

PERFORMANCE DETERMINANTS OF AGRICULTURAL EXTENSION
ORGANIZATIONS OF BANGLADESH

BY

MOHAMMAD HASSANULLAH

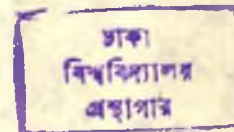
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ON
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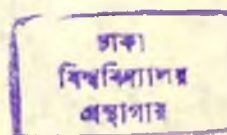
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ABSTRACT

Title: Performance Determinants of Agricultural Extension Organizations of Bangladesh

Performance of Agricultural Extension Organizations of Bangladesh was evaluated by using a proposed AKSTPILL Model representing aggregate attainments of professional goals of extension work viz. attitude change, knowledge transfer, skill development, technologies diffusion, productivity bincrease, income increase and level of living improvement among their clients. The model was tested in two selected organizations, namely Department of Agricultural Extension and Directorate of Cane Development and Research taking a sample of 887 farmers and 437 service personnel across different hierarchies of the organizations. The findings showed that agricultural extension organizations of Bangladesh had been performing about two-fifth of the potential level with significant variation among primary administrative units, the Upazillas and Subzones. The extension organizations of Bangladesh succeeded to attain the potential level of their professional goals of attitude change, knowledge transfer, skill development technology diffusion, productivity increase, income increase and level of living improvement at the rate of 4.83%, 1.75%, 1.95%, 2.45%, 1.11%, 1.22% and 0.40% respectively. The overall performance increased at the rate of 2.25% per year. The relationships between the attainment of behavioral goals was circular, so also the relationships among attainment of economic goals. The chain of relationship was found to be broken between the attainment of behavioral and economic goals, possibly due to program deficiency.

The determinants of performance were searched out by using a model of management, a proposed net-work of macro systems and processes viz. model of extension work, environment, strategy, management, staff and resources. The findings showed that level of performance was significantly contributed by environment and staff. Models of extension work (T&V and others), strategy, management and resources had circular relationships and has failed to influence on staff or on performance of the organizations significantly. The failure was attributed to the pull of opposite influences of individual discrete Variables on the performance and the attainments of different goals of the organizations. Maximization of performance depends on rationalization of discrete Variables of different systems and processes so as to generate the greatest synergy inside the organization. The Variables, which need minimization, optimization or maximization were identified. Improvement along the critical path of model of extension work-resource-management-staff are likely to provide the greatest opportunity for maximizing the performance of the organizations.

PREFACE

Management research basically aims at evaluating performance of organizations to make them more effective. Efforts have generally been made to analyze a single or selected aspects of the organizations and postulate models or formulate principles for improving performance and its related phenomena. Such studies focus only on a part of the process of management and provide tools which are found to be inadequate.

This study is an in-depth inquiry of all major aspects of environment, strategy, management, staff, resource and performance variables to evaluate current state of achievements and identify models of maximizing performance of agricultural extension organizations of Bangladesh. It includes random samples of 887 farmers and 437 service personnel of 64 villages of 64 Blocks and Cane Development Units of 20 Upazillas and 12 Subzones under 6 greater districts and 4 Sugarmill Zones of Bangladesh selected through stratified sampling procedure from two selected organizations, namely Department of Agricultural Extension under the Ministry of Agriculture and Directorate of Cane Development and Research of Bangladesh Sugar and Food Industries Corporation under the Ministry of Industry.

Performance was the dependent variable, aggeragative of the attainment of 7 professional goals of extension work, namely attitude change, knowledge transfer, technology diffusion, productivity increase, income increase and level of living improvement. There were 92 discrete, 25 aggeragative and 2 dummy

independent variables. The magnitude, variability and interrelationships of dependent and independent variables were studied to find out their emergent nature. Factor contributions of all independent variables to performance as well as attainment of different goals were estimated at individual as well as at micro, macro and global levels of interaction and aggregation. Two models namely a performance evaluation and a management models were tested. In this process 5 major, 20 minor and 92 supporting hypotheses were tested. Thesis was presented as follows :

PART A : BACKGROUND, OBJECTIVES AND PERSPECTIVE

Part A contains theoretical and empirical background and objectives and were presented in two chapters. Chapter I sets the background, need and objectives of the study. Chapter II contains reviews of available literature relating to performance and its determinants of business, health and social service, and agricultural extension organizations to clarify relevent concepts and methodologies.

PART B METHODOLOGY

Part B is devoted to a discussion of research Methodologies. Based on the literature review a theoretical framework of the study was postulated and presented in Chapter III including model assemptions, and relevent major, minor and supporting hypthises. The survey and analytical design of the study were presented in Chapter IV which contains sampling, survey and analytical

procedures. The empirical specification of model variables and validation of their measurements, where necessary, were presented in Chapter V.

PART C : PERFORMANCE, AND ITS MICRO MODELS

Part C contains the estimate of performance and the results of intermediate analysis containing micro and macro models of performance maximization which were presented in Chapter VI to XI. The magnitude and variability of performance as well as the attainment of goals of attitude change, knowledge transfer, technology diffusion, productivity increase, income increase and level of living improvement among primary administrative units, Upazillas and Subzones, were presented in Chapter VI. It also contains the empirical test of the proposed AKSTPILL Model of performance evaluation which was used in this study. The model represents the attainment of 7 professional goals such as attitude change, knowledge transfer, skill development, technology diffusion, productivity increase, income increase and level of living improvement. Chapter VII to XI contain magnitude and variability of all discrete variables of environment, strategy, management, staff and resources respectively and their associations and/or factor contributions to performance as well as goal attainments at micro and macro levels of interaction and aggregation.

PART D : GLOBAL MODELS OF PERFORMANCES

Part D contains models for maximizing performance as well as goal attainments in a total interacting situation. Chapter XII

presents regression models for maximizing performance as well as attainment of each of the 7 professional goals at global level of interaction of discrete and aggregate system and process variables. The chapter also describes the extent of change in total explanatory power as well as individual factor contributions to the performance due to different levels of aggregation and interactions. Empirical test of management model for maximizing performance as postulated in the theoretical framework of the study was presented in Chapter XIII. It also contains path analysis to identify critical path for quick improvement of management including rationalization of the magnitudes of variables to generate positive energy for maximizing performance.

PART E :SUMMARY, BIBLIOGRAPHY AND APPENDICES

In part E summary, bibliography and appendices were presented. For quick review each Chapter has a brief summary at the end. An overall summary of the research was presented in Chapter XIV. Following the Bibliography all preliminary informations about organizations, technologies, english version of the questionnaires and schedules and major analytical outputs were appended.

PART A : BACKGROUND, OBJECTIVES AND PERSPECTIVE

CHAPTER I : INTRODUCTION

CHAPTER II : REVIEW OF LITURATURE

I. INTRODUCTION*

Background¹

Agricultural extension organizations of Bangladesh² has been emerged as massive public services with an enormous manpower. They are engaged in modernizing agriculture, the most significant sector for growth and development of the country, with particular relevance to rural people who constitute 84.8% of the total population. Performance of agricultural extension organizations is therefore critically important. Efforts have been made, time and again, to improve their performances through changes of structures and functions as well as their orientations,

¹The statistical data in this section were collected from: Statistical Year Book of Bangladesh, 1983-84, Bangladesh Bureau of Statistics. GOB, Dhaka, Dec. 1984.

²Bangladesh, liberated to become an independent nation in 1971 is located between 20.34 to 26.38 degree N latitude and 88.01 degree to 92.41 degree E Longitudinal axis (Map 1). The area of Bangladesh is 143,778th square kilometers, 65% of which is arable. About 85% of the area is flat alluvial plain crisscrossed by mighty rivers, the Ganges, the Brahmaputra and the Meghna and their numerous tributaries. The delta is one of the largest in the world, which after the deposition of rich alluvial soil provides very fertile land. It enjoys a sub-tropical monsoon climate. It has a population of about 100 million, projected to be 139.7 million by the end of this century. With the exception of natural gas the country has no other proven and/or exploitable mineral resources of significance. Agriculture thus provides economically and otherwise the most meaningful avenue for growth and development of the country. Administratively the country is divided into four Divisions, 64 Districts, 493 Upazillas/Thanas, 4472 Unions and 85,650 villages. An Upazilla is the lowest administrative unit currently having an elected local government for planning and implementation of local development projects.

approaches and methods. In this endeavor a number of overseas donor agencies have been providing significant assistance. Yet, as the analysis shows, the prevailing socio-economic conditions and the outcome of the past and the current development efforts do not indicate a level of performance that is expected from these organizations: their manpower, infrastructure and use of resources.

Bangladesh Economy and Current Development Efforts

The economy of Bangladesh is characterized by high population density (658 per sq. km), high population growth rate (2.32% per annum), high infant mortality (118 per 1000 life birth) with low life expectancy (54.4 yrs), predominantly rural (84.8% live in rural areas and 79.4% labor force employed in agriculture), poor health and sanitation, rampant unemployment (30%) and under employment, low educational level (23.8%), critical shortage of skilled manpower and entrepreneurship, low agricultural and industrial productivity, exploitative agrarian structure, wide and increasing inequality of income, wealth and opportunities, severe inflationary pressures, absence of appropriate policy and institutional framework for mobilization of domestic resources for the promotion of non-farm activities and allegedly wide spread corruption.

Development efforts during the recently concluded Second Five Year Plan did not produce the desired results. The economy

in fact has failed to achieve targets in agriculture, industry and other fields (Sayeduzzaman, 1985). The annual growth rate of overall GDP was 3.8% as against the target of 5.4% and the tax-GDP ratio was 8.3% as against 9.5%. The industrial growth rate was 4.3% as against the target of 8.4%. Foreign aid receipt was 16% below the estimated amount. Agricultural growth rate was 3.6% as against the target of 5.0% with food production reaching 15.8 as against the target of 17.5 million tons. Jute production was 25.0% below the target, with export being 7.0% as against the target of 8.6%. The index of family planning acceptance remained as one-third of the target level.

The failure to achieve development targets was largely attributed to the declining growth in agriculture. The growth rate of agriculture declined from 4.7% (1982-83) to 3.6% (1983-84) to 3.1% (1984-85) resulting in increasing food deficit and consequently increasingly more import of food grain. Due to the reduced production of jute, sugarcane and other agro-industrial commodities the growth rate of the industrial sector particularly those of agro-based industries remained unsatisfactory. The annual growth of agriculture not only declined but also fluctuated violently from 0.6% to 7.1% depending on the climatic conditions. The failure was attributed to adverse climate, recession and stagnation in the industrial countries which were beyond the control of the government.

Need and Potential for Agricultural Development

Agriculture is still the back-bone of the Bangladesh economy, as it accounts for close to 50% GDP and employs about 80% of labor force. It provides the bulk of raw materials to the agro-based industries such as sugar, food, jute, textile, tea and leather, and agriculture shares about 87% of all exports (World Bank, 1985, p.2). Therefore, agricultural development is crucial to provide food for its enormously large and growing population, to maintain a minimum level of living and to provide labor and capital to the very poorly developed industrial and service sectors of her economy.

With recently developed technologies the growth potential of agriculture seems to be very high in Bangladesh both in terms of cropping intensity and per unit production. Crop production studies revealed that the HYV seeds, fertilizers, irrigation could significantly increase agricultural productivity. The findings from various sources may be summarized in Table-1.

It appears that the growth potentials of major crops are two to three times more than the present levels of production. The same was true for other agricultural commodities. Therefore, agriculture has the greatest potential to provide increased production helping to reduce food deficit and the shortage of industrial raw materials, and provide employment opportunity with reasonable income for attaining a better level of living of the

majority of people who live in villages. Because of the increased productivity and income as well as self reliance in food, a more desirable socio-economic and institutional framework could emerge as part of the development process. Thus the country's survival and growth, primarily depend on agricultural development. But much of the development potential, remained unrealized.

Table 1: Production Potential of Major Crops of Bangladesh

Technologies	Yield per Acre of Different Crops (in Mds/Acre)				
	Aus	Aman	Boro	Wheat	Sugarcane
Traditional Technologies	12	13	29	11	400
Modern Technologies	45	35	55	40	800

Source: M. Hassanullah, 1985. "Economic Organization of Bangladesh Agriculture". JMBE, 10(2): 222-260

The failure to achieve a desired level of agricultural development, though attributed to the conditions which were beyond human or local institutional control, is in fact largely due to very low rate of diffusion of new and improved technologies of production and family living. Irrigation was extended to only 21.46% of the net cropped area. Only 4%, 10% and 54% of cultivable land was brought under HYV Aus, Aman and Boro cultivation respectively. Per acre use of balanced plant nutrients was very low, although quantitatively the distribution of chemical fertilizers increased manifold. It may be recalled that the failure in achieving the food production target in the

First Five Year Plan was attributed to failure in achieving the input distribution targets. Only 62%, 25% and 29% of target level were achieved for distribution of fertilizers, HYV seeds and irrigation respectively (Hashem, 1978). This indicates that the use of improved husbandry principles and practices even now is far too inadequate to produce desirable output from the use of improved inputs. The use of improved technologies for other agricultural commodities like fruit, vegetables, poultry and cattle, fisheries, etc. was also negligible. The adoption and diffusion of improved agro-technologies seem to have potential for increasing productivity and thus for better level of living among the farming community of Bangladesh.

A desired level of diffusion of more productive technologies in all subsectors of agriculture could not be achieved. This suggests that the agricultural extension organizations may have failed to play their expected roles effectively in helping farmers change their socio-economic conditions. The inadequacies of agricultural extension organizations have been implicitly endorsed as reorganization of service delivery systems in agriculture and decentralized administration at Upazilla level were emphasized in formulating the Third Year Plan.

Importance and Growth of Agricultural Extension Services

Importance of Agricultural Extension Services

In view of the prevailing poor socio-economic conditions, despite high potential for agricultural growth and development, no country needs a more rapid rate of progress than does Bangladesh. Continued progress requires continuous identification, adoption and diffusion of new and better production technologies in order to maintain an ever increasing rate of productivity that helps to improve quality of life. However the diffusion of innovations is an educational process. The rate of acceptance and continued use of innovations depends largely on (1) how quickly and adequately the potential users get opportunity of learning about the use of innovations and are convinced of their benefits and (2) how adequately they develop skills in using the innovations in real life situation. Here in lies the importance of extension service to educate the farming community about the newly developed science and technologies of production and living.

The need for the skillful application of science and technologies in agriculture was recognized long ago. Research institutions were organized to experiment and discover new and improved production technologies. As a result a large number of innovations have been pouring into the treasure of technological knowledge, but the rate of their diffusion among the potential users has been far too slow. Experience shows that farmers in

practice have hardly been able to exploit one third of the production potential of newly invented crop varieties because of inadequate knowledge and skills for applying new technologies of their cultivation. Effective extension service could help farmers reduce this gap and create appropriate physical and social infrastructure to achieve a more rapid rate of growth and development which would in turn result in more satisfying level of living.

Growth of Agricultural Extension Services

Agricultural extension organization had a long historical background and passed through different stages of growth. Five stages are identified, namely (a) initiation, (b) expansion, (c) gestation, (d) dispersion, and (e) consolidation. The important events of all phases of growth with their main characteristics have been presented chronologically in Table-2.

Analysis of growth process reveals that primary institutions for extension work were created very slowly and were aimed at serving the colonial interests of export of raw materials for industries abroad. It is interesting to note that need for disseminating scientific informations and help solve the farmers problem was felt by philanthropists quite a long time ago (1820). But it took almost a century to appoint public extension agents.

Table - 2 : Growth Phases of Agricultural Extension Services of Bangladesh

Phase	Year	Events and Characteristic Features
Period of Initiation 1820-1950	1820	Establishment of Agri-horticultural Society: a private institution for discussing problems and people to adopt improved methods of cultivation.
	1865	Department of Forestry to look after forest reservations
	1869	Demand for Department of Agriculture by Cotton Supply Association of Manchester to ensure supply of industrial raw materials, particularly of cotton in that case.
	1871	Creation of Agriculture Sector under the Department of Revenue, Agriculture and Commerce of undivided India.
	1880	Famine Commission's Report : Recommending creation of independent Department of Agriculture of both Central and Provincial Governments simultaneously.
	1889	Establishment of Civil Veterinary Department for treatment of animals.
	1891	Voelckers Report : Suggesting lines of agricultural improvements.
	1905	Establishment of Provincial Department of Agriculture with a Directorate of Agriculture
	1914	Appointment of District Agricultural Officers and Establishment of District Demonstration Farms, for dissemination of technological information.
	1939	Creation of Jute Regulation Department to control area of jute cultivation as means of price stabilization.
	1942	Creation of Directorate of Fisheries primarily looking after open water fisheries and execution of fishing acts.
1947	Independence of India : With partitioning India as India and Pakistan.	

Phase	Year	Events and Characteristic Features
Period of Expansion 1951-1962	1951	Abolition and Absorption of Jute Regulation Department with Directorate of Agriculture.
	1954	Establishment of V-Aid Program (National Development Organization) as an integrated extension program for farm, home and youth development.
	1956	Creation of Department of Plant Protection to combat pest attack and execute pesticide law.
	1959	Establishment of Bangladesh Academy for Rural Development (BARD) to experiment and evolve a more effective system of rural development.
	1959	Creation of Directorate of Land and Water Use under EPWAPDA to organize farmers of irrigation installations and encourage water use.
	1961	Establishment of BAU and Creation of Department of Agricultural Extension and Teachers Training. A beginning of research and teaching of agricultural extension
	1961	Creation of Directorate of Agricultural Marketing for market intelligence and improvement of rural markets.
	1961	Creation of East Pakistan Agricultural Development Corporation for production, distribution and marketing of agricultural inputs.
	1961	Abolition of NDC (V-AID) and absorption of personnel in the Directorate of Agriculture
	1961	Creation of Fisheries Extension Service for improvement of private pond fisheries.
	1962	Establishment of Agricultural Information Service to collect and disseminate agricultural information.
Period of Gestation 1963-1972	1965	Completion of handing over input function to EPADC (Now BADC)
	1967	Birth of Artificial Insemination and Fodder cultivation program

Phase	Year	Events and Characteristic Features
	1968	Establishment of Agricultural Development Estates of EPADC for promoting vegetable and fruit production around 4 big cities
	1968	Bifercation of Agricultural Extension and Research as Separate Directorates to give intensive efforts to both research and extension functions.
	1971	Liberation war and emergence of independent Bangladesh.
Period of Dispersion 1973-1981	1974	Intensive jute cultivation scheme for increasing jute production through providing inputs, credit, marketing, farmer organization and extension.
	1974	Creation of Horticultural Development Board for improvement of horticultural crops through supply of seeds and saplings from production centers
	1974	Creation of Tobacco Development Board to improve cultivation of virginia tobacco for cigarette as import substitute.
	1976	Establishment of Sugarcane Extension Service for ensuring cane supply to sugar mills by providing input, credit, marketing and extension services to cane growers.
	1977	Establishment of Cotton Development board to introduce cotton cultivation as import substitution by integrating input, credit, marketing and extension functions.
	1977	Creation of forest Extension Circle to promote community forestry and supply of seedlings for farm forest trees
	1977	Strengthening Fisheries Extension Service to provide additional manpower and facilities for fishery extension work.
	1978	Establishment of Bangladesh Tea Board integrating research and development functions for the tea planters.
	1978	Establishment of Bangladesh Sericulture Board integrating research, extension credit and marketing of silk worms.

Phase	Year	Events and Characteristic Features
	1979	Introduction of T&V System in DA (E&M) as a new approach in agricultural extension work.
	1979	Introduction of equitable salary structure for public servants which begin to attract talents in the agricultural professional activities.
Period of Consolidation 1982 onwards	1982	Adoption of T&V System all over the country as an effective system of extension work
	1982	Introduction of Upazilla system for decentralized administration and public participation.
	1982	Establishment of Department of Agricultural Extension to Strengthen Agricultural Extension System.
	1983	Integration of six crop based extension organizations with DAE (Jute, tobacco, cotton, horticulture, plant protection, land and water use) as an integrated system.
	1983	Feeds and fodder production extension project to improve livestock production.
	1984	Intensification of Fishery Extension Service

By the end of British rule the basic institutional structures for extension work in crop, livestock, forest and fisheries had been created.

Great expansion of extension services occurred during 1951 to 1962. Department of Agricultural Extension stretched upto village level through merger of abolished jute regulation department. Parallel to agricultural extension a system of multi-discipline extension work, the V-AID was created upto village level with great enthusiasm and expectation. Agricultural Development Corporation was created to relieve extension systems from input function. Extension work expanded to some specialized fields like plant protection, water management, marketing, etc. Research and studies on extension and rural development also began.

Handing over input and credit functions the Directorate of Agriculture has spent a period of gestation for almost a decade. This situation lead to creation of some more specialized services like fisheries extension service, agricultural information service as well as some important specialized schemes. To overcome the inactiveness research and extension functions were separated in 1968 granting extension an independent status of a service. Meanwhile Integrated Rural Development Program was developed to integrate development functions dispersed under different organizations and ministries soon after Bangladesh emerged as a new and independent nation.

In consistent to hopes and aspiration of a new nation specialized commodity-wise development agencies were created to boost up production of major crops like jute, sugarcane, tobacco, horticulture, tea, rubber, etc. This dispersion of extension function made the newly created Directorate of Agriculture (Extension and Management) further inactive. Efforts were then made to reactivate it through introduction of Training and Visit system of extension work.

Extreme dispersion lead to integration of major crop sector organizations as full-fledged Department of Agricultural Extension through World Bank Assistance Program in early eighties. But proliferation of organizations continued in other sub-sectors of agriculture like livestock, forest and fisheries. However a period of consolidation began.

A Critical Review of Extension Services

It appears that a massive organizational base has emerged to bring about desired level of socio-economic changes in the rural communities of Bangladesh. There were attempts to improve the effectiveness of agricultural extension services through a variety of administrative measures taken at different times. In the early fifties a tendency grew to develop specialized agencies for each broad area of activities in all sectors of the economy as a means to give more attention to specific area of activity and as an alternate institutional arrangement for more effective work. In the crop sector of agriculture a second stage of

specialization occurred in the seventies resulting in the development of individual crop based extension organizations for almost all major crops.

Proliferation of extension organizations in different sectors of rural development activities created complex problems of cooperation and coordination. It resulted in the duplication of work, conflict and contradictions. The under use of scarce human and capital resources were manifested in their poor performance. An unbalance in resource use was also created and regional inequality in productivity occurred because of wrong priorities and emphasis. Clients were drifting from organization to organization for better terms of services and had to spend much of their productive time to meet their various needs. Islam (1978, PP. 342-351) observed :

"Bangladesh has many extension services, some-times in the same area for different enterprises under the same or different agencies or ministries. The ultimate result is occasional confusion and chaos instead of enlightments among the farmers due to competing claims and counter claims by multiplicity of extension agencies in order to impress upon their clients. The cumulative effect of such multiple extension services has been disastrous."

In the late seventies it was realized that narrower specialization escalated the cost of services with little improvement in effectiveness. Eventually the problem of multiple extension services became a national concern. The World Bank highlighted the problem and made it mandatory to merge at least six crop based extension organizations namely, the Directorate of Agriculture (Extension and Management), the Directorate of plant protection, the Directorate of Agriculture (Jute Production), the Tobacco Development Board, the Directorate of Land and Water Use

and the Horticultural Development Board as a partial and first step towards a total reorganization. What should be the level of specialization within an extension system is still a controversial issue. In any circumstance some mechanism of integration is certainly necessary at the operational level. The government has recently established an Upazilla level administrative system for effective local control and coordination under the guidance and supervision of an elected local government.

Parallel to the development of narrower specialization extension, input and credit functions were separated and integrated several times. The arguments for integration is based on the concept that extension agents without having the scope of providing some material assistance are generally ignored by the clients resulting failure to achieve the desired level of technological changes. The counter argument is that extension, input and credit functions are mutually incompatible resulting in role conflict and eventually poor performance. some believe that there is "vacuum" of goods and services in the rural areas and extension is to fill up the vacuum (Mosher, 1978, pp. 5-6). Extension therefore, assumed the responsibilities of a number of services which are often mutually in-compatible affecting their performance.

The operational base of extension organization also shifted from the district demonstration farms to the Thanas, (now Upazillas) to the unions and finally to the blocks resulting in

smaller and smaller working units. The argument is that the smaller the units, greater the direct contact and hence higher would be the performance of the organizations. Then intensive crop development programs were therefore organized with very smaller working units from the very inception of those programs. The working units were based on either a geographical area, area of cultivation of a crop or a number of families per extension workers. The variation is wide and were likely to affect performance of the organizations.

As the size of the operational units has become smaller, the manpower as well as resource need has been increasing tremendously. Consequently, less qualified people are being employed with little or no logistic support. The employment of low qualified grassroots level of workers is often justified by the concept of homophily which is presumed to be the best for effective communication. Some of the NGOs have been organizing their work on the basis of a village or a small group of selected persons and are employing graduates or masters of general science and arts with higher salary and logistic support. Some argue that professional qualification is not required to be a change agent at the grass root level, while others argue that professional education is a prerequisite for better performance. The arguments are generally based on ideas having no tested empirical validity.

It is now widely felt that the extension agents are poorly educated to advice the adult experienced clients. Hence, they must be trained for effective extension work. A variety of

approaches have been adopted to augment knowledge and skills of extension agents. A massive in-service training program of different duration ranging from 2 years basic certificate course to fortnightly one day rotational training have been organized by either specialized trainers in a training institute, the subject matter specialists at supervisory level or by the immediate supervisors themselves.

Similarly, the organization structure, span of supervision, task structure, authority and power of individual positions of different organizations have wide variation and are generally determined and vested as thumb rule. Their impact was hardly evaluated empirically. In a comparative study of eight village based agricultural extension organizations it was found that the organizations varied widely in terms of 21 selected major management variables including use of capital resources (Hassanullah, 1982). It is not unlikely that these variations might have caused variable performances among the organizations.

Similar to the organizational structure, function, staff quality and resources, the management strategies and approaches have also been frequently changed in a bid for improving performance. At the beginning of extension work (1914) the role of extension agents was exclusively educational. With the introduction of modern inputs like improved seeds, fertilizers, biocides, irrigation, mechanization, etc. the input and credit functions of extension agents became prominent. But the working approach remained unchanged until the involvement of the World

Bank in early seventies when Training and Visit model was adopted by general agricultural extension as well as some other crop based organizations, (e.g. jute) abandoning earlier models of service delivery or advisory service. The model farmer model was also introduced in some organizations. Some organizations like Sugarcane Extension Service attempted to transplant extension education model in the prevailing service delivery model. There is wide variation in operation because of purity of any one model has not been achieved. The adopted models have also caused problems of effectiveness among the extension services.

At the height of these shifts in models the direct contact with clients remained selective and varied according to a particular model. These different models were not empirically validated. The shifts in models were also not comparatively tested except for periodic program evaluation. The commodity production programs as well as the non-government organization (NGOs) retained their service delivery model. Some of the NGOs however switched over to Paulo Freire's model of adult education which has been designed to develop "critical consciousness" along with the supply of some kind of inputs as relief goods or sold on cash or credit at market or subsidized prices.

It was latter realized that no organization could be effective in attaining their goals through diffusing fewer technologies. Consequently agricultural extension is advising about home development and population control, fishery extension is integrating horticulture in their program of pond development, sugarcane extension is expanding its program to inter-crops for

effective cane development work. The narrower or wider technological base was affecting the performance.

Thus the extension work in Bangladesh has passed through many trials and errors. Alternative concepts and methods of extension work and program management were introduced at different times without proper examination of their validity, resulting the existence of opposite forces which are likely to make management ineffective to generate greater synergy within the organizations affecting their performance. This ambivalence must be resolved to make a rational approach for their effective performance. Unless this is done, complexity will be increased and the operating personnel will continue to be confused resulting low performance.

Need and Objectives of the Study

Need for the Study

The study of organizational performance is aimed at creating understanding of the factors that help or hinder the members of an organization in maximizing the performance in a given environment. It appears to flow in two directions, universality and contingency approaches. The former argues that irrespective of circumstances and functions certain factors universally determine the level of organizational performance. The other maintains that the performance of an organization is contingent upon many situational and organizational dimensions. Nevertheless both views assumed that it is possible to identify the factors

either contingent or universal that would determine the level of performance of an organization (Child, 1974, p.2). The effect of such factors may however vary with the objective, size, clients and other characteristics of a particular organization or group or similar organizations. A precise understanding of the explanatory variables as related to the organizational performance can help the executives manage them successfully.

In manufacturing and trade organizations a wide range of researches have been carried out to understand this phenomenon and identify the variables that would influence it either positively or negatively. Research on organizational performance has also been extended to health, social and family planning programs. Although not conclusive, these studies have helped to create better understanding and to direct attention of the program administrators to those variables which seemed to have influence on the overall performances of such organizations.

Study of organizational performance has hardly been carried out in agricultural extension organizations except for some performance evaluations in certain program context. Most research studies on extension organizations are related to those client characteristics which were thought to be promoting or impeding technological diffusion. Some studies have attempted to identify those attributes that might help improve the success of individual extension agents. In the absence of such studies very little is known about the forces that regulate the level of performance of extension organizations as a whole particularly in

the context of Bangladesh. Consequently alternative concepts and methods were tried based on rules of thumb which have had little success. It is a costly endeavor to undertake trial and error in respect of the management of an organization which has a definite goal of providing services to millions of clients. It is now time to examine the environmental and organizational dimensions and their relationships in order to construct models which will produce predictable results.

This study is as such of utmost importance to develop insight into the phenomenon of organizational performance and meet prevailing knowledge gap in the field of management of Agricultural Extension services which play a critical role in the process of socio-economic development of the country.

Objectives of the Study

The primary purpose of this study is to evolve models of maximising organizational performance in the field of Agricultural Extension. Keeping this purpose in view the specific objectives of the study are :

1. To postulate a model of performance evaluation for Agricultural Extension organizations and test it.
2. To design and test the methodology of measuring the organizational variables in the field of Agricultural Extension services and test their validity for future use.

3. To estimate the magnitude and variability of performance among primary administrative units of different Agricultural Extension organizations.
4. To examine the interrelationships among the organizational variables and identify the variables having significant influences on the performance of Agricultural Extension organizations.
5. To estimate the factor contributions of individual discrete and aggregate system and process variables at different levels of interaction so as to identify significant contributors of performance of Agricultural Extension organizations, and
6. To construct models of management that would maximise the performance of Agricultural Extension organizations.

Summary

Socio-economic parameters indicate a poor picture of the Bangladesh economy. The past and current development efforts failed to bring desirable changes in all sectors. The failure is attributed to declining and fluctuating growth in Agriculture, though its growth and development potential is very high. The failure is generally explained in terms of economic forces which were beyond human and local institutional control. But the fact remains that rate of use of the new and improved technologies of Agricultural production is too low to achieve a desired level of agricultural production and improvement of level of living of

rural people. It bears the evidences of poor performance of Agricultural Extension services. Over a period of a century Agricultural Extension organizations have gradually been emerged with massive organization and manpower. The government has been endeavoring to improve their performances with the assistance of a number of overseas donor agencies. Efforts have been made to improve their performances through changes of structures and functions as well as their orientations, approaches and methods but with little success. Changes were introduced one after another without abandoning the one introduced earlier. The emergent dimensions of design and operation of the organizations is therefore likely to create an internal condition of inconsistency and contradictions which might have resulted in poor performance.

It is therefore an important issue for an in-depth inquiry as the Agricultural Extension organizations have been playing a critical role in helping millions of rural people to modernize agriculture and live a more satisfying life. This study has therefore been undertaken to (1) postulate and test an appropriate performance evaluation model, (2) estimate magnitude and variability in performance among operational units of the organizations, (3) design and test the methodology of measuring organizational variables, (4) measure the magnitude and variability of organizational variables, (5) measure their contributions to performance at different levels of aggregations and interactions, and (6) design models of management that would maximize their performance in the context of Bangladesh.

II. REVIEW OF LITERATURE

Introduction

Performance of an organization has problems of conceptualization. The term may be variously perceived depending on one's orientation, purpose and field of investigation. Relevant literature have been reviewed to clarify the concepts of performance and the factors that are likely to influence it. Research on organizational performance is relatively a new pursuit in the field of management of agricultural extension organizations and is likely to be deficient in conceptual clarity. Hence review of relevant literature from other functional fields of management may help develop better understanding about the concept of performance, its determinants, and help construct more appropriate models of performance evaluation and management of the organizations engaged in agriculture extension work. An attempt has therefore been made first to clarify the concept of performance in business and health and social services as well as in agricultural extension organizations. Secondly the available literature have been reviewed to identify the variables which were found to have influence on the performance of the organizations engaged in different fields of activities.

Concept of Performance

The perspectives, models and measures of organizational

performance as used by different authors have been presented chronologically in Table-3. It appears that organizational performance is perceived in many ways and a wide range of indicators are used either singly or in combinations to measure the level of performance of an organization, such as productivity, profitability, volume of business, job satisfaction, morale, absenteeism, etc. across different types of organizations. All of them may be perceived as different dimensions of performance and multidimensional approach is often advocated (Ferrell, 1979, p.259). Concepts of performance as used in different functional fields of management have been reviewed to postulate a model of performance as appropriate to agricultural extension organizations.

Business Organizations

In business, organizational performance has been often equated with effectiveness and are measured by different dimensions of organizations (Georgopolos and Tannenbaum, 1957; Spray, 1976; Evan, 1976; Snow and Hrebiniak, 1980). At the earliest Parsons (1956) suggested to take society rather than the organization itself as the basis of studying organizational effectiveness, because any organization produces goods and services to meet the needs of the society. But subsequently

Table-3: List of Recent Studies on the Concept of Organizational Performance

Author	Year	Perspective/Model	Performance Variables
A. Business Organizations			
i) Review Studies			
Parsons	1956	Society: Goal	Social change, client behavior
Etzioni	1960	Organization: Resource optimization	Balance resource distribution among goals
Pugh, et.al	1963	Organization: Structural-Functional	Profitability, productivity, market share, morale
Price	1968	Organization: Goal	Effectiveness in terms of goal attainments
Evan	1976	Organization: System	Ratio between input, output, transformation and feedback
Child	1977	Society: Customer behavior	Customer likings and satisfaction, cost effectiveness
Ferrell	1979	Organization: Conflict	Stress, hostility, tension, anxiety
Stoner	1982	Society: Goal	Efficiency and effectiveness
ii) Empirical Studies			
Georgopoulos & Tannenbaum	1957	Organization: means and ends	Productivity, flexibility, inter organizational strain
Kaczka & Krik	1967	Organization: Behavioral	Profit, sales, ratio of sales to inventory, cost, group pressure, and group cohesion
Mohney & Weitzel	1969	Organization: System	Flexibility, development, cohesion, democratic supervision (24 structural functional dimensions)
Hirsch	1975	Organization: Control	Control on environment, pricing, distribution, patent, copy right
Pennings	1976	Organization: System	Production, loss, morale, anxiety

Author	Year	Perspective/Model	Performance Variables
Khandwalla	1977	Organization: Goal	Profitability, stability of profitability, growth rate (revenue)
Warmington, et.al.	1977	Organization: Socio-technical system	Behavioral, technical and financial dimensions
Snow & Hrebinaik	1981	Organization: Functional behavioral	Managerial perception of general and financial performance
Herbert	1981	Organization: System	Profitability, productivity satisfaction, turnover, absenteeism
Haque	1985	Organization: Goal	Output, sales, productivity

B. Health and Social Services

- i) Review Studies None
- ii) Empirical Studies

Tannenbaum	1961	Organization: Goal	Goal attainment, means and resource preservation
Bowers	1964	Organization: System	Growth, cost, volume of business, manpower, turnover, etc.
Seashore & Yuchtman	1967	Organization: Resource Optimization	Business volume, cost, labor, labor productivity
Steward	1976	Organization: Goal	Prescribed and derived goals as perceived by organizational members
Coulter	1979	Organization: Goal	Productivity
Glison	1980	Organization: Structural behavioral	Productivity, efficiency
Mosleuddin, et.al.	1987	Society: Goal	Behavioral changes

C. Agricultural Extension Services

- i) Review Studies

Van dan Ban	1963	Society: Goal	Change in clients income, technology used, client participation
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Author	Year	Perspective/Model	Performance Variables
Roling	1974	Society: Input-output	Clients behavioral change, change of productivity and income

ii) Empirical Studies

Cernea & Tepping	1977	Organization: Behavioral Functional	Clients exposure, contact, technology diffusion, staff behavior, training
Dan, et.al	1967	Organization: Functional	Value and Number of activities (Behavioral setting genotype)
Warner, et.al	1975	Organization: Goal	Achievement of national goals (30 goals)
Ekpere	1976	Organization: Functional	Number of educational activities: meetings, demonstration, etc.
Bennett	1977	Society: Goal	Inputs, activities, client participation, technology diffusion, client reaction, KASA change, productivity.
Young & cunninghem	1977	Organization: System	Clients action toward means and ends of extension
Singh & Bhuller	1979	Society: Goal	Productivity
Singh & Kaur	1986	Society: Goal	Productivity, behavioral changes
Agnihotri	1988	Society: Goal	Productivity

models were developed to evaluate performance which also integrate organizational dimensions.

Etzioni (1960) identified four general models of organizational analysis: (1) system, (2) goal, (3) survival, and (4) effectiveness models in which goals and effectiveness were perceived as alternative concepts. He defined effectiveness as the pattern of relationship among the elements of a system which would make the organization more effective in accomplishing a given goal. Georgopolus and Tannenbaum (1957) equated effectiveness and performance and measured it in terms of subjective judgment. To them the concept of effectiveness subsumes the concept of productivity, flexibility and conflict. Pugh, et.al. (1963) identified productivity, profitability, morale, etc. as performance variables. Kaczka and Krik (1967) identified profit, sales, ratio to sales and inventory, unit cost, group pressure and cohesion as performance measures. Mahoney and Weitzel (1969) identified 24 organizational dimensions relating to input, output and thorough put as dimensions of organizational effectiveness. Pennings (1976) identified 5 indicators of effectiveness such as production, production decline, financial loss, morale and anxiety. Hirsch (1975) took profitability as an indicator of performance of pharmaceutical manufacturing firms and phonograph recording companies. In reviewing the research traditions Evans (1976) equated effectiveness and performance and reported failure to adequately associate organizational dimensions and performance. Warmington, et.al. (1977) viewed organization as socio-technical

systems and differentiated its performance as technical and behavioral performance. Child (1977, p.150) defined performance as a function of value placed upon its activities by customers and clients and cost effectiveness with which the output is produced. Stoner (1982) equated organizational performance as job accomplishment. Effectiveness and efficiency were perceived as two components of performance. The former was thought of doing the job correctly and the latter as choosing appropriate objectives to pursue. Earlier Price (1968, p.3) defined effectiveness as degree of goal achievement. Brevord (1978) reviewed and identified 17 different criteria generally used to evaluate organizational effectiveness with little or no overlap and opined goal optimization as an appropriate model of organizational effectiveness. On studying 103 manufacturing industries of Canada, Khandawalla (1977) defined performance as by both objectives and subjectively rated criteria of performance goal attainment and measured the level of performance. Both measures had significant correlation. Herbert (1981, p.53) considered organizational effectiveness as goal attainment and measured in terms of profitability, return on assets, productivity, cost, efficiency, adaptiveness, employment, satisfaction, turnover rates, absenteeism, grievance rate, work days lost and employee development. Similar criteria were used by Haque (1985) in evaluating performance of Jute Industries of Bangladesh.

Health and Social Services

Unlike business organizations health and social service organizations operate in different organizational climate and pursue goals which are mostly intangible and quality of service receives priority over productivity or profitability. In this circumstances the approaches were also diversified. In evaluating the performance of local leagues, a voluntary organization, Tannenbaum (1961) equated performance with effectiveness and defined it as the extent to which an organization would fulfill its objectives and would preserve its means and resources. In studying life insurance companies a large number of performance indicators were factor analyzed in three separate studies (Bowers, 1964; Bowers and Seashore, 1966; Seashore and Yuchtman, 1967). It was found that 7 to 10 indicators explained most of the variance of performance. The authors advocated superiority of system model and defined effectiveness as ability to exploit its environment in acquisition of scarce and valued resources to sustain its functions. Hrebiniak and Alutto (1973) measured performance of psychiatric departments in terms of discharge rate and cost of care. Similarly Glisson (1980) measured the performance of 30 health and social service organizations in terms of productivity and efficiency as measured by number of clients handled per week per worker and clients served per \$10,000 annual budget. The performance of family planning services in five ESCAP countries was measured in terms of recruitment, holding and diffusion of population control measures per staff day in which recruitment, holding and use were

perceived as output and staff days as input. In analyzing the National Federation of Priest Councils, a religious organization, Stewart (1976) evaluated four major models of organizational performance namely, resource optimization of Yuchtman and Searshore, multiple criteria of organization means and ends of Georgopolos and Tannenbaum, functional behavior of Ghorpade and goal attainment of Price. Perrow (1967) and White, et. al. (1977) adopted goal attainment as it would subsume other dimensions. The authors preferred derived goals over prescribed goals, having society as frame of reference, not the organization itself as advocated earlier by Parsons (1956a, 1956b). Cameron (1978) measured organizational effectiveness of institute of higher education as system model in terms of 9 dimensions relating to staff and student's satisfaction and development, ability to acquire resources, maintain health and interact with the society. In evaluating the effectiveness of public sector services, Coulter (1979) evaluated 3 models of organizational effectiveness such as (a) behavioral-attitudinal, (b) processional, and (c) goal attainment. The author argued that staff attitude, behavior and internal processes may contribute to effectiveness but should not be confused with it and suggested that goal attainment links an organization to its internal processes and its impacts onto the society.

Agricultural Extension Service

Agricultural extension organizations are out of school educational services aiming to bring desirable changes among its

clients leading to higher productivity and better living. Three models namely system, functional-behavioral-attitudinal and goal attainments were also commonly used in analyzing performance of extensions organizations. Taking extension organization as system Young and Cunningham (1977) measured performance in terms of 43 attributes relating to information, agents, methods and programs. To them it was reliable and adaptable to any extension system. Akinbode (1976) used implementation of government agricultural development policies pertaining to entire operational system as measures of effectiveness of Nigerian Agricultural Extension Service. Carnea and Tepping (1977) identified 6 indicators of performance pertaining to organizational design, role performance and clients reaction based on which a monitoring system was designed for World Bank financed extension projects. The socio-economic changes among the clients were perceived as impact indicators. Bennett (1977) however developed even a broader framework of analyzing extension impacts which was based on 7 hierarchies of evidences relating to organizational inputs, activities and clients behavioral-attitudinal and socio-economic changes. Forest and Marshall (1977) used this hierarchy in evaluating extension work in Shawano country of Wisconsin. Both means and ends were included in the hierarchy.

The performance of extension was also studied as job performance (Warner and Cunningham, 1975; Dan, et. al., 1967 and Ekpere, 1976). Dan, et.al.(1967) attempted to measure extension impact in terms of number, duration of client participation in various educational activities performed by extension service,

what the author termed as "Behavior Setting Genotype." Warner (1967) defined organizational effectiveness in extension as "How well an organization is doing its job" in realizing its goals. Ekpere (1976) also measured performance in terms of number of educational activities such as meetings, demonstrations, visits, etc. Most frequently advocated and used model was the goal attainment model. Van dan Ban (1963) stated that extension program effectiveness was to be evaluated in terms of its educational objectives relating to productivity, income, and adoption of new technologies in the society. Kelsey and Hearne (1964, pp.117-137) earlier postulated that goals of extension work are fundamental in respect of educational, economic and social changes in the society. The economic goals however got priority in estimating extension impact (Singh and Bhuller, 1979; Ray, et.al. 1979; Jayaramar, 1979; Singh and Kaur, 1986; Agnihotri, 1988). Roling (1974) postulated behavioral-attitudinal and economic changes of clients as extension output. The achievements of economic goals were perceived to be conditional to availability of credit and supply services. Warner (1967) however cautioned to use goal model as extension effectiveness due to problem of goal inter-changibility and goal displacement. In any goal model these problems therefore need to be carefully resolved for meaningful estimate of performance of agricultural extension organizations.

Factors Influencing Performance

Research shows that organizational performance is a complex and interactive phenomenon but not a random one. It is possible

to identify and manipulate the phenomenon for achieving a desired level of performance. It is observed that a wide variety of factors relating to environment, strategy, structure and processes, either directly or indirectly influence the performance of an organization. Isolated studies attempted to explain various dimensions of organizations or compare them under various types of organizations. Some studies attempted to ascertain the interactive nature of a number of variables and their influences on performance. No attempt was made to unveil the phenomenon in its totality in an empirical situation. Some reviews were however made to postulate the performance and its determinants on the basis of isolated empirical studies. Knowledge and understanding in this respect of management is still highly limited. Based on the available literature an attempt has been made to identify the variables which showed some relation with performance across different types of organizations which have latter been used to postulate a hypothetical management model for agricultural extension organizations of Bangladesh (Table-4).

Table-4: List of Studies Reviewed on Determinants of Organizational Performance

Author	Year	Dependent Variables	Explanatory Variables
A. Business Organizations			
i) Review Studies			
Mason	1939	Organizational performance	Environment, management processes
Ward	1961	Job performance	Background, age, education, experience, personality, attitude, youthfulness, commitment, job satisfaction, goal expectation, participation
Eckman	1961	System behavior	Environment
Miner	1962	Job performance	Personality attributes (50 attributes)
Tilles	1963	Strategy	Environment: internal and external consistency, resources, risk avoidance, timeliness, workability
Perrow	1967	Structural properties	Technology, function, goals, size, age, dispersion, culture
Newman & Summer	1973	Organizational effectiveness	Structure and processes
Jurkovich	1974	Strategies, operation, tactics, coalition behavior, decision making	Environment: stable, unstable
Srivastava & Salipante	1976	Performance, job satisfaction	Autonomy
ii) Empirical Studies			
Burns & Stalker	1961	Performance	Types of organizations: mechanistic, organic
Smith & Brown	1964	Organizational effectiveness (goal attainment)	Level and dispersion of control, consensus, morale
Woodward	1965	Organizational performance	Structure and environment
Backman & Tannenbaum	1966	Satisfaction	Control
Backman, et.al.	1966	Performance Satisfaction	control, power

Author	Year	Dependent Variables	Explanatory Variables
Lawrence & Lorsch	1967	Performance	Environment, structure
Rushing	1967	Administrative intensity	Size and complexity
Woodward	1967	Integration	Differentiation
Lawrence & Lorsch	1967	Economic performance	Differentiation, integration
Majid	1967	Performance	Conflict
Alderfer	1967	Commitment, job satisfaction	Job structure, job complexity, seniority, personal qualities, pay, respect for superiors, skills, ability, interpersonal relationship
Tannenbaum	1968	Amount and distribution of control and power	Functions, participations, human orientation, organic structure
Pugh, et. al.	1969	Structural forms	Origin, history, ownership, control, size, charter, technology, location, dependence, structure
Hickson & Pugh	1969	Structural properties	technologies
Pondy	1969	Administrative intensity	size, complexity, labor productivity, salary
Walton, et. al	1969	Interdepartmental conflict	Jurisdictional ambiguity, communication, obstruction inequalities, reward
Corwin	1969	Job satisfaction	Conflict
Hage & Aiken	1971	Communication	Structural properties: size, hierarchies, authority, formalization, complexity, flexibility
Aram, et. al.	1971	Organizational performance	Job satisfaction
Montgomery	1972	Administrative structure	Environment: political social and economic
Hellerigal	1973	Organizational design: mechanistic organic	Environment: stable, unstable

Author	Year	Dependent Variables	Explanatory Variables
Argeris	1973	Performance	Structure, behavior
Hellerigel & Slocum	1973	Organizational design	Environment
Khandwalla	1973	Performance	Consistency in structural properties
Rumelt	1974	Financial performance	Strategy, structure
Greene	1974	Performance	Merit pay, job satisfaction
Phillips	1976	Performance	Market structure, customer's age, family type, social participation, status, holding size, belief, values
Keller	1975	Job satisfaction	Conflict
LaFollete	1975	Survivality, performance	Staff qualities, behavior, organizational climate
Ouchi	1977	Control	Structure: size, vertical and horizontal differentiation
Molner & Rogers	1979	Structural and operational conflict	Similarities and differences in service, clients, sectors, mode of decision making, organizational age, congruence, complexities
Brown & Schneck	1979	Bureaucratization and professionalization	Stages of development, culture
Nachmias	1982	Lateral and vertical conflict	Size, specialization, centralization
Rab	1983	Decentralization	Size, product diversity, dispersion, competitiveness, technology, market
Haque	1985	Performance: output, sales productivity, profitabilities	Working capital
Tiwari & Srivastava	1987	Productivity	Staff behavior

B. Health and Social Services

i) Review Studies

Weber	1947	Efficiency	Bureaucracy
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Author	Year	Dependent Variables	Explanatory Variables
ii) Empirical Studies			
Blaumer	1960	Job Satisfaction	Control
Tannenbaum	1961	Effectiveness	Control: height and slope
Bowers	1964	Performance, satisfaction, cost, development, growth, turnover	control
Smith & Brown	1964	Effectiveness	Communication, control structure
Seashore	1966	Effectiveness	Leadership styles
Bowers & Seashore	1966	Effectiveness	Leadership styles: peer and supervisory
Hage & Aiken	1967	Power	Structural properties: formalization, complexity, centralization, authority, hierarchies
Rogengren	1967	Control: structural, supervisory	Size, ownership
Corwin	1969	Organizational conflict	Size, specialization, hierarchy, complexity, conflict, participation, cohesion, experience, supervision
Yuchtman	1968	Performance	Control
Hrebinaik & Alutto	1973	Performance	Ownership and size
Gruenfeld & Kasum	1973	Effectiveness	Job satisfaction, leadership style
Ranson	1975	Differentiation, integration	Size, environment, authority, interdependence, political and ideological factors
Greenwood et.al.	1975	Performance	Situation: size, technology, environment: structure: differentiation and integration

Author	Year	Dependent Variables	Explanatory Variables
Fieldman	1976	Job satisfaction, participation, influence, motivation, commitment	Socialization
Schmidt & Kochan	1977	Organizational performance	Inter-organizational climate: and reciprocal relation
Leifer & Huber	1977	Boundary spanning	Structure: environmental uncertainty
Bruning & Snyder	1983	Organizational commitment	Age, sex, position
Sheridan	1983	Job turnover, absenteeism	Commitment, tension
Miyan	1984	Program implementation	Structure, resources
Mosleuddin, et.al.	1987	Behavioral changes	Structure, supervision
C. Extension Organizations			
i) Review Studies			
Hunter	1970	Time use	Functional multiplicity
Akinbode	1976	Effectiveness: policy implementation	Type of crops, product, quality control, educational activities, demonstrative and supportive activities
Benor & Harrison	1977	Performance	Functional exclusivity, multiplicity, selective technology and client contact, training
House	1981	Program effectiveness	Leadership, power structure
ii) Empirical Studies			
Montgomery	1972	Performance	Professionalization, centralization, decentralization, political, social and economic forces
Mirdha & Haque	1975	Contact	Clients education, farm size, annual income, training, agricultural knowledge, political awareness, innovativeness, leadership

Author	Year	Dependent Variables	Explanatory Variables
Rahaman & Mahaboob	1976	Organizational effectiveness	Client characters: age, sex, education, attitude, etc.
Ekpere	1976	Educational activities performed	General extension, integrated production program
Gross	1977	Attitude toward service	Personal characters of clients
Jaisal & Srivastava	1976	Performance	Strategies, approaches and structure
Day	1980	Goal attainment	Environment: division of labor by sex, control in the household, social status, power, wealth
Agnihotri	1988	Agricultural productivity, use of inputs	Extension and marketing services

Environment and Performance

Among the variables, environment plays a dominant role in organizational designs and conduct and thereby its performance. Environment is defined as the conditions external to the organization which influence its behavior (Hall, 1972). Those conditions include cultural, political, economical and legal factors, as well as technologies and information (Nightingale and Toulouse, 1977)

The influence of environment on organizational performance was quite extensively studied. The empirical studies were based on the concept that environment influences the conduct of the firms and their conduct in turn affects the performance (Mason, 1939). The term conduct refers to the process of accomplishing the managerial functions. Later the role of conduct received little attention. Eckman (1961) postulated organization as system and asserted that role of environment is exceedingly important in the influence on the behavior of a system. The objective of analyzing a system as such must be to establish its relation with environment. Upon reviewing the past research works Fielder (1971) observed that performance of interacting groups was contingent upon the interaction between situational favourableness and leadership style. Jurkovich (1974) identified 64 types of organizational environment, both external and internal and postulated that different types of environments had consequences for the planning of strategies, operations, tactics, coalition behavior and decision making. Hellerigel (1973) stated

that environment was the determinant of organizational design as a whole. He classified environmental conditions as stable and unstable and found that former goes with mechanistic and the latter with flexible organizational design. The environment may have variable influence within a single organization demanding different structural forms for different units. Apart from the general environment inter-organizational climate also plays significant influence on organizational performance (Schmidt and Kochan, 1977; Leifer and Huber, 1977).

In a business context, the primary interest centered around the market. Georgopolos and Tannenbaum (1957) viewed organizational effectiveness within a system framework and explained it in terms of productivity, flexibility and absence of organizational strains. Subsequently, a series of such studies were carried out. Vernon (1972) provided an excellent review of those studies on performance. It was recognized that power of market structure to influence performance was modest (Phillips, 1976). Because the effect of market structure was not uniform and casual relationship could not be established. The relationship was not direct and unidirectional rather it appeared to be both 'cause and effect'. (Lenz, 1981).

But some characteristics of customer/client like age, education, family type, social participation, socio-economic status, holding size, belief, values and characteristics of the client system were found to have significant influence on performance.

The effect and contributions of different environmental dimensions on the performance of agricultural extension has also been studied (Rahaman and Mahboob, 1976; Mirdha and Haque, 1975; Gross, 1977; Dey, 1980; House, 1981) but the results are conflicting. Client character, both at individual and system level did not have significant influences on the performance of extension programs and organizations under different socio-economic conditions.

Environment, Structure and Performance

Earlier Burn and Stalker (1961) identified two ideal types of organizations, mechanistic and organic and suggested that success would depend upon the adoption of organizational structure sufficient to deal with competitive circumstances. Based on this observation Lawrence and Lorsch (1967) established the thesis that organizational performance chiefly depends upon the 'goodness of fit' between environment and structure (differentiation and integration). Woodward (1965) studied 203 firms of different types and found significant difference in their structure and performance. The successful firms had little in common in terms of their structural characters. She explained that difference was not due to human but situational and the effectiveness was the outcome of "goodness of fit" between the organizational structure and environment. Argeris (1973) argued against the idea of 'environment - structure fit' as the crucial contingency. To him the critical contingent performance relationship was in between organizational structure and people.

He suggested that the inducement system, power sharing, etc. must be matched with the needs and socialization of the organizational participants. Pennings (1975) studied the degree of association between dimensions of structure and environment. They however, found that 'goodness of fit' of environmental and structural variables failed to explain variance in effectiveness.

Ranson, et.al.(1975) studied various dimensions of size, environment, authority, inter-independence, political and ideological factors and change problems as the determinants of structural dimensions, differentiation and integration, of a large number of local authorities of Britain. It was found that all measures of size had positive associations with differentiation and integration and no association with environmental and political dimensions, like population density and wealth, political control and structure. From the same study Greenwood, et.al.(1975) supported the assumption of contingency theory of management that the extent of which an organization secures "goodness of fit" between situational circumstances and structural characteristics would determine the level of organizational performance. The situational variables were chosen as size, technology and environment. The effect of those variables on structure and performance was reported to be variable in different or similar organizations (Dewar and Hage, 1978; Beyer and Trice, 1979; Glisson, 1980; Dubick, 1978; Chistenson and Sachs (1980). Earlier in analyzing land reform programs of 25 countries Montgomery (1972) reported that choice of administrative arrangement of a public service was open or at

least not determined by known political, social and economic forces.

Strategy and Performance

Those who support the structure environment contingency, seldom considered the outcome of domain and strategic choices of a firm and its internal management practices. An inappropriate strategy will not only fail to yield benefits but also may bring disastrous results. The appropriateness of a strategy depends on its consistency with environment, internal process, resources, risk avoidance and time (Tilles, 1963). The idea of the relationship between strategy and performance grew out of Chandler's study of American Life Insurance Corporation. Building upon his work Rumelt (1974) refined the understanding of relationship among strategy, structure and financial performance.

In the field of agricultural extension the strategies and approaches relating to structure and function of the organizations were reported to have profound influence on performance (Jaisal and Srivastava, 1976; Hunter, 1970; Benor and Harrison, 1977; Chang, 1977; Akinbode, 1976). Functional multiplicity, selective farmer contact, system integration were reported to have conflicting influence on performance of agricultural extension organizations.

Management Processes and Performance

The management processes were reported to have profound effect on organizational performance. The structural arrangement

is a conscious choice of top management resulting in expected role and role relationships between operational units and sub-units and individual positions. Most studies in this area of management were directed to structural characteristics of different organizations, their inter-relationships and influence on staff behavior thereby influencing the performance of an organization.

The choice of structure is influenced by size, technology, task and goal orientation. Perrow (1967) considered technology as prime determinants of structure and a better basis of comparing organizations as compared to structure, functions or goals. To him there was no point to test the effect to size, age dispersion, or national culture without having a control over technology. The normative prescription of certain type of structures became realizable under certain type of technology in use. There were conflicting findings on the effect of size and technology over structure. Rushing (1967) examined the effect of size (number of productive personnel) and complexity (division of labor) on the administrative intensity (number of managerial and clerical staff) in 41 industrial enterprises and found that their effect was independent and opposing i.e. size is inversely and complexity is directly associated with administrative intensity. There interactive effect holds good only for managerial and clerical staff but not for professional staff. In studying a sample of 46 organizations of English Midlands Pugh, et.al. (1969) found that origin, history, ownership, control, size,

charter, technology, location, dependence on other organizations as significant predictors of structure. The technological imperative was subsequently refuted through more detail studies of diversified organizations of English Midland (Hickson and Pugh, 1969) and of South-East Essex (Woodward, 1967). Increased structural differentiation calls for integrative mechanism. In a comparative study of six organizations in the same industrial environment Lawrence and Lorsch (1967) found strong relation between the extent of differentiation and integration which would meet the requirements of environment and economic performance of organizations.

With the vertical and horizontal differentiation of organizational structures a hierarchical system emerges from corporate to operational levels with differentiation of line and staff functions giving rise to differential distribution of responsibility and authority and a mechanism of control which affects staff behavior. Srivastava and Salipante (1976) reviewed the influence of autonomy on job satisfaction and performance and found a positive influence of autonomy on effectiveness which came through job satisfaction. In studying 141 plants managers of different enterprises they found rather a weak relationship between autonomy and organizational performance. In a recent study of public enterprises of Bangladesh Rab (1983) identified variable needs for decentralization due to such variable as size, product diversity, geographical dispersion, competitiveness, technology, market, etc.

The structural dimensions of social service organizations have been found to influence organizational performance either directly or indirectly through other organizational dimensions. Hage and Aiken (1967) examined structural properties and their relationships in 16 health and welfare organizations and found variable influences. Participation in decision making was found to have strong relation with complexity but its relation with formalization was weak. Except rule observance, the hierarchy of authority and the chain of command had no significant association with structures. They also found that centralization of resource distribution decisions resulted in centralization of work decisions. Using the same data they (1969) found that organizational structure with routine work was more centralized and formalized but less stratified with less professional staff. Such organizations emphasized goal efficiency and client quality not innovativeness, staff morale and quality of service. Hage et.al. (1971) also found that the structural properties of those organizations seriously affected inter-departmental communication either scheduled or unscheduled. In a study of 388 in-patient psychiatric departments, Hrebinaik and Alutto (1973) found that performance varied with ownership and was inversely related to departmental size. With an increase in size, private ownership tended to employ more administrative and paraprofessional staff, while public hospitals increased professional staff.

An unanticipated consequence of structure is conflict which violates norms of co-operation but do not alter authority and

responsibility structure and is dysfunctional for an organization (Pondy, 1969). Earlier Pondy (1967) postulated three types of conflict namely bargaining, bureaucratic and system conflicts. In studying 300 managers of 5 departments of a firm Walton, et.al. (1969) identified jurisdictional ambiguity, communication obstruction and inequalities as determinants of intra-organizational conflicts (Kochan, et.al.1975). Conflicts of any form showed negative effect on job satisfaction (Keller, 1975; Corwin, 1969). In a recent study of public bureaus Nachmias (1982) differentiated conflict as lateral and vertical and found both as cause and effect of organizational attributes of size, specialization and centralization of both ethnically homogeneous and heterogeneous bureaus.

The phenomenon of control defined as a process of influencing behavior is a structural outcome and had been studied extensively (Tannenbaum, 1968). Earlier Tannenbaum (1956) estimated the amount and distribution of control in 4 local Unions of Michigan taking a sample of 150 members and found that control related to functions, participation, ideologies, and conflict. Control found to have positive influence on participation which in turn affects organizational effectiveness (Blaumer, 1960; Smith and Brown, 1964; Backman and Tannenbaum, 1966; Backman, et.al. 1966). Using organization as unit of analysis Ouchi (1977) uncovered the relation between structure and control in 78 retail departmental stores and found that 33 percent variance in control could be explained by structural characteristics, such as size and differentiation. Tannenbaum (1961) found that voluntary organizations had low height of

control and its distribution was negatively sloped as compared to industrial organizations. He further proved that the organizations having high and positively sloped control were more effective. Bowers (1964) investigated relationships between control and 7 criteria of performance in an insurance company. Based on the findings he concluded that there was slight difference between total ideal and actual control. The slope of control has typically negative and the total actual control, not any of its components, had positive relation to overall effectiveness with variable influence on components of effectiveness. It had relation to all forms of satisfaction, cost performance, and organizational development but not the growth of business and turn-over. Smith and Brown (1964) studied communication and control structure in a voluntary association using same study design as was evolved by Tannenbaum (1961) and found that size had significant relation with both communication and control structure, and effectiveness. However structure of control rather than communication was found to be significant correlates of effectiveness. Both decentralized control and total control were correlated to effectiveness. They also found consistency between control and communication i.e. downward communications and decentralized control and upward communication and centralized control, both having higher effectiveness. It was confirmed the significant correlation between amount of multidirectional communication, total amount of control and loyalty of staff members. As regard the means of control Rosengren (1967) differentiated control as structural and supervisory control and

found that maximum structural control, approximating a bureaucratic organization, was found in association with limited supervisory control and vice versa in 80 large government psychiatric hospitals and 52 small private hospitals. The study also confirmed that the scope of employee control varied inversely with the scope of patient control, sometimes because of structural arrangement and sometimes because of supervisory style. Yuchtman (1968) however attempted to establish causality between control and performance in insurance company through regression analysis of time lag data of control and performance. The author did not rule out the possibility of circular relationship but felt reasonably confident that control was at least a cause of organizational performance.

Both intra and inter-organizational conflict is the outcome of organizational structure and control. Conflict may emerge over role performance, interaction and in exercise of power and authority, having profound effect on organizational performance. Majid (1967) confirmed that a person occupying a position in an organization and in a situation of role conflict performs such role that he evaluated as more legitimate or more obligatory by interviewing 71 district councilors, the local officials in Indoma Division of Northern Region of the Federal Republic of Nigeria. In studying 28 public high schools of U.S.A. Corwin (1969) identified pattern of relationship between organizational conflict and structural variables such as differentiation, participation, regulating procedures, heterogeneity and stability of personnel and interpersonal structure. It was found that size, specialization, hierarchy, complexity, staff addition and

heterogeneity were related to organizational conflict, participation and cohesiveness seemed to be conducive variables facilitating conflict, but experience and close supervision seemed to be integrative variables. However, the relationship seemed to be variable depending upon bureaucratic and professional context. Intra-organizational conflict is a behavioral-attitudinal dimension and the inter-organizational conflict is an environmental dimension, both having influence on organizational performance. Molnar and Rogers (1979) studied 147 dyadic relationships in the context of work of the natural resource organizations in five non-metropolitan countries and found inter-dependence. They also found that structural properties were the determinants of intra-organizational conflicts.

The structural dimensions were perceived as a continua and the position of an organization on each of such continua gives rise to some pattern variables which result some typologies of structural organization such as tall and flat, mechanistic and flexible, bureaucratic and non-bureaucratic, rigid and adaptive, mechanistic and organic, etc. Each of these types has performance imperatives. Weber (1947, p.337) postulated that bureaucratic form was superior to any other forms in attaining the highest degree of efficiency and was applicable to any administrative task. Pugh, et.al (1969) studied the degree of bureaucracy in 52 organizations of English Midlands and found that its growth and development was influenced by size, technology, dependence and ownership. They asserted that a single bureaucratic type would no

longer useful as bureaucracy would take different forms in different settings. Brown and Schneck (1979) examined the bureaucratization and professionalization in U.S. and Canadian industries. The findings supported structural characteristic as stable and persistent which was influenced by ownership (foreign) but not by cultural differences. Hellerigel and Slocum (1973) postulated that overall organizational design was determined by its environment. To them stable environment and mechanistic structure and turbulent environment and flexible structure went hand in hand within same organization. Different structural forms existed as sub-environments which varied significantly. The tall and flat organizations were found to have little influence on decision making, need satisfaction and leadership style (autocratic and democratic style). The rigid and adaptive typology received attention in recent years. Newman and Summer (1973) postulated the structural and process variables as adaptiveness and asserted that adaptive structure could be more effective. Earlier Khandwalla (1973) after studying the organizational structures of 79 American manufacturing firms concluded that internal consistency of structural design was significantly associated with organizational performance.

Staff Quality, Behavior and Performance

Staff qualities and behavioral variables were also reported to have effect on organizational performance. Miner (1962) identified as many as 50 personality attributes of staff which might have influence on their job performance and hence the

organizational effectiveness. Ward (1961) classified some of the personal qualities as favorable managerial qualities. Besides, these attributes the background, age, educational attainments and experience are also associated to job performance. An organization having comparatively more staff with appropriate background, youthfulness, higher educational qualification and longer work experience was found to be more effective. The qualities and background influence their commitment, job satisfaction, goal expectation and participation which might lead to greater performance expectation and higher outputs of state agencies. The organizational commitment was however not influenced by age, sex and positions (Bruning and Snyder, 1983). Job structure and complexity however played significantly variable influence on commitment and job satisfaction as regards pay, behavior of superiors and scope of utilizing abilities and skills. A job enlargement and enrichment program was found to have positive effect on performance (Alderfer, 1967). The effect of satisfaction on performance comes through collaboration as tested by Aram, et.al. (1971) in 16 product line groups of industrial enterprises. It may also come through incentive and merit pay (Greene, 1974). Having no job satisfaction people were found to produce more with assigned goals, evaluation apprehension and positive feed-back. When however the level of commitment and tension crosses the threshold level people tend to escape resulting high turnover, absenteeism and thereby affecting organizational performance negatively (Sheridon and Abelson, 1983). Thus employee qualities and behaviors result an

organizational climate (psychological) which may be devastating to the organizational survivality and performance (LaFollete, 1975).

Bowers and Seashore (1966) attempted to predict effectiveness of a leading life insurance company in terms of leadership and found that both leadership (supervisory and peer leadership) and effectiveness are multidimensional and the predictive power of the model was enhanced when non-leadership variables were also simultaneously accounted. The positive effect of participatory supervisory style and organizational performance was also reported by Gruenfeld and Kassum (1973) in padiatric hospitals. Fieldman (1976) considered the problem of job satisfaction, participation, motivation and commitment in a broader context of socialization and found that with the continued socialization process the conducive behavioral attitudinal aspects steadily increased among professional and para-professional staff of 118 hospitals of U.S.A.

The staff background, qualities and behavioral attitudinal dimensions were found to have influence on the organizational performance. Montgomery (1972) identified that land reform programs of 25 countries having more non-career officials produced better results as compared to having more professional administrators in both centralized and decentralized bureaucratic system.

Resource and Performance

In organizational research little attention is paid to the resource need and its effect on organizational performance. Such study is rarely found in service sector although all other organizational dimensions are directly or indirectly influenced by the availability of resources. In a recent study of jute enterprises of Bangladesh over a period of 5 years Haque (1985) found high positive relation of working capital with productivity and profitability of jute enterprises. Recently Miyan (1984) in collaboration with Yayasan Indonesia Sejahtera, a research group of Indonesia studied the management of population assistance programs in Bangladesh and Indonesia and found that program implementation suffered for structural problems as well as due to inadequate resource availability.

Summary

In view of inadequacies of broad base research on the management of agricultural extension organizations review of relevant research studies of management was imperative to postulate an analytical model of organizational performance in the field of agricultural extension. Review of relevant studies showed problem of perspective and relevance of performance studies. There were two alternative approaches i.e. system and goal models and the others were subsumed in it. The former argues that organizational performance is the total health of the organization and the latter argues that no organization exists for maintaining its own health. Rather health of an organization

is an input for its goal attainment. So the concept of goal attainment seems to be more appropriate measure of organizational performance. Controversies also exists about performance on whose view points, the owners, the employees or the customers. Parsons (1956) argument that society should be the basis of evaluating organizational performance, as it aims to meet the needs of the society, seemed to be more plausible. Each of these perspectives had however problems of measurement as dimensions of both system and goals faces problems of inter-changibility and displacement.

It is also observed that models are universal and can be used in all types of organizations; if operationalized appropriately in particular type of service or organizations. Solution lies with researchers aim, orientation and approach. Some of course viewed that it is a matter of stages of analysis. In a system model at several stages of analysis the goals are integrated as independent or explanatory variables or the vice versa.

As regard the determinants of performance the variable evidences indicate that the organizational performance is a complex and interactive process. A vast number of influences are at work. Some of these are quantifiable, other are not; still others are internal and managerial and of the latter many are subtly interwoven. The analysis of organizational performance, either goal or system model therefore needs multivariate model which would provide scope of integrating all possible dimensions. In the field of manufacturing industries 17 such models were identified with conflicting results (Steers, 1975). Most of those

studies attempted to establish relationship between performance of an organization and its environment, structure and administration or in between the latter groups of variables (Lenz, 1981).

Multivariate organizational performance analysis were also made in the health and social services sector. The findings revealed that performance was the outcome of environmental factors as well as the integration of structural organization. The process of interaction depends on the interactive linkage between specialized activities. The influence of selected resource, environment, personnel and organizational factors on program performance was not alike in all countries.

Empirical analysis of performance and its determinants in a total interacting situation is not available. However in such a situation determinants of organizational performance are expected to be few, some of which may be normative or universalistic and the others as contingent to the situational context of a particular firm. The principal focus of most of those researches on organizational performance continued to be on post hoc explanation of statistical relationship rather than exploring the processes which cause those relationship. This fundamental issue of casual relation thus remain unanswered. Considering the seriousness of the issue further research in this area of organizational management need to be seriously emphasized (Phillips, 1976; Mancke, 1974; Lenz, 1981).

This brief review reveals that some studies attributed performance to specific structural characteristics; others to the

overall configuration of structure. Size of firm, technology, cost structure, market share, operational diversity received attention as performance imperative (Child 1974; Chevalier, 1972; Stear and Cable, 1978). Multiple and conflicting contingencies seemed to be operative and the organization design can not be optimal with respect to every contingency. Therefore, different contingencies may exist in the same setting affecting performance.

Inspite of those limitation it is possible to postulate a logical framework of study as relevant to agricultural extension organizations if they are translated and articulated in the context of agricultural extension organizations.

PART B: METHODOLOGY

CHAPTER III : THEORETICAL FRAMEWORK

CHAPTER IV: SURVEY AND ANALYSIS

CHAPTER V: EMPIRICAL SPECIFICATION OF MODEL VARIABLES

III. THEORETICAL FRAMEWORK

Introduction

The aim of this study is to postulate and test a model of performance evaluation for agricultural extension organization and articulate the organizational variables as a model of management which would maximize their performance. To fulfill these objectives attempt has been made:

1. To construct a theoretical model of performance evaluation for agricultural extension organizations,
2. To identify model variables on apriori assumptions,
3. To articulate the variables as model of management for maximizing their performance, and
4. To postulate hypotheses for testing the models.

Appropriate Perspectives and Models

Different perspectives and models have been used in studying different types of organizations. A list of such studies has been presented in Chart 1. Perspective and models of this study have been deduced from those concepts as appropriate to the agricultural extension organizations.

Appropriate Perspective

Agricultural extension organizations are public services. Their operation is based on the common public policies and strategies and their structures and functions are consciously chosen to bring definite changes in a society. Therefore, Parsons (1956) approach of society, not the organizations

themselves, can provide an appropriate perspective of evaluating their performance. Since agricultural extension organizations pursue definite goals of bringing behavioral and economic changes among their clients, the magnitudes of attainment of such goals may provide the evidences of the level of performance which might be determined by the conduct of the organizations as manifested through the prevailing attributes of external and internal environment.

Proposed Model of Performance Evaluation

Agricultural extension organizations have both professional and operational goals. The aggregate level of the attainment of either professional or operational goals may thus provide an appropriate measure of performance. For convenience of measurement, control and accountability the organizations set their operational goals in terms of various measures such as area of cultivation, production and income of clients, etc. Such goals vary widely from organization to organization or among their operational units. Therefore operational goals have problems of goal interchangability and displacement (Warner, 1967). Professional goals are universal and are subsumed explicitly or implicitly in the operational goals. The attainment of professional goals could thus provide a more logical measure of performance of agricultural extension organizations. It is therefore chosen as appropriate measure of performance of agricultural extension organizations.

The professional goals of agricultural extension organizations are hierarchical, i.e. the attainment of one goal leads to the attainment of successively higher goals (Roling, 1974). At the bottom they aim at changing the attitude of their clients toward new and improved technologies. Successively, they aim at transferring knowledge of those technologies, develop skills of application and diffuse their use and thereby aim at increasing clients productivity, income and level of living. Thus change of clients attitude, knowledge, skills and use of technologies are behavioral goals and that of productivity, income and level of living are economic goals (Fig.1). In a given situation each of those goals has an attainable maximum which may be termed as potential level, i.e. the level which is technically feasible to achieve. The magnitude of performance could therefore be measured from the aggregate attainment of all component goals as percent of their potential levels. Performance of an organization becomes maximum when it would achieve the potential levels of all component goals.

The model can be used to measure the level of performance of agricultural extension organizations irrespective of their technological base and operational jurisdictions or models or approaches of extension work. The model assumes that:

"In a balance and well planned agricultural extension program the attainment of goals are not independent but hierarchical and unidirectional".

of few technologies through conditional diffusion i.e. diffusion is hinged with special subsidy or incentive, the attainment of economic goals may be negatively associated with that of the behavioral goals.

A Derived Model of Management

A model of management refers to articulation of organizational variables in a framework of relationship leading to maximizing performance of an agricultural extension organization. The model was derived from a paradigm of management variables as originally postulated by Khandwalla (1977,p. 271). He classified the organizational variables as environmental, strategic, structural, behavioral and pattern variables. In his construct the management process variables were subsumed under structural variables and the resource variables were omitted. The pattern variables were explained as a combination of different classes of variables. In this study the construct was modified and operationalized in the context of agricultural extension organizations (Fig. 2). The variables are broadly classified as follows:

1. Performance
2. Environment
3. Strategy
4. Management Process
5. Staff
6. Resource

Each of those broad category of variables may be perceived as multivariate macro systems and process variables which could be split up into a number of micro systems and processes consisting of discrete variables. Some of those discrete variables may also be multivariate variables which could be decomposed into some specific elements.

The individual discrete variables may interact at three levels; namely (a) micro system and process, (b) macro system and process, and (c) holistic system. Their relationships may flow either directly or indirectly through different systems and processes. No empirical research could be traced which has exposed the entire milieu of an organization and identified their relationships at different levels of interaction. Therefore, it is very difficult to speculate the network of relationships at individual discrete variables or at micro system and process levels on a priori assumptions. However an attempt has been made to articulate the network of relationships at macro system and process level based on the review of literature and has been presented in Fig. 2.

There are evidences that performance of an organization is the outcome of "goodness of fit" between environment and organization (Lawrence and Lorsch, 1967; Woodward, 1965). The effect of environment is not direct but is manifested through the conduct of the organization (Mason, 1939). There are also evidences that performance is the outcome of "goodness of fit" between the organizational variables and organizational

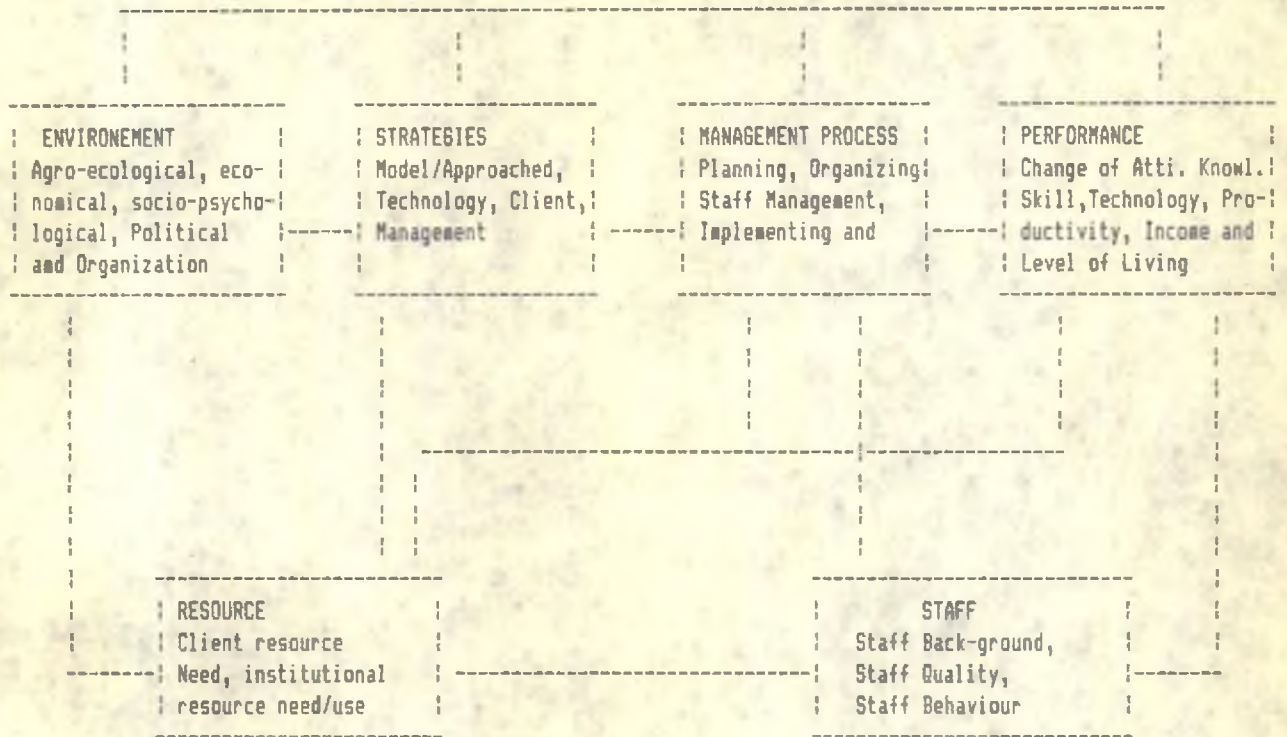


FIG. 2: A Proposed Model of Management of Agricultural Extension Organizations

participants (Argeris, 1973). The influence of strategies and management on the performance of organizations has been extensively reviewed earlier.

The availability and use of resources may be hinged to environment or strategy of the organizations and are assumed to have direct bearing upon staff quality and behavior and hence the conduct of the organization (Miyan, 1984; Haque, 1985). The underlying assumption of the model is:

"The influences of organizational variables, both discrete and aggregate systems and processes, on the performance of agricultural extension organizations are significantly direct, consistent and unidirectional".

The real pattern of relationships are expected to be emerged through empirical tests.

Variables Influencing Performance

Environmental Variables

The environment of agricultural extension organizations is the external conditions relating to their client system. The environment as macro-system consists of agro-ecological, economic, socio-psychological, political and organizational micro systems. Each of these micro systems has several discrete variables which may set the scope and limits of the performance of an agricultural extension organization. Some of them are universal having similar effect across all organizations and operational units of the same organization. The magnitudes of variables are likely to have wide variability with variable influence on performance. In spite of variable influences of

discrete variables the influence of environment as a macro system on the performance of extension organization is assumed to be direct and significant. Therefore the major hypothesis is:

1.0: Performance of agricultural extension organizations is directly and significantly influenced by the environment in which they operate.

The variables of agro-ecological environment a major component of environment are land and climatic conditions of the operational units and their accessibility. Those agro-ecological variables are likely to influence the innovation decisions and productivity of clients. Accessibility may however keep the extension systems closure to their clients. The effect of agro-ecological variables such as solar energy, rainfall, flood and drought risk, productive capacity of land, irrigation on the agricultural productivity are extensively investigated and reported in the biological science literature. Their effects are likely to be positive, except in case of environmental risk which is expected to be negative. These variables are therefore likely to influence and contribute significantly to the attainment of economic goals and hence the performance of the organizations. Accessibility, within any operational unit, as an environmental variable is expected to have a positive and linear effect on the extension agents efforts and hence the performance of the organization. The influence of agro-ecological environment on the performance of extension organizations is assumed to be significantly direct. The following minor and supporting hypotheses are therefore postulated for testing:

Minor Hypothesis

1.1: Performance of agricultural extension organizations is directly and significantly influenced by agro-ecological environment in which they operate.

Supporting Hypotheses

1.1.1: More is the availability of solar energy, better is the performance of agricultural extension organizations.

1.1.2: More is the rainfall, better is the performance of agricultural extension organizations.

1.1.3: Lower is the environmental risk (flood and drought), better is the performance of agricultural extension organizations.

1.1.4: Higher is the productive capacity of land, better is the performance of agricultural extension organizations.

1.1.5: More is the irrigation coverage, better is the performance of agricultural extension organizations.

1.1.6: More is the accessibility within an operational unit, better is the performance of agricultural extension organizations.

The economic variables of the client system such as farm size, tenurial structure, level of subsistence, draft power availability and the scope and limitations of product marketing may create a variable economic environment which have occasionally been reported to have variable effects on the innovation decisions of the clients. Thus the variables of

economic environment may either impede or facilitate the performance of agricultural extension organizations. Larger farms, owner farming, more draft power may facilitate, while subsistence farming and product market difficulty are likely to hinder the attainment of the goals of extension work. The economic environment is assumed to be favorable and influence the performance of the organizations directly. Hence the following minor and supporting hypotheses are derived for empirical testing:

Minor Hypothesis

1.2: Performance of agricultural extension organizations is directly and significantly influenced by the economic environment in which they operate.

Supporting Hypotheses

1.2.1: Larger is the operational farm size, better is the performance of agricultural extension organizations.

1.2.2: More are the owner farmers, better is the performance of agricultural extension organizations.

1.2.3: Lower is the subsistence pressure among clients, better is the performance of agricultural extension organizations.

1.2.4: More is the draft power availability, better is the performance of agricultural extension organizations.

1.2.5: More is the availability of clients family labour, better is the performance of agricultural extension organizations.

1.2.6: More is the commercialization of agricultural production, better is the performance of agricultural extension organizations.

1.2.7: Lower is the product market difficulty, better is the performance of agricultural extension organizations.

As with the economic environment, so the variables of socio-psychological environment of the client system consisting of discrete variables like, size and type of client families, their education, communication exposure and participation in the management of local institutions may vary widely across geographical areas. These socio-psychological variables are also reported to have positive or negative influences on the performance of extension organizations. However it is assumed that the net effect of socio-psychological environment is still positively significant. Therefore following specific minor and supporting hypotheses are formulated for empirical testing:

Minor Hypothesis

1.3: Performance of agricultural extension organizations is directly and significantly influenced by the socio-psychological environment in which they operate.

Supporting Hypotheses

1.3.1: Smaller is the clients family size, better is the performance of agricultural extension organizations.

1.3.2: Higher is the client literacy, better is the performance of agricultural extensions organizations.

- 1.3.3: Larger is the number of clients having formal education, better is the performance of agricultural extension organizations.
- 1.3.4: Greater is the number of the clients exposed to mass communications, better is the performance of agricultural extension organizations.
- 1.3.5: More are the clients having organizational participation, better is the performance of agricultural extension organizations.
- 1.3.6: More are the clients having co-operative membership, better is the performance of agricultural extension organizations.
- 1.3.7: More are the clients having leadership experience, better is the performance of agricultural extension organizations.
- 1.3.8: Smaller is the number of clients having client-patron relationship with extension agents, better is the performance of agricultural extension organizations.
- 1.3.9: More favorable is the attitude of clients toward changes in the society, better is the performance of agricultural extension organizations.

The political environment of the client system is also equally valuable because it inspires people leading to commitment and action. For unless the clients act in a certain direction, no extension organization can perform well. The variables of the political environment of the client system such as political consciousness and participation have also been reported to have

significant influences on the performance of organizations. Regarding the political micro environment and its discrete variables the following minor supporting hypotheses are therefore formulated for empirical testing:

Minor Hypothesis

1.4: Performance of agricultural extension organizations is directly and significantly influenced by the political environment in which they operate.

Supporting Hypotheses

1.4.1: Larger is the number of clients having political consciousness, better is the performance of agricultural extension organizations.

1.4.2: Greater is the participation of clients in political processes, better is the performance of agricultural extension organizations.

1.4.3: More is the socio-political influence on program administration, better is the performance of agricultural extension organizations.

No extension organization operates in isolation. A host of complementary or even competitive organizations operate concurrently giving rise to an organizational environment which may create scope or limit for the performance of the organizations. The variables of organizational environment are subsumed in their mutual relations or conflicts. As regard the organizational environment the following minor and supporting hypotheses are postulated for empirical testing:

Minor Hypothesis

1.5: Performance of agricultural extension organizations is directly and significantly influenced by the organizational environment in which they operate.

Supporting Hypotheses

1.5.1: Greater is the inter-organizational relationship among related organizations, better is the performance of agricultural extension organizations.

1.5.2: Lower is the inter-organizational conflict among concerned organizations, better is the performance of agricultural extension organizations.

Strategic Variables

Strategy is perceived as a macro system of core concepts based on which dominant organizational variables are articulated as unified whole to generate greater synergy for achieving organizational goals. Strategies have long term effects on organizational structures and conduct. The choice of strategy of agricultural extension organizations relates to models and approaches, technologies, clients and management to be considered as micro-strategic systems, each having several discrete variables. Each variable is a corporate decision affecting the entire spectrum of the organization. It is presumed that overall strategy is favorable influencing the performance directly. Therefore the major hypothesis of the model is:

2.0: Performance of agricultural extension organizations is directly and significantly influenced by the strategies they adopted.

As regards approach strategies, integration of models, functional exclusivity or multiplicity of functions and universality or selectivity in contact were reported to have a positive or negative influence on performance. Five basic models of extension work were identified, all of which have been introduced in Bangladesh, viz. (1) Service Delivery, (2) Advisory Service, (3) Model Farmer, (4) Training and Visit, and (5) Extension Education Models (Hassanullah, 1986)¹. Each of these

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1. An extension agent under service delivery model sells inputs on cash or credit and give prescriptions, oral or written, for their use. Under advisory service model he does nothing but advice his clients about what to do and what not to do. In a model farmer model a few clients, generally one for each cooperative are developed as model assuming others to learn from him. Under training and visit model the extension agents receive one day fortnightly training on few selected impact points and communicate the same to few selected contact farmers of each sub-block of the working units on a fixed day rotational visits. Under extension education model the extension agents organize educational activities as and when required for educating their clients on a range of technologies in solving their problems.

models have implications on the objectives, functions and scope of extension work having variable influence on over all performance of the organizations. Functional exclusivity refers to the concept that an extension organization should perform educational activities exclusively. The concept of universality and selectivity refers to extension systems which adopt a strategy of either universal or selective contact with their clients. An extension organization is expected to perform well when it makes universal contact with its clients. In this context the the following minor and supporting hypotheses are postulated for empirical testing:

Minor Hypothesis

2.1: Performance of agricultural extension organizations is directly and significantly influenced by extension approaches it adopted.

Supporting Hypotheses

2.1.1: Greater is the integration of extension models, better is the performance of agricultural extension organizations.

2.1.2: Greater is the functional exclusivity of agricultural extension organizations, better is their performance.

2.1.3: More universal is the contact with clients of agricultural extension organizations, better is their performance.

Professionally, extension aims to develop its clients in all aspects of their life and profession. Hence choice of technological strategy is key to success of an organization. An

organization may opt for or promote diffusion of a package of diversified technologies affecting life and profession of its clients or a narrow package affecting very little aspects of clients productivity and living. It may also opt for technologies having either high or low adaptability. The choice of technologies therefore determine the degree of acceptance and ultimately clients productivity, income and level of living. The technological strategy is assumed to have significantly direct effect on the performance of extension organizations. The following minor and supporting hypotheses are put forwarded for empirical testing:

Minor Hypotheses

2.2: Performance of agricultural extension organizations is directly and significantly influenced by their technological strategies.

Supporting Hypotheses

2.2.1: Higher is the adaptability of recommended technologies, better is the performance of agricultural extension organizations.

2.2.2: Greater is the coverage in technological advises, better is the performance of agricultural extension organizations.

Extension organizations as a public services may also pursue implementation of government policies and programs disregarding the needs and abilities of the client system.

Client strategy is therefore likely to influence its performance. Client strategy relates to its client orientation and participation which provides legitimacy and support of clients thereby influencing their performance. An appropriate client strategy is therefore likely to have profound effect on performance of the organization. To test these assumptions the following minor and supporting hypotheses are postulated:

Minor Hypothesis

2.3: Performance of agricultural extension organizations is directly and significantly influenced by their client strategies.

Supporting Hypotheses

2.3.1: Greater is the magnitude of client orientation, better is the performance of agricultural extension organizations.

2.3.2: Greater is the participation in decision making by the clients, better is the performance of agricultural extension organizations.

The management strategies also provide an internal climate for better performance of an organization. The top management may adopt either a participative or coercive strategy. It may also set a degree of professionalization and set a level of performance aspiration which may have effect upon the performance of the organizations.

These strategic variables either singly or in aggregation would result in a degree of appropriateness of adopted strategies that may or may not be conducive to generate greater synergy effecting the performance of the organization. Therefore following minor and supporting hypotheses are formulated for empirical testing:

Minor Hypothesis

2.4: Performance of agricultural extension organizations is directly and significantly influenced by their management strategy.

Supporting Hypotheses

2.4.1: More participatory is the management process, better is the performance of agricultural extension organizations.

2.4.2: Lower is the coerciveness in management, better is the performance of agricultural extension organizations.

2.4.3: The higher is the level of performance aspiration among the staff, the better is the performance of agricultural extension organizations.

2.4.4: The greater is the professionalization of agricultural extension organization, better is their performance.

Management Process Variables

Management processes is perceived as a macro process which refers to planning, organizing, managing personnel, implementing

and controlling the functions of the organization. These functions are thought of as micro processes, each of which consists of a number of variables. An extension organization develops annual development plans, design their internal structures, manage available staff, implement work plans and control their behavior to optimize performance. A wide range of variables thus interact and influence upon performance either individually or in combination. Nevertheless it is assumed that management as a macro process have been contributing directly and significantly to the performance of the organization. Therefore the major hypothesis is:

3.0: Performance of agricultural extension organizations is directly and significantly influenced by their management processes.

Planning: Planning is a micro process which is expected to produce a sound plan of work as a prerequisite for effective performance. A plan is said to be sound when prepared by following logical steps of program planing giving adequate emphasis to each step. Staff participation in program planning is another dimension which is an added value to a sound plan of work. A sound plan with staff participation is expected to result in staff commitment and consensus, not conflict and influence the performance of extension organizations. The absence or presence of these attributes of planning process may give rise to a program affecting performance either positively or

negatively. In order to test those model assumptions following minor and supporting hypotheses are postulated:

Minor Hypothesis

3.1: Performance of agricultural extension organizations is directly and significantly influenced by their planning process.

Supporting Hypotheses

3.1.1: More is the soundness of extension programs, better is the performance of agricultural extension organizations.

3.1.2: More is the participation of staff in program planning, better is the performance of agricultural extension organizations.

3.1.3: Lower is the magnitude of role conflict, better is the performance of agricultural extension organizations.

Organizing: Organizing function is also perceived as a micro process which results the structure of the organization. The size of operational units in terms of area or a number of clients and their grouping as span of supervision at successive levels are the organizing variables which give rise to a formal structure. Such structure is essential for effective work but a particular type of structure may impede or facilitate performance of an extension organization. Structure in association with such variables as authority and power to role incumbents in an operational unit and the organization as a whole may influence its performance greatly. Along with structure and authority the

operational rules and procedures give rise to a degree of formalization which may influence performance either positively or negatively. An optimum degree of formalization is a prerequisite for better performance. The question of rigidity and flexibility of structure and responsibility is also an important variables of an extension organization as it provides the organization to adjust with a changing environment. Contrary, high flexibility may result in a laissez fair situation having negative influence on performance. To test these model assumptions the following minor and supporting hypotheses may be formulated:

Minor Hypothesis

3.2: Performance of agricultural extension organizations is directly and significantly influenced by their organizing process.

Supporting Hypotheses

3.2.1: Smaller is the size of primary operational units of agricultural extension organizations, better is their performance.

3.2.2: Smaller is the number of clients per extension agent, better is the performance of agricultural extension organizations.

3.2.3: Smaller is the span of supervision, better is the performance of agricultural extension organizations.

3.2.4: More is the strategic authority, better is the performance of agricultural extension organizations.

3.2.5: More is the magnitude of tactical authority, better is the performance of agricultural extension organizations.

3.2.6: Higher is level of formality in agricultural extension organizations, better is their performance.

3.2.7: More is the flexibility of agricultural extension organizations, better is their performance.

Staff management as a micro process relates to staff salary, incentive, length of time to serve at a place and promotion opportunities and are reported to contribute toward better job performance and hence organizational performance. To test these assumptions the following minor and supporting hypotheses are postulated:

Minor Hypothesis

3.3: Performance of agricultural extension organizations is significantly and directly influenced by their staff management process.

Supporting Hypotheses

3.3.1: Higher is the level of salary of staff, better is the performance of agricultural extension organizations.

3.3.2: More is the incentive offered to staff, better is the performance of agricultural extension organizations.

3.3.3: Lower is the frequency of transfer of staff, better is the performance of agricultural extension organizations.

3.3.4: Lower is the managerial succession, better is the performance of agricultural extension organizations.

Implementing: Extension program implementation is also perceived as a micro process having several discrete variables. The major variables are supervision, coordination, communication, leadership style which are assumed to have influence on the programme implementation and hence affect the performance of the organizations directly and positively. To test these assumptions the following minor and supporting hypotheses are postulated:

Minor Hypothesis

3.4: Performance of agricultural extension organizations is directly and significantly influenced by the process of implementation of their programs.

Supporting Hypotheses

3.4.1: More is the level of co-ordination, better is the performance of agricultural extension organizations.

3.4.2: Higher is the magnitude of supervision of operational units, better is the performance of agricultural extension organizations.

3.4.3: More is the mobility of front line supervisors, better is the performance of agricultural extension organizations.

3.4.4: More is the horizontal communication among the staff, better is the performance of agricultural extension organizations.

3.4.5: Lower is the relation orientation of supervisory leadership, better is the performance of agricultural extension organizations.

3.4.6: More is the task orientation of supervisory leadership, better is the performance of agricultural extension organizations.

The performance of an extension organizations primarily depend on their educational process through which clients are educated. To make it effective the programs are spelled out into educational activities through which clients are educated for behavioral and economic changes. The magnitude of educational activities, quantity and quality of client participation have therefore profound influence on performance. The test the assumptions the following minor and supporting hypotheses are formulated:

Minor Hypothesis

3.5: Performance of agricultural extension organizations is directly and significantly influenced by their educational process.

Supporting Hypotheses

3.5.1: Higher is the magnitude of educational activities for clients, better is the performance of agricultural extension organizations.

3.5.2: Higher is the magnitude of clients participation in educational activities, better is the performance of agricultural extension organizations.

3.5.3: More is the quality of clients participation in educational activities, better is the performance of agricultural extension organizations.

Controlling: In order to ensure task performance control variables are important indeed. These are span, level and dispersion of control across hierarchical levels having profound influence on the performance of extension organizations. These variables may either singly or in aggregation are expected to have influence on the conduct of the organization and thereby influence its performance. To test these assumptions the following minor and supporting hypotheses are postulated:

Minor Hypothesis

3.6: Performance of agricultural extension organizations is directly and significantly influenced by its controlling processes.

Supporting Hypotheses

- 3.6.1: Smaller is the span of control, better is the performance of agricultural extension organizations.
- 3.6.2: Higher is the magnitude of control, better is the performance of agricultural extension organizations.
- 3.6.3: More is the dispersion of control, better is the performance of agricultural extension organizations.
- 3.6.4: Lower is the severity of punishment, greater is the performance of agricultural extension organizations.

Staff Variables

The human elements play the crucial role in determining the level of performance of an organization. The professional staff with all their background, quality and behavior is assumed to make direct influence on the performance and therefore another major hypothesis of the model is:

- 4.0: Performance of agricultural extension organizations is directly and significantly influenced by their staff.

Background of staff of an organization are reported to have influence on organizational performance. Extension organizations generally prefer to recruit staff having agricultural, rural and elite background which are assumed to have direct influence on the performance of the organizations. To test these assumptions the following minor and supporting hypotheses are postulated:

Minor Hypothesis

4.1: Performance of agricultural extension organizations is directly and significantly influenced by the background of their staff.

Supporting Hypotheses

4.1.1: More is the staff having nuclear family, better is the performance of agricultural extension organizations.

4.1.2: Smaller is the size of staff's families, better is performance of agricultural extension organizations.

4.1.3: More is the staff having agriculture as the occupation of their parents, better is the performance of agricultural extension organizations.

4.1.4: More is the income of the staff families, better is the performance of agricultural extension organizations.

4.1.5: More is the staff having rural background, better is the performance of agricultural extension organizations.

4.1.6: More is the staff having elite background, better is the performance of agricultural extension organizations.

Staff of certain qualities are expected to make wide difference in performance of an organization. The quality variables are age, education, experience, training and personality attributes which would make the human elements more effective in planning and implementing programmes which in turn enhance the magnitude of performance. To test these assumptions the following minor and supporting hypotheses are formulated:

Minor Hypothesis

4.2: Performance of agriculture extension organizations is directly and significantly influenced by the quality of their staff.

Supporting Hypotheses

4.2.1: More are the younger staff, better is the performance of agricultural extension organizations.

4.2.2: Higher is the level of education of staff, better is the performance of agricultural extension organizations.

4.2.3: Higher is the level of personal quality of staff, better is the performance of agricultural extension organizations.

4.2.4: More is the work experience of staff, better is the performance of agricultural extension organizations.

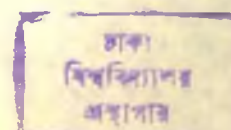
4.2.5: More is the extension work experience of staff, better is the performance of agricultural extension organizations.

4.2.6: More is the in-service training received by the staff, better is the performance of agricultural extension organizations.

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4.2.7: More is the extension training received by the staff, better is the performance of agricultural extension organizations.

4.2.8: More is the organizational tenure of staff, better is the performance of agricultural extension organizations.



Given the environment, structure and processes, staff with certain qualities and back-ground may adopt a behavioral pattern that signifies their level of commitment, motivation and job satisfaction. A highly committed, motivated and satisfied staff are assumed to keep themselves on the job and engage in work without anxiety. Structural problems along with negative behavioral pattern may result in intra-organizational conflict which might have serious implications on the performance of extension organizations. Each of these variables of staff behavioral micro system either singly or in interaction or aggregation may influence performance of the organizations. To test these assumptions the following minor and supporting hypotheses are postulated:

Minor Hypothesis

4.3: Performance of agriculture extension organizations is directly significantly influenced by the behavior of their staff.

Supporting Hypotheses

4.3.1: More is the staff having professional commitment, better is the performance of agricultural extension organizations.

4.3.2: Higher is the level of motivation among their staff, better is the performance of agricultural extension organizations.

- 4.3.3: More is the level of job satisfaction among the staff, better is the performance of agricultural extension organizations.
- 4.3.4: Lower is the absence of staff from their duty station, better is the performance of agricultural extension organizations.
- 4.3.5: Lower is the anxiety-stress among their staff, better is the performance of agricultural extension organizations.
- 4.3.6: Lower is the intra-organizational conflict, better is the performance of agricultural extension organizations.

Resource Variables

The organizations need resources to carry out its functions while clients need resources to utilize the services of the organizations. If resource needs are adequately met the organization is expected to perform better. One of the major assumption of the model is therefore:

- 5.0: Performance of agriculture extension organizations is directly and significantly influenced by the extent of their resource availability and use.

Resource need of clients are met through inputs and credit. The farmers require some imports such as seeds, fertilizers, besides, etc. to put the extension advises into operation. They also need cash or credit to finance the input use or accomplishing agricultural operations. It is therefore assumed that performance of extensions organizations is dependent on the

fulfillment of clients input and credit needs. To test these assumptions the following minor and supporting hypotheses are formulated:

Minor Hypothesis

5.1: Performance of agricultural extension organizations is directly and significantly influenced by the extent of fulfillment of the resource needs of their clients.

Supporting Hypotheses

5.1.1: More is the extent of fulfillment of purchased input needs of clients, better is the performance of agricultural extension organizations.

5.1.2: Higher is the extent of fulfillment of clients credit need, better is the performance of agricultural extension organizations.

On the other hand extension organizations have to meet their own human and capital needs in order to carry out their tasks. All components of capital needs and expenses may not have equal influence on the performance of the organizations. But it is assumed that they contribute positively to the performance of the organizations. Therefore, several minor and supporting hypotheses are postulated for empirical testing:

Minor Hypothesis

5.2: Performance of agricultural extension organizations is directly and significantly influenced by the extent of the fulfillment of their own resource need.

Supporting Hypotheses

5.2.1: Higher is the extent of manpower need fulfillment of agricultural extension organizations, better is their performance.

5.2.2: More is spent for travel of staff, better is the performance of agricultural extension organizations.

5.2.3: More is spent for logistic support of operational units, better is the performance of agricultural extension organizations.

5.2.4: More is spent for supporting contingent activities which included educational activities, better is the performance of agricultural extension organizations.

5.2.5: More is spent per client family, better is the performance of agricultural extension organizations.

Summary

The theoretical model of this study was postulated from Parsons' (1956) concept of society as the appropriate perspective of studying organizational performance as organizations produce goods and services to meet the needs of the society. Agricultural extension organizations provide out of school

educational services to help farmers increase their productivity and income. Therefore it aims to bring both behavioral and economic changes in the farming community. As the success of agricultural extension organizations depend on how far they could achieve the goals of meeting educational needs of the farmers, the goal model has been chosen as most appropriate framework of evaluating their performance. To avoid the problem of goal displacement and changibility, the attainment of professional goals were selected as the appropriate measures of performance.

The professional goals of agricultural extension organizations are to bring positive changes in attitude, knowledge, skill, technologies, productivity, income, and level of living. These 7 professional goals have been thought of as hierarchical and their accomplishments are the manifestation of their performance. Based on these goals, a professional goal model was designed what may be termed as AKSTPILL Model, representating the first letter of each goal of changing attitude, knowledge, skill, technology, productivity, income and level of living. The model seemed to be universal and can be operationalized in any agricultural extension organization.

Ninety-two environmental and the organizational variables of the five macro systems and processes, namely environment, strategy, management, staff and resources were chosen on apriori assumptions. These systems and processes have been articulated into a model of management showing their paths of relationships with performance. The aggregate influence of the systems and

processes have been assumed to be direct and significant on the performance of the organizations. The influence of individual discrete variables of different systems and processes may either be positive or negative depending upon the character of the variable. To test the assumptions, 5 major, 20 minor and 92 supporting statistical hypotheses were formulated. Based on the test results of the individual variables, the empirical validity of the proposed performance evaluation and management models will be tested.

IV. SURVEY AND ANALYSIS

Introduction

Theoretical models of performance evaluation and management were postulated earlier to measure the performance of agricultural extension organizations and to articulate organizational variable for maximizing the performance. It is now necessary to decide upon or select methodology as appropriate to this study. In this pursuit the procedure of selecting the organizations, survey and analytical plans have been chosen.

Organizations Under Study

A number of government and non-government organizations are engaged in agricultural extension work with wide variability in their structures and functions. The particulars of major organizations have been presented in Appendix-A. Two agricultural extension organizations were selected as embedding ground for testing the models and associated hypotheses.

Selection of Organizations

The following criteria were used in selecting the organizations:

1. Wide variability in management dimensions,
2. national scale of operation,
3. comparable hierarchical structures, and
4. similar field of technological base,

Based on these criteria two organizations were selected,

namely (1) Department of Agriculture Extension under the Ministry of Agriculture, and (2) Directorate of Cane Development and Research of Bangladesh Sugar and Food Industries Corporation under the Ministry of Industries. The institutes and branches which were administratively separated from the organizations and were not directly involved in extension work were excluded.

Brief Introduction of Selected Organizations

Those two organizations had a national scale of operation primarily working for crop development. The Department of Agricultural Extension operates all over the country but the Directorate of Cane Development and Research confines its operation in only 16 Sugar Mill Zones. They have comparable hierarchical structures, and are administered in two different administrative climate having variability in management variables. A brief exposition of their background, organization structure, clientele, approach and technological bases have been presented in Appendix-B.

Survey Design

Population and Sample Size

Population of this study is 15,777 service personnel and 73,63,376 client families of agriculture and sugarcane extension services. Clients are dispersed at the village level and service personnel are spread across all hierarchical levels of the organizations. Service personnel include professional staff only.

A total of 980 clients and 482 service personnel were randomly and proportionately selected across the different hierarchies of the organizations. The total and sample of operational units of the selected organizations, number of service personnel and clients have been shown in Table 5.

Table 5: Size and Distribution of Population and Samples

Population Strata	Operational Units			Service Personnel/Clients		
	Popn.!	Sample!	Percent!	Popn.!	Sample!	Percent
Service Personnel						
National, HQ	2	2	100.00	96	49	51.042
Regions	8	5	62.500	8	5	62.500
Zones	36	10	27.778	250	61	24.400
Upazilas/ Subzones	599	32	5.342	2,065	108	5.230
Units/ Blocks	13,354	64	0.479	13,354	259	1.939
Clients						
Villages	116,244	64	0.055	73,63,376	980	0.013
Total	130,243	177	0.136	73,79,149	1,462	0.020

The sample represents 3.56% of the professional service personnel and 0.013% of the clients of the two organizations (Table 5). The sample of operational units and respondents were proportional to the number of population of each of the strata of both organizations (Table 6). The geographical distribution of sample operational units have been presented in Map 1. Some of the respondents could not be interviewed or did not return the questionnaires due to (1) death, (2) transfer or migration or (3)

non-cooperative to be interviewed or (4) returning the questionnaire, inspite of repeated persuasion. A number of responses were rejected because of inaccurate or incomplete recording or inconsistent responses. Finally, 1324 responses (90%) were taken into account for analysis. The response or return of questionnaires was not uniform among all strata. Generally, respondents of Upazilas/Sub-Zones and farm families were more responsive and their response was as high as 93% (Table 7).

Selection Procedure

A stratified random sampling procedure was followed and proportionate sample of operational units and respondents were selected from each of the six strata. First, two organizations were selected according to selection criteria as stated earlier. Six Zones out of 15 (Greater districts) were randomly selected for agriculture, excluding 5 coastal and hill zones, namely Banderban, Chittagong Hill Tract, Chittagong, Barisal and Patuakhali. The exclusion was made because of extreme agro-ecological conditions of chars and hills. The selected zones were Dinajpur, Bogra, Jessore, Jamalpur, Mymensingh and Noakhali. Similarly four sugar mill zones were selected out of 13, excluding the smallest one, the Deshbandhu Sugar Mill. The selected sugar mills zones were Thakurgaon, Rajshahi, Kushtia and Zeal-Bangla Sugar Mills Zones. A proportionate sample of Sub-zones or Upazilas of each selected zones were randomly selected. A proportionate sample of professional staff was randomly

Table 6. Size and Distribution of Population and Samples Among Selected Organization.

Sample Stratas	Agriculture Extension Organization						Sugarcane Extension Organization					
	Operational Units			Service Personnel/ Clients			Operational Units			Service Personnel/ Clients		
	Total Units	Sample	%	Popn.	Sample	%	Total Units	Sample	%	Popn.	Sample	%
Service Personnel												
National HQ	1	1	100.000	69	29	42.028	1	1	100.000	27	20	74.074
Regions	8	5	62.500	8	5	62.500	-	-	-	-	-	-
Zones	21	6	28.571	105	20	19.048	15	4	26.667	140	41	29.286
Sub-zones/Upazillas	464	20	4.310	1825	72	3.945	135	12	8.889	240	36	15.000
Units/Blocks	11740	40	0.341	9860	179	1.815	1614	24	1.487	1614	80	4.957
Clients												
Villages	85650	40	0.047	70,51,000	693	0.010	30,594	24	0.078	3,12,376	287	0.092
Total	97885	112	0.114	70,62,867	998	0.014	32,359	65	0.201	3,14,397	464	0.148

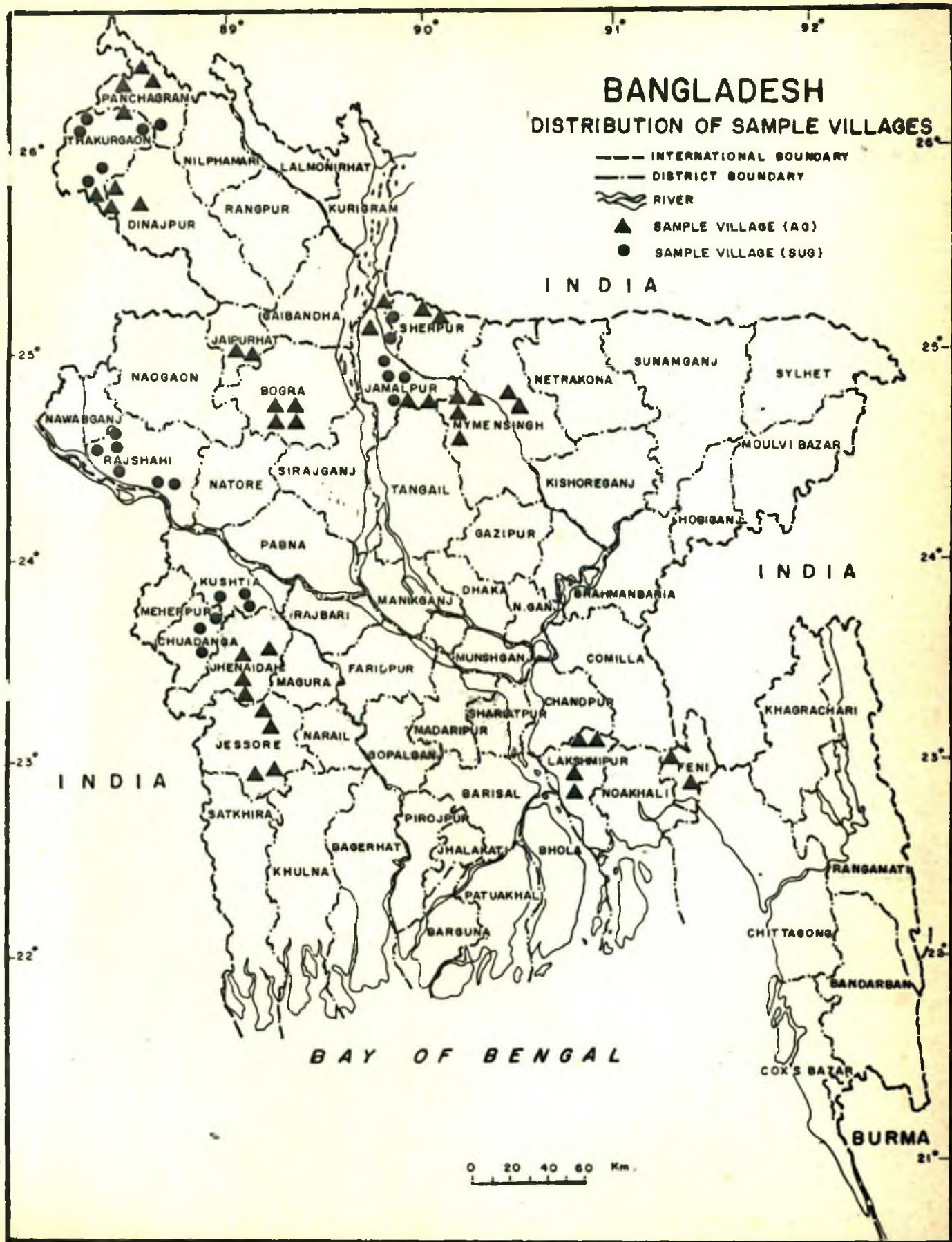


Table 7: Distribution of Primary and Final Sample of Respondents

Operational Units	Total	Agricultural Extension Organization			Sugarcane Extension Organization			Total		
	Sample	Primary	Final	%	Primary	Final	%	Primary	Final	%
	Units	Sample	Sample		Sample	Sample		Sample	Sample	
Service Personnel										
National HQ	2	29	15	52	20	14	70	49	29	59
Regions	5	5	3	60	-	-	-	5	3	60
Zones	10	27	19	70	40	36	90	67	55	82
Upzillas/ Subzones	32	76	61	80	36	43	119	112	104	93
Blocks/Units	63	182	180	99	80	66	83	262	246	94
Clients										
Farms Families	973	696	528	76	277	259	94	973	887	91
Total		1015	806	79	453	418	92	1468	1324	90

selected from each of the head quarter of the selected organizations, their regions, zones and sub-zones or Upazilas. From each selected Sub-zone or Upazila a number of village level extension workers were selected subject to a minimum of 6 and maximum of 12. Two Blocks or Cane Development Units were selected from each selected Upazilas or Sub-zones and one village of each selected Blocks or Cane Development Units were randomly selected. A proportionate sample of farmers were then randomly selected from each selected village subject to minimum of 12 and maximum of 25 farmers.

Designing Questionnaires and Schedules

Two questionnaires were designed in Bengali, one for the farmers and the other for the service personnel to collect the required data from relevant categories of respondents taking care of both general and special questions to different groups of respondents. An information schedule was also prepared to collect relevant information from official records. The questionnaires were pretested to identify and overcome problems of communication. English versions of questionnaires and schedules have been presented in Appendix-D.

Conducting the Field Survey

The list of operational units was prepared and selection was made randomly. From the selected units list of service personnel and the farmers were prepared with the help of extension workers, from which service personnel and farmers were then randomly

selected. The selected service personnel were personally met and questionnaires were handed over to them with a brief explanation. Filling of questionnaires were followed up time to time. The questionnaires were then collected after proper scrutiny. The farmers were however interviewed with the questionnaires and responses were recorded by locally employed interviewers. Persons having a minimum education of secondary school certificate level with a prior experience of survey or census work were selected as Interviewers. The selected Interviewers were oriented about interviewing, explaining about the questions and how to record responses. Their work was supervised time to time. Because some sample respondents could not complete the questionnaires, some could not be interviewed due to death or migration and some wished to avoid completing the questionnaire, overall response was only about 90 percent.

The filled in questionnaires and schedules were edited and the responses were posted in the computer transfer sheets. Data was then checked and entered in diskettes for computer analysis. The data were verified and corrected at all stages of analysis. One file was maintained for each data base of (1) farmers (F), (2) Service Personnel (SP), and (3) Official records (OR).

Analytical Plan

Data Bases

The relevance of different organizational variables differ across hierarchies of the two organizations. Hence data of

different variables were collected from three bases, Viz, Farmers as clients, the Service Personnel at all levels of hierarchies and Official Record. Farmers provided evidence of extension performance and some of the operational and environmental conditions. Service personnel provided the evidence of organizational properties. Official records provided supplementary data. By intergrating these three data bases a matrix of performance and its probable determinants was developed at the level of primary administrative units, the Upazilas and Sub-zones.

Units of Analysis

Farmers, service personnel and primary administrative units, the Upazilas and Subzones were used as units of analysis for all primary statistical analyses. For higher level of analyses like correlation and regressions, primary administrative units were taken as units of analysis. Data of all variables were aggregated or desaggregated at Upazila and Subzone level for correlation and regression analyses. Primary administrative units hve been treated as organizations as they exhibit properties of organizations such as some minimum level of formality in transting business, some minimum hierarchy of authority and so forth (Khandawalla, 1977, p.9). An Upazila or Sub-zones, being the lowest administrative unit exhibits all properties of a formal organization. They have specific goals to achieve, a definite plan of work and some degree of flexibility in administrative and financial matters to plan and carry out programs.

Testing Validity of Scales

Some of the organizational variables are intangible and were measured by surrogate measures. Twenty-eight such variables were included and measured in this study. The conceptual basis of the surrogate measures are described in the next chapter. Reproducibility, consistency and reliability of each of those scales were tested. A scale was assumed to be reproducible when the **men difference** of scores among odd and even numbers of respondents, irrespective of their administrative positions, units or groups was found to be insignificant. The internal consistency of scale items was tested through **correlation coefficients (r)** between the score of individual scale items and the total score of the scale. Significant correlation (0.05 level) between score of an item and total score of the scale was considered to be consistent. The reliability was tested through **Cronback Alpha Coefficient**. The Reliability was considered to be acceptable when the value of the coefficient exceeded 0.50 (Thorndike and Hagen, 1977, PP 56-101; Khandwalla, 1977, P.658)¹.

1. Reliability of multi-item variables was measured by the formula:

$$a = \left(\frac{n}{n-1} \right) \left(\frac{St^2 - E Si^2}{St^2} \right)$$

Where; a = Estimate of Reliability
 n = Number of Items
 St = Standard Deviation of the Test
 E = Sum of all n-items
 Si = Standard Deviation of an Item

Test of Variability in Organizational Variables

The variables and their components were compared among primary administrative units. The significance of mean difference of all quantitative variables were tested through analysis of variance separately for each data base. For qualitative variables, population distributions were tested by Chi-square and contingent coefficients. Though higher levels of significance have been indicated in the Tables, 0.05 probability level was considered as a minimum threshold level of judgement.

Correlation and Factor Contributions

All variables of the said three data bases were aggregated or desegregated against 32 selected Upazilas and sub-zones and a new matrix was developed for correlation and regression analysis. The matrix included seven goal attainments and one performance and 92 explanatory variables relating to environment, strategy, management, staff and resource.

Pearson correlation was used to ascertain the magnitude and direction of relationships among and between performance and the explanatory variables.

Paired regression, both linear and quadratic was used to ascertain the magnitude and the nature of factor contribution of each of the explanatory variables to performance. From Pearson correlation collinearity among explanatory variables were examined. The explanatory variables were step-wise regressed

with performance at micro and macro level of interactions. Examining colinearity some of the variables were excluded and step-wise regressed at holistic level of interaction to examine their factor contributing behavior.

Aggregative Systems and Processes Analysis

In order to analysis the aggregative systems and process variables the magnitude of each discrete variables was converted into standard scores taking mean value as 100. The scores of each of the discrete variables were then multiplied by a weight, the proportion of its contribution to performance as determined though multiple regression of each group with performance. Two sets of aggregate or combined variables were estimated by aggregation of transformed and weighted values of environment, strategy, management, staff and resource systems and processes and for their different micro-system and processes. A fifth matrix of aggregative systems and process were developed. These aggregate variables were again step wise regressed with each goal attainments as well as performance to ascertain th factor contribution of each system and process.

Testing of Models

Through regression analysis, paths of relationships among aggregative environment, strategy, management, staff and resource macro systems and processes were identified. Alternative paths were then regressed to ascertain their explanatory power to performance differential and to identify the critical path which

explain the highest magnitude of variation in performance of the organizations. The model assumptions were tested through regression and path analysis.

Scope of the Study

The analytical model of this study was derived from studies on general management irrespective of any particular function. The model was spelled out and tested in the context of two selected agricultural extension organizations of Bangladesh, namely Department of Agricultural Extension and the Directorate of Cane Development and Research. Hence findings of the study have direct relevance to those two organizations. As the model was designed on the basis of universal attributes of agricultural extension organizations, it also has direct relevance to the performance of agricultural extension organizations in general irrespective of their functional areas. The study also had indirect relevance to organizational management, particularly in the field of organizational performance.

The study was designed to integrate both environmental and organizational variables dimensions as predictors of performance of an agricultural extension organization. It therefore provides insight into all aspects of management of agricultural extension organizations, its environment, strategies, management processes, staff and resources. Hence it provides a broader spectrum of knowledge about the management of agricultural extension organizations and could help design principles as guide to the extension managers with particular reference to Bangladesh.

Summary

Based on the criteria of wide variability of organizational variables, national scale of operation, comparable hierarchical structures and similar technological bases two agricultural extension organizations, namely Department of Agricultural Extension under the Ministry of Agriculture and the Directorate of Cane Development and Research of Bangladesh Sugar and Food Industries Corporation under the Ministry of Industry, were selected for empirical testing of the derived models of performance evaluation and the management of agricultural extension organizations.

A stratified random sample of 980 farmers and 482 service personnel were drawn from 6 population strata of village, working units or blocks, administrative units of Upazila and Subzones, zones, regions and national head quarters. The samples were distributed in 64 villages, 64 block or units, 32 Upazila (20) and Subzones (12), 10 zones and districts, 4 regions and two national head quarters of the selected two organizations. Two questionnaires, one for farmers and the other for service personnel and information schedules were designed for collection of information taking care of general and special questions. The service personnel filled the questionnaires and farmers were interviewed by locally employed interviewers having past survey experience of conducting survey or census work. Proper orientation was given to them before interviewing and their work was closely supervised. Finally responses of 887 farmers and 437 service personnel were taken into account for analysis.

The scales of measuring intangible variables were tested for reproducibility, internal consistency and reliability to ascertain their validity. The variability of organizational variables both performance and explanatory variables were tested at primary administrative units through the use of analysis of variance. For qualitative variables biasness of population distribution was tested by using Chi-square tests. Pearson correlation (r) was used for estimating magnitude and direction of relationships among and between performance and performance explanatory variables. Factor contributions of organizational variables to performance as well as attainments of component goals were estimated at micro and macro system and process, as well as at holistic levels of interaction through step-wise regression. For all regression analyses primary data were aggregated or desegregated at Upazila or Subzone level of the organizations, which were treated as unit of analysis for higher level of analyses.

The organizational variables were aggregated at micro and macro systems and processes by transforming them into standard scores assigning proper weightages to estimate magnitude and direction of relation with and factor contributions to performance as well as attainments of component goals. Finally paths of macro-systems and processes were identified through regression analysis, and Critical path was identified through stepwise regression with performance. In all those analyses 0.05 level of probability was considered for minimum level of significance as acceptable minimum threshold of judgement and interpretation.

V. EMPIRICAL SPECIFICATIONS OF MODEL VARIABLES

Introduction

Performance and explanatory variables both discrete and aggregative systems and processes have been conceptualized earlier. In this chapter those variables have been provided with empirical specifications based on which measuring scales were designed. One of the objectives was to design and test the methodology of measuring management variables in the field of agriculture and test their validity. This objective was included in the study as most of the organizational variables are intangible and are often needed to be measured for research studies. In pursuance of this objective, the validity of measurements of multi-item scales were tested and the test results have also been presented along with their measurements.

Performance Variables

The charters of agricultural and sugarcane extension services specified their goals either explicitly or implicitly as change of attitude, knowledge, skills about the technologies they have been advocating and the diffusion of those improved technologies among the clients and help them increase their productivity, income and level of living. In a given circumstance each of those goals has an attainable maximum which is technically feasible to attain. In order to estimate the extent of goal attainments in respect of change of attitude, knowledge, skills and diffusion of new and improved technologies of transplanted aman paddy and sugarcane cultivation were selected, as agricultural extension organization had been

devoting their major time to increase food production and paddy commands 80 percent of it and the sugarcane extension had been devoting its entire effort for sugarcane cultivation. The selected technologies were as follows:-

Sugarcane

1. Recommended Varieties
2. Early Plantation
3. Trench Method
4. Sett Treatment
5. Soil Treatment
6. Balanced Fertilization
7. Top Dressing of Urea
8. Rouging of Diseased Plants
9. Mechanical Pest Control

Transplanted Aman Paddy

1. Recommended HYVs
2. Ideal Seed Bed
3. Optimum Spacing
4. Optimum Seedling Age
5. Balanced Fertilization
6. Top Dressing of Urea
7. Trace Elements
8. Pest Control
9. Timely Harvesting

Detail technical specifications of these technologies have been presented in Appendix-C. Based on these selected package of technologies changes of clients attitude, knowledge, skills and technology diffusion have been estimated as follows :

Attitude Change Attainment

A Likert scale of summated ratings was designed to measure change of attitude toward elected technologies. Three statements were constructed expressing clients belief, feeling and action tendency in respect of each selected technology. The respondents were asked to express their extent of agreement or disagreement on a 3-point scale (1 to 3) to each of those 27 statements. The

total attitudinal scores ranged from 27 to 81. The highest scale value (81) was considered as potential level which an organization may intend to achieve. The expressed responses were summated to measure the actual level of attitude to the selected package of technologies. The scale was found to be reproducible as the variance of actual attitudinal scores among the random sub-samples (odd and even) were insignificant (Table 8). The items of the scale were found to be internally consistent as correlation between score of each item to total scale value was significant from 0.05 to 0.001 level (Table 8). The reliability coefficient (alpha) was 0.66 which was assumed to be high enough to consider the scale as reliable. The scores ranging from 21 to 40.5, 40.6, to 67.5 and 67.6 to 81 signify negative, neutral and positive attitude. The attitude change attainment was estimated from actual attitudinal level as percent of potential level. Both actual magnitude and attainment were then aggregated at the level of primary administrative units, Upazilas/Subzones for analytical and interpretational purposes.

Knowledge Transfer Attainment

A simple knowledge test was administered to estimate the level of acquired knowledge regarding the selected package of technologies. Two questions were asked to each respondent regarding each technology, each carrying 5 points for correct answer and zero for entirely incorrect answer. For example, the respondents were asked two questions for recommended varieties to judge how much they know about the names of the recommended varieties and their characteristics. Similar questions were

Table 8: Reproducibility, Consistency and Reliability of Selected Measuring Scales

NO	Variables	Reproducibility: Odd/Even Mean Diff. (F-Values)	Consistency: Range of r between item and Scale Values.	Reliability: (Cronback 2 Alpha Coeff.)
X2	: Attitude Toward Technology	0.585 NS	0.18* - 0.503***	0.66
X21	: Product Market Difficulty	1.897 NS	0.469*** - 0.752***	0.77
X30	: Attitude Toward Change	0.001 NS	0.25** - 0.52***	0.95
X33	: Socio-Political Influence	0.130 NS	0.91*** - 0.95***	0.97
X34	: Inter Organizational Relation	0.188 NS	0.97*** - 0.99***	0.98
X35	: Inter Organizational Conflict	0.143 NS	0.97*** - 0.98***	0.78
X39	: Technology Adoptability	0.000 NS	0.19* - 0.57***	0.94
X40	: Technological diversity	0.171 NS	0.64*** - 0.78***	0.91
X41	: Client Orientation	0.321 NS	0.75*** - 0.81***	0.83
X43	: Participativeness	0.532 NS	0.67*** - 0.77***	0.83
X44	: Coerciveness	0.860 NS	0.55*** - 0.66***	0.55
X45	: Performance Aspiration	0.114 NS	0.46*** - 0.71***	0.81
X47	: Programme Soundness	1.507 NS	0.62*** - 0.80***	0.91
X48	: Staff Participation in Programming	0.459 NS	0.64*** - 0.84***	0.92
X49	: Role Conflict	4.442*	0.30*** - 0.58***	0.60
X53	: Strategic Authority	0.349 NS	0.59*** - 0.77***	0.89
X54	: Tactical Authority	0.000 NS	0.42*** - 0.76***	0.87
X55	: Formalization	0.032 NS	0.20* - 0.59***	0.58
X56	: Flexibility	0.022 NS	0.44*** - 0.67***	0.77
X61	: Coordination	3.764 NS	0.65*** - 0.73***	0.77
X64	: Horizontal Communication	0.142 NS	0.51*** - 0.71***	0.52
X65	: Supervisory Leadership (Relation orientation)	0.279 NS	0.56*** - 0.80***	0.81
X66	: Supervisory Leadership (Task Orientation)	1.730 NS	0.67*** - 0.86***	0.87
X69	: Quality of Client Participation	0.018 NS	0.76*** - 0.92***	0.95
X71	: Level of Control	0.017 NS	0.41*** - 0.79***	0.88
X90	: Job Satisfaction	0.119 NS	0.52*** - 0.76***	0.89
X92	: Anxiety-Stress	0.383 NS	0.53*** - 0.82***	0.89
X93	: Intra-Organizational Conflict	0.104 NS	0.76*** - 0.85***	0.93

Note : 1. *, **, *** Mean 0.05, 0.01 and 0.001 levels of Significance respectively.
2. Cronback Alpha Value exceeding 0.50 was considered to be Significant.

asked for each technology. The total scores ranged from zero to 90. The highest score 90 was presumed to be attainable or potential level representing a fair knowledge about the selected technologies and the actual scores obtained by a respondent as achieved level. The ranges of scores from 1 to 30, 31 to 60 and 61 to 90 signify low, average and high levels of technological knowledge respectively. The attainment of knowledge transfer was then estimated from the actual knowledge level as percent of the potential level of primary administrative units, Upazilas or Subzones.

Skill Development Attainment

The skill level was measured by achieved practice of certain things which signify skillfulness in applying or using a technology. The respondents were asked whether they do two specific things in applying or using each technology; each carrying 0 to 5 points for skill. The total skill scores ranged from Zero to 90. The highest score was taken as potential or attainable level and the score secured by each respondent as achieved level. The ranges of scores from 1 to 30, 31 to 60 and 61 to 90 signify low, average and high levels of skill respectively. The attainment of skill development was then estimated from the achieved level as percent of potential or attainable level. The scores of individual respondents were aggregated at the level of primary administrative units of the organizations, Upazilas or subzones.

Technology Diffusion Attainment

The respondents were asked in how much of the area of paddy or sugarcane cultivated they applied or used a technology i.e. **attained level of diffusion**. The total area of paddy or sugarcane plantation or the area which was technically feasible for applying or using a technology was considered as **potential area of diffusion**. For example the portion of medium low land of paddy was considered as potential area for adopting HYVs and the total paddy land was considered as potential area for adopting optimum spacing, optimum seedling age, etc. Technology diffusion attainment was then estimated from the actual adopted area as the percent of the potential area of diffusion. The actual area of diffusion and attainment of technology diffusion was then aggregated at the level of primary administrative units, Upazilas or Subzones.

Productivity Increase Attainment

Per acre productivity was measured by using value added concept expressed in terms of thousand Taka per acre. The highest per acre productivity was considered as **potential or attainable level of productivity**. The productivity increase attainment was estimated from the actual per acre productivity as the percent of attainable level of productivity. Both actual level of productivity and productivity increase attainment was then aggregated at the level of primary administrative units, Upazilas or Subzones.

Income Increase Attainment

Per capita income of each farm family was estimated by taking account of incomes from all agricultural and non-agricultural sources. The observed highest per capita income was considered to be attainable or potential level. Income increase attainment was measured from attained income level as the percent of the highest per capita income attained. The highest per capita income was presumed to be attainable if assisted by the extension personnel effectively.

Level of Living Improvement Attainment

Level of living is commonly measured by assigning scores to varying level of material possessions. Often elements of health, education and social status are also integrated in the scoring system. Alternately, level of living was measured in this study as per capita value of all goods and services consumed including value of subsistence. This was presumed to be more effective measures as it would signify ability to sustain higher level of subsistence consumption and maintenance of material possessions as well as affluent consumption. The highest per capita level of living among the clients was perceived as the potential level of living which could be attained by other clients, if extension would work effectively. The attainment of level of living as percent of the potential level of living. Both absolute level and attainment of the level of living improvement was aggregated at the level of primary administrative units, Upazila or Subzones.

Performance

The performance of agricultural extension organizations was estimated in two ways to test methodological validity. First, the percent of attainable level of each of the 7 component goals of extension namely, change of attitude, knowledge, skill, diffusion of technologies, productivity, income and level of living of each client respondent were aggregated as simple average. An weighted average was not possible due to difference in unit of measurements. Secondly, the proportion of attainable level of each goal was assigned a value 1, 2, 10 to corresponding value of 0 to 0.10, 0.11 to 0.20, 0.21 to 0.30, 0.31 to 0.40, 0.41 to 0.50, 0.51 to 0.60, 0.61 to 0.70, 0.71 to 0.80, 0.81 to 0.90, 0.91 to 1.0 and then the scores were summated to arrive at a cumulative level of attainable goals achieved. The scores varied from 0 to 10 for each goal and from 0 to 70 for the attainments of all goals as measures of performance. Both measures were found to be highly correlated ($r=0.70^{***}$). The summated rating was however finally used as estimate of performance of agricultural extension organizations. The ranges of scores from 0 to 23, 24 to 47 and 48 to 70 were perceived as low, medium and high levels of performance respectively.

Environmental Variables

Agro-ecological Variables

Solar Energy : Solar energy as a major component of

environment plays vital role in increasing productivity. It was measured as number of days of clear sunshine received by an operational unit. The record of sunshine was taken from local centres of metrological department. The data from the nearest such centre of a Subzone or Upazila were collected from the reports of Bangladesh Statistical Bureau.

Rainfall: Average rainfall for each Upazila or Sub-zone was taken from the nearest metrological centre as reported by the BBS in cm per year.

Environmental Risk: Environmental risk is perceived as probability of crop damage due to natural hazzards like flood and drought, the two major source of crop failure in Bangladesh. An index of environmental risk was developed combining both flood and drought incidence. Bangladesh Bureau of Statistics signifies prevalence of flood and drought at three levels 0,+,,++ and reported intensity of both flood and drought for each Upazila. A score of 0,5, 10 was assigned for those three levels respectively both for flood and drought and a combined score was arrived at for each Upazila or Sub-zone, signifying degree of environmental risk as a whole.

Productive Capacity of Land: Productive capacity of land of an operational unit was measured by area of double and triple cropping under rainfed condition as percent of total arable land. This is a traditional method of estimating productive capacity of land of a region. The method was used as detail soil analysis was not possible.

Irrigation Coverage: Irrigation coverage was measured by area of irrigated land covered by all methods of irrigation as percent of total arable land of a primary administrative unit, Upazila or Subzone.

Accessibility: Accessibility is perceived as the relative easiness to travel through a primary administrative unit. It was measured as road millage. Both metallic and non-metallic roads were taken into account as modes of transport at that level are bicycles or motor cycles which are plyable in all types of roads.

Economic Variables

Operational Farm size: Operational farm size is the area of land in acres cultivated by a farm family either owned, share cropped or leased in.

Tenurial Structure: The farms are operated under three tenurial system, namely own ownership, ownership-cum-share cropping and share cropping only. The tenurial structure was represented as the percent of farms operated as own ownership in a primary administrative unit, Upazila or Subzone.

Subsistence Pressure: Subsistence pressure was measured as per capita operational farm size available for livelihood of a family. The assumption was that smaller is the per capita operational farm size, highest is the subsistence pressure.

Draft Power Availability: The draft power availability was measured as an area of operational farm size per pair of bullock power. In order to estimate the bullock power a pair of bullock

was considered as 1.0, a pair of cow as 0.5 and a pair of buffalo as 1.5. All adult cattle heads used for cultivation was multiplied by the aforesaid factors and available bullock power per family was estimated. Then area of operational farm size per pair of bullock was estimated. It may be mentioned that none of the sample respondent owned any mechanical power for cultivation.

Family Labour Availability: It was estimated as man days of family labour available per acre of operational farm size. The available family labour was estimated as the number of family members working regularly on a farm multiplied by 300 days of the year. It was then divided by the operational farm size.

Commercialization: It is defined as the degree of marketable surplus produced by a farm family and was measured in terms of percent of produces sold in the market after meeting the consumption of the family members.

Product Market Difficulty: It was perceived as the degree of difficulty experienced by a farmer in marketing the agricultural products, which in this case, was paddy or sugarcane as these crops were the basis of estimating extent of technological diffusion. The farmers were asked to express the degree of difficulty experienced for eight elements of marketing their products, namely timely harvesting, storing, preparing for sales, transporting to market or sale centres, having fair price, assured selling, assured price and buyers' behaviour on a 4-point scale from 1 to 4 expressing no difficulty, little difficulty, much difficulty and very much difficulty. The summated scores

ranged from 8 to 32. The scale found to be reproducible as variance among radomly chosen sub-samples (odd and Even) were insignificant (Table 8). The scale items were internally consistant as the correlation between item scores and total score of the scale was highly significant ($r=0.469^{***}$ to 0.752^{***}). The reliability of the scale was significantly high as the reliability coefficient was 0.77 (Alpha coeff.). The ranges of scores from 8 to 16, 17 to 24, 25 to 32 signify existence of low, medium and high levels of product market difficulty respectively.

Socio-psychological Variables

Clients Family Size: It is represented as number of members per client family.

Client Literacy: It was expressed as the percent of clients capable of reading and writing in an operational unit.

Clients Formal Education: It was expressed as percent of clients having primary and above level of education in a primary administrative unit.

Clients Mass Communication Exposure: Mass Communication exposure was measured as the percent of clients of a primary administrative unit having regular access to mass communications such as radio, televison and news papers.

Clients Organizational Participation: Organizational participation is taking part in the activities of different organizations namely, informal associations, clubs, councils, committees, etc. It was represented as the percentage of clients

of an unit haing membership to one or more of such organizations.

Clients Co-operative Membership: This was represented by the percent of clients of a primary administrative unit having membership to co-operative societies.

Clients Leadership Experience: It was represented as the percent of clients of a unit having leadership experience in managing the local institutions.

Client-patron Relationship: It is perceived as relation between two individuals involving exchange relationship. Such relationship may exist among the clients themselves or in between the clients and change agent. The latter was included as the former is not relevent to this study. The respondent was asked whether they had close relationship with the Block Supervisor or Cane Development Assistant on the basis of exchange of goods and services for mutual benefits. The extent of such relation was expressed as percent of clients of a primary administrative unit having such relationship with agricultural or sugarcane extension workers.

Clients Attitude Toward Change: A Likert scale of summated ratings was designed to measure the magnitude of attitude of clients toward general changes in the society. Ten statements were designed expressing clients belief, feeling and action tendency toward selected changes relating to means of progress, new technology, traditional practices, innovative initiatives, fear of change, helping others to change, accepting change

advise, investing for change advice and accepting socially disapproved profitable changes.

The respondent were asked to express their extent of disagreement or agreement on a three point scale from 1 to 3; one denoting strong disagreement and 3 strong agreement and 2 being undecided. The ratings were summated ranging from 10 to 30. The ranges of scores from 10 to 15, 16 to 24 and 25 to 30 are as negative, neutral and positive attitude toward change.

The scale was reproducible as the variance of mean scores between random sub-samples was not significant (odd/even). Scale items were found to be internally consistent as the correlations between individual item scores and the total scale score were highly significant (0.001 level) and its overall reliability was highly significant ($\alpha=0.95$) (Table 8).

Political Variabels

Political Consciousness: It was perceived as the commitment to certain political philosophy and processes and was represented as proportion of farmers of a primary administrative unit having registered membership of political parties.

Political Participation : Political participation was represented as percent of farmers taking part in casting votes during last presidential election of the country (1981).

Socio-political Influence: Socio-political influence was perceived as the extent of influence exercised by the socio-politically influential personalities of the society in the

matters of planning and operation of the extension programs. It was measured through the use of a scale designed on the basis of the principle of summated ratings. The probable elements of influence were identified as selecting operational area, selecting clients, setting targets, evaluating program operation, employment, promotion, reward and punishment and professional development of extension personnel. The extension personnel having supervisory and administrative responsibility as heads of office were asked to assess the extent of such influence on each of those elements in a 5-point scale denoting 1 having no influence and 5 having very much influence and 2, 3, 4 as in between. The scores ranging from 8 to 40 were summated as the extent of socio-political influence at primary administrative units.

The scale was reproducible as the variation among random sub-samples (odd and even) was insignificant (Table 8). The scale items were internally consistent as the correlations between scores of items and total scores of the scale ranged from 0.91*** to 0.95***. The reliability of the scale was significantly high ($\alpha=0.97$) (Table 8). The ranges of scores from 8 to 16, 17 to 24, 25 to 32 and 33 to 40 signify prevalence of low, medium, high and very high levels of socio-political influence on extension program administration respectively.

Organizational Variables

Inter-organizational Relationship: Extension organizations in Bangladesh operate through interaction with a number of

organizaions among whom six are significantly important, namely civil administration, local governments, rural development board, input supply agencies, banks and co-operatives. The extension personnel having responsibility of headsof offices were asked to evaluate their relation with each of those six organizations on the basis of five elements which signify relation with them namely, frequency of contact, basis of contact, mutual influence, mutual dependence of success and goal compatibility on a 5-point scale. The summated scores for all organizations and elements of relation ranged from 30 to 150. The ranges of scores from 30 to 70, 71 to 110 and 111 to 150 signify existance of low, medium and high level of inter-organizational relationship respectively. The scale was reproducible as the variation of mean score values among random sub-samples (odd/even) was not significant ($F=0.188NS$) (Table 8). The scale items were internally consistant as the correlation coefficients between scale items and the scale value ranged from 0.97*** to 0.99***. The reliability of the scale was significantly high ($\alpha=0.98$).

Inter-organizational Conflict: Inter-organizational conflict was perceived as extent of disagreement and tension experienced by the members of an organization in interacting with the members of related organizations.

The extent of conflict was estimated by the extension personnel haaving responsibility of heads of offices through evaluation of the prevalence of six elements of conflict namely, interference, overstatement, informationdistortion, information

obstruction, value incompatibility and philosophical difference with each of the six organizations namely, civil administration, local government, rural development board, input supply agencies, banks and co-operative on a 5 point scale. The total scores ranged from 36 to 180 and were aggregated at different operational levels. The ranges of scores from 36 to 84, 85 to 132 and 133 to 180 signify existence of low, medium and high levels of inter-organizational conflict respectively. The scale was reproducible as the variation of responses among the random sub-samples (odd and even) was not significant (Table 8). The scale items were internally consistent as the correlations between items and the scale values were highly significant ($r=0.97***$ to $0.98***$). The reliability was also high ($\alpha=0.78$).

Models and Approaches

Extension Models: Model refers to steps in setting educational function or pattern of educational activities. The administrative units included in the research were operating under three models, namely Training and Visit, Advisory Service and Mixed. The first model included all Upazilas of Dinajpur and Bogra agricultural zones, the second model included all Upazilas of Jessore, Mymensingh, Jamalpur and Noakhali agricultural zones and all Sub-zones of sugarmill-zones represent the third model. The models were represented as dummy variable in the regression analysis.

Functional Exclusivity: Functional Exclusivity refers to the extent of involvement of extension personnel in out of school

educational activities only. It was measured as the percent of time the extension personnel were spending for educational activities on an yearly basis.

Universality in Contact: It refers to proportion of clients having direct contact with the extension personnel. It was measured from the number of Contact Farmers or Supervised Farmers as the percent of total number of potential client farmers in an administrative unit.

Technological Statagic Variables

Technology Adoptability : It is perceived as degree of applicability of a package of technologies in terms of certain attributes. It was measured through a scale designed on the basis of the principles of summative ratings. Ten attributes of a technology were indentified such as technical soundness, value compatibility, simplicity, trialibility, divisibility, input intensity, labour intensity, visibility, communicability and profitability. The respondents were asked to evaluate the adoptability of each of the selected attributes on a 3-point (1 to 3) scale. The scores were averaged for all 9 technologies and ranged from 10 to 30. The ranges of scores from 10 to 17, 18 to 23 and 24 to 30 signify low, medium and high adoptability of recommended technologies respectively. The scale was reprodurable ($F=0.000$ NS), internally consistent ($r=0.19^*$ to 0.57^{***}) and highly reliable ($\alpha=0.94$) (Table 8).

Technological Diversity: Technological diversity refers to the width of technological base inwhich extension personnel

advise their clients. The respondents were asked to express the extent of technological coverage given by an extension worker in advising them in each of the 12 fields namely, agricultural production (crops), agricultural production (livestock, forest and fisheries), marketing of agricultural produces, preservation and use of agricultural resources, home management and development, health and family planning, youth development, development of local leadership, social development, public welfare and formal education on a three point scale (1 to 3) signifying extent of coverage of each field. The ranges of scores from 12 to 20, 21 to 28 and 29 to 36 signify low medium and high levels of technological diversity respectively. The scale was reproducible as the mean difference of responses of random subsamples was not significant ($F=0.171$ NS). The scale items were found to be internally consistent as the r -values between items and scale ranged from 0.64*** to 0.78***. The reliability of the scale was significantly high ($\alpha=0.91$) (Table 8).

Client Orientation: Client orientation was perceived as predisposition of an extension organization in respect of clients needs and capabilities. The extent of client orientation was measured as the degree of importance assigned to clients economic condition, social condition, current problems, felt need, physical and mental ability in planning and implementing extension programs by extension personnel on a 5-point scale. The total scores ranged from 6 to 30 for each respondent and were aggregated at primary administrative units. The ranges of scores from 6 to 14, 15 to 22 and 23 to 30 signify existence of low,

medium and high levels of client orientation respectively. The scale was found to be reproducible ($F=0.321$ NS), internally consistent ($r=0.75^{***}$ to 0.81^{***}) and highly reliable ($\alpha=0.83$) (Table 8).

Client Participation (Decision Making): It was perceived as the extent of formal involvement or taking part in making decisions for development and operation of an extension program. Since such decisions are commonly made through either permanent or temporary committees, the percent of members of all committees represented by clients at primary administrative unit were taken as the extent of client participation.

Management Strategic Variables

Participativeness : It is the orientation of the top management in observing democratic principles of allowing employees participate in strategic decision making (Khandwalla, 1977, pp. 646-651). The extent of participativeness was measured by the extension personnel on a 7 point scale as they perceived the top management observes democratic principles of decision making in respect of technology development, adopting new program, making long term investment, changing work procedure, changing organizational structure, designing annual development program, designing employment policies and creating work facilities. The scale developed by Khandwalla (1977) was adopted in this study with necessary modification. The scores for participativeness ranged from 8 to 56 for each respondent and were aggregated at the level of primary administrative units.

The ranges of scores from 8 to 24, 25 to 40 and 41 to 56 signify low, medium and high levels of participativeness respectively. The scale was reproducible ($F=0.532$ NS), internally consistent ($r=0.67***$ to $0.77***$) and reliable ($\alpha=0.83$) (Table 8).

Coerciveness: It is an aggressive, arbitrary and dominance seeking mode of top management (Khandwalla, 1977). The extent of coerciveness was measured by the extension personnel through a 7-point scale expressing the degree of coerciveness, using 5 coercive means of management such as decision imposition as a means of resolving conflicts, alerting personnel about the consequence of non-compliance of management decisions, non-explanation of imposed changes, non-use of professional expertise for initiating changes and non-use of arbitration as a means of resolving intergroup conflicts. The scale originally designed by Khandwalla (1977, pp.649-650) was adopted in this study. The scores ranged from 5 to 35 for each respondents and was aggregated at the level of primary administrative units. The ranges of scores from 5 to 15, 16 to 25 and 26 to 35 signify the existence of low, medium and high levels of coerciveness respectively. The scale was reproducible ($F=0.850$ NS), internally consistent ($r=0.55***$ to $0.66***$) and reasonably reliable ($\alpha=0.55$) (Table 8).

Performance Aspiration: Performance aspiration was perceived as degree of emphasis assigned to goal attainments by the members of the organization. It was estimated by the extension personnel on a 5-point scale measuring the degree of

emphasis assigned in achieving 10 complementary goals of extension work such as change of clients attitude, knowledge and skills about new and improved technologies, diffusion of technologies, increase of clients productivity, income and welfare, distribution of production inputs, credit administration, client participation and utilization of resources available to the organization. Total scores of the scale ranged from 10 to 60 for each respondent and were aggregated at the level of primary administrative units. The ranges of scores from 10 to 27, 28 to 43 and 44 to 60 signify low, medium and high levels of performance aspiration among the staff respectively. The scale was reproducible ($F=0.114$ NS), internally consistent ($r=0.46***$ to $0.71***$) and highly reliable ($\alpha=0.81$) (Table 8).

Professionalization: Professionalization is perceived as extent of service personnel of an organization having professional qualification. The extent of professionalization was measured as the percent of service personnel of a primary administrative unit had degree or diploma in agriculture.

Management Process Variables

Planning Process Variables

Program Soundness: A program is said to be sound when logically established program planning steps are followed with equal importance. The extent of soundness was estimated by the extension personnel through a 5-point scale of importance assigned to each of the 12 steps of program planning such as

studying client system, identifying problems, setting priority, identifying solutions, evaluating alternatives, choosing the best solution, setting target of achievement, specifying activities, allocating responsibilities, allocating resources, establishing accountability and designing system of reporting and supervision. The scores ranged from 12 to 60 for each respondent and were aggregated at the level of primary administrative units. The ranges of scores from 12 to 28, 29 to 44 and 45 to 60 signify low, medium and high levels of soundness of programs respectively. The scale was reproducible ($F=1.507$ NS), internally consistent ($r=0.62***$ to $0.71***$) and highly reliable ($\alpha=0.91$) (Table 8).

Staff Participation in Programming: It is perceived as the extent of opportunity available to take part in program planning. The extension personnel were asked to specify the frequency of getting opportunity to take part in every step of the 12 identified steps in program planning on a 5-point frequency scale. The total scores ranged from 12 to 60 and were aggregated at various operational levels. The ranges of scores from 12 to 28, 29 to 44 and 45 to 60 signify low, medium and high levels of staff participation in program planning respectively. The scale was reproducible ($F=0.459$ NS), internally consistent ($r=0.64***$ to $0.84***$) and highly reliable ($\alpha=0.92$) (Table 8).

Role Conflict: Role conflict is defined as the prevalence of incompatible situation to a role incumbent in role performance. The degree of role conflict was measured as the extent of prevailing incompatibility between (a) available time

and workload, (b) prevailing and appropriate methods of work, (c) interest groups and common objectives of work, (d) contradictory policy and direction, (e) workload and inadequate manpower, (f) responsibility and ability, (g) contradictory and inconsistent direction from multiple sources, (h) responsibility and inadequate resources, (i) violating existing rules for work accomplishment, and (j) busy but for unnecessary work. The extension personnel evaluated the degree of prevalence of those 10 contradictory situations through a 4 point scale ranging from 1 to 4. The scores ranged from 10 to 40 for each respondent and were aggregated at the level of primary administrative units. The ranges of scores from 10 to 20, 21 to 30 and 31 to 40 signify existence of low, medium and high levels of role conflict respectively. The scale was reasonably internally consistent ($r=0.30^{***}$ to 0.58^{***}) and reliable ($\alpha=0.60$) but was not reproducible as mean difference was significant among the random subsamples ($F=4.442^*$) (Table 8).

Organizing Process Variables

Size of Operational Unit : The size of an operational unit was measured in terms of its area in square miles.

Size of Client: The average number of farm or sugarcane growing families per extension worker of a primary administrative unit was taken as the measure of the size of clients per extension worker.

Span of Supervision: The total number of technical personnel

whose work was directly supervised by a line person of a unit was taken as a measure of span of supervision.

Strategic Authority: It is defined as extent of power to make decision on strategic issues. The strategic issues were identified as technology selectio, setting objectives, selecting working procedures, structuring the organization, determining operational jurisdiction, adopting new programs, undertaking joint programs, employment policy, client participation and professional development. The service personnel evaluated their power in making decision on a 5-point scale from 1 to 5 designed on the basis of principles of Likert summative ratings. The total scores ranged from 10 to 50 for each respondent and were aggregated at the level of primary administrative units. The ranges of scores from 10 to 23, 24 to 37 and 38 to 50 signify existence of low, medium and high level of strategic authority respectively. The scale was tested and was found to be reproducible ($F=0.349$ NS), internally consistent ($r=0.59***$ to $0.77***$), and highly reliable ($\alpha=0.98$) (Table 8).

Tactical Authority: Tactical authority is defined as the power to make decisions on the tactical issues in implementing a program. The tactical issues were identified as client selection, setting priority of work, setting target of work, selecting aids, selecting method of work, allocation of responsibility of work, working time, determining training need, recognition and review of performance. The service personnel evaluated their extent of power in making decisions regarding those selected tactical issues on a 5-point scale from 1 to 5

designed on the basis of principles of Likert summative ratings. Total scores ranged from 10 to 50 for each respondent and were aggregated at the level of primary administrative units. The ranges of scores from 10 to 23, 24 to 37 and 38 to 50 signify the existence of low medium and high levels of tactical authority respectively. The scale was tested and was found to be reproducible ($F=0.000$ NS), internally consistent ($r=0.42^{***}$ to 0.76^{***}), and highly reliable ($\alpha=0.87$) (Table 8).

Formalization: Formalization is defined as extent of communication and work procedures were written down, communicated and adhered to (Hage and Aiken, 1967). In order to estimate the extent of formalization 12 statements were framed expressing various aspects of formality and the respondents were asked as to how true was the prevalence of such formalities in their organization on a 4-point scale from 1 to 4 on the basis of the principles of Likert summative ratings. The total scores ranged from 12 to 48 for each respondent and was aggregated at different operational units. The range of scores from 12 to 24, 25 to 36 and 37 to 48 signify the existence of low, medium and high degrees of formalization respectively. The scale was tested and was found to be reproducible ($F=0.032$ NS), internally consistent ($r=0.20^*$ to 0.59^{***}) and reasonably reliable ($\alpha=0.58$) (Table 8).

Flexibility: Flexibility is defined as changibility of structural organization. The degree of flexibility was estimated by the service personnel on a 5 point scale designed on the basis of the principle of Likert summative ratings signifying the

frequency of changes as related to organization structure, job title, job structure, place of work, allocation of responsibility, working method, employment policy, operational policy and work program. The scores ranged from 9 to 45 and were aggregated at the level of primary administrative units. The ranges of scores from 9 to 21, 22 to 33 and 34 to 45 signify low, medium and high levels of flexibility respectively. The scale was tested and was found to be interanally consistent ($r=0.44***$ to $0.67***$), reproducible ($F=0,022$ NS) and highly reliable ($\alpha=0.77$) (Table 8).

Staff Management Process Variables

Salary Level: Salary level was represented as average per annum salary in thousand taka received by an individual including fringe benefits in 1982-83.

Incentive : It was the value of cash and kind in thousand Taka received by a service personnel of an operational unit as in 1982-83 for commendable work.

Transfer Frequency: It was the average interval in years an incumbent was transferred from one place to another both with or without promotion through out the organizational tenure.

Horizontal Communications: Level of horizontal communication is perceived as the intensity of exchange of information, both formal and informal through different channels of communications. It was estimated by service personnel on a 5-point scale of Likert summative ratings signifying the intensity

of use from 1 to 5 of each of 5 means of communication, namely face to face discussion, telephonic talk, formal meeting, exchange of letters and social activities. The scores ranged from 5 to 25 for each individual and was aggregated at primary administrative units. The ranges of scores from 5 to 12, 13 to 18 and 19 to 25 signify the prevalence of low, medium and high levels of horizontal communications respectively. The scale was tested and was found to be reproducible ($F=0.142$ NS), internally consistent ($r=0.51^{***}$ to 0.71^{***}) and reasonably reliable ($\alpha=0.52$) (Table 8).

Supervisory Leadership (Relation Orientation): It is perceived as relation orientation of superior-subordinate relationship. The service personnel estimated the degree of orientation of their boss-subordinate relation for each of the six bases of relation such as prior acquaintance, friendship or family ties, inhabitants of same locality, student of same educational institutions, of same professional education, personal loyalty and personal service on a 5-point scale of Likert summative ratings. The scores ranged from 6 to 30 for each individual and were aggregated at the level of primary administrative units. The ranges of scores from 6 to 14, 15 to 22 and 23 to 30 signify the prevalence of low, medium and high levels of relation oriented supervisory leadership respectively. The scale was tested and was found to be reproducible ($F=0.279$ NS), internally consistent ($r=0.56^{***}$ to 0.80^{***}) and highly reliable ($\alpha=0.81$) (Table 8).

Supervisory Leadership (Task Orientation): It is perceived as task orientation of superior-subordinate relationship and was measured through 5-point scale (1 to 5) signifying the degree of influence of each of the six task based relation namely, ability, initiative, timeliness and discipline, achievement determination, target achievement, working beyond office hours by the service personnel. The total scores ranged from 6 to 30 for each individual and was aggregated at different levels of operational units. The ranges of scores from 6 to 14, 15 to 22 and 23 to 30 signify the existence of low, medium and high levels of task orientation of supervisory leadership respectively. The scale was tested and was found to be reproducible ($F=1.730$ NS), internally consistent ($r=0.67***$ to $0.86***$) and highly reliable ($\alpha=0.87$) (Table 8).

Educational Process Variables

Level of Education Activities: It was perceived as the magnitude of educational activities organized by extension workers and supervisors per working unit, and was measured in terms of time spent in a year. The time was estimated by summing the number of activities performed such as meetings, demonstrations, visits, etc. multiplied by average duration of each of those activities expressed in staff days. On an average agricultural extension organizations of Bangladesh were conducting 255.11 staff hours (SHs) educational activities (± 421.08) annually in an working unit which was estimated to be 11.61 percent of the available total time for an working unit¹.

It excluded preparation and travel time as well as time spent for other official duties. In an ideal situation it should be about one-third of the total available time (33.33%). As the agricultural extension organizations of Bangladesh on an average spent 42.68% percent time for extension work; the time spent for educational activities was 7.85% lower than optimal. Therefore, given the existing job structure there was no scope of increasing magnitude of educational activities substantially.

Client Participation (Education Activities): It was perceived as clients attendance to take part into the educational activities. The level of participation was measured as summation of time spent by a respondent for all educational activities in a year. It was calculated by summation of the products of number of each activity attended multiplied by average time spent for each activity and was expressed in Man Days.

Quality of Participation: The quality of participation was perceived as the degree of interaction between the extension workers and the participants in a educational activity. The farmers evaluated their quality of participation on a 5-point scale from 1 to 5 denoting the frequency of getting opportunity of inquiring new subjects, asking questions, seeking explanation, narrating personal experiences, correcting mistakes, commenting on the presentation, asking to demonstrate, exercising, presenting problems and holding personal discussion. The scale was designed on the basis of the principle of Likert's summative ratings. The total scores ranged from 10 to 50 for each client and was aggregated at primary administrative units. The ranges

of scores from 10 to 23, 24 to 37, and 38 to 50 signify low, medium and high levels of quality of clients participation in educational activities respectively. The scale was tested and was found to be reproducible ($F=0.018$ NS), internally consistent ($r=0.76***$ to $0.92***$) and highly reliable ($\alpha=0.95$) (Table 9).

Controlling Process Variable

Span of Control: It is the total number of professional and secretarial staff working under direct control of a head of an office.

Level of Control: Control is perceived as regulation of behaviour and outputs (Ouchi, 1977). The level of control is defined as the extent of influence exercised by the service personnel on various aspects of program operation. Sixteen aspects were identified such as adopting new work procedure, undertaking new program, setting targets, determining quantity and quality of work, setting operational policies, choice of technologies, client selection, adopting joint program, planning organization structure, setting recruitment policies, staff employment, officers employment, promotion of staff and officers, determining emoluments, reward and punishment. The extent of influence on each of these aspects was determined by the service

1 The available staff hours of a working unit was calculated as the product of total working hours of an extension agent in year (300 days) multiplied by hours of an working day (6.5 hours) with which the aggregate share of the supervisors (3 persons) available to the working unit was added to. The total available staff hours for a working unit was estimated as 2198 per year.

personnel themselves on a 5-point scale ranging from 1 to 5, one (1) signifies no influence and 5 very high influence. The total scores ranged from 16 to 80 indicating the extent of influence exercised by each of them and was aggregated at the level of primary administrative units. The ranges of scores from 16 to 37, 38 to 59 and 60 to 80 signify the existence of low, medium and high levels of control respectively. The scale was tested and was found to be reproducible ($F=0.017$ NS), internally consistent ($r=0.41***$ to $0.79***$) and highly reliable ($\alpha=0.88$) (Table 8).

Dispersion of control: The dispersion of control is defined as the extent of distribution of control exercised by the service personnel of an administrative unit. The variance of control level among the service personnel of a unit was taken as measure of dispersion of control. Higher is the variance, greater is the dispersion of control.

Severity of Punishment: The severity of punishment is perceived as the extent of sanctions imposed by the controlling position of an operational unit. The possible form of sanctions were identified and ordered on the basis of severity such as rebuke, show cause notice, warning, suspension, salary withheld, salary increment, forfeiture of annual salary increment, financial penalty and demotion. On the basis of severity of punishment specified weights ranging from 1 to 10 were assigned. The controlling position of an administrative unit was asked to specify the number of cases the specified forms of punishment were imposed in 1982-83. The degree of punishment was then

computed from the summation of number of cases multiplied by the assigned weights for each form of punishment.

Staff Variables

Staff Background Variables

Staff Background Variables: Type of family was represented as percent of total service personnel having nuclear family.

Staff Size of Family: The size of family was represented as the number of family members among the service personnel of an administrative unit.

Staff family Income: Family income was represented as the income per staff family per year in thousand Taka from all sources.

Staff Parent's Occupation (Agriculture): Parent's occupation represent as percent of service personnel of a unit having agriculture only as their parent's occupation.

Staff Rural Back-ground: Staffs Rural back-ground was represented as the percent of service personnel of a unit spending boyhood in village.

Elite Representation: Elite representation was represented as the percent of service personnel of a unit having socio-political elites as near relatives, namely father, brother, sister, uncles and father-in-laws.

Staff Quality Variables

Staff Age : Age in years as on 30th June, 1983.

Staff Education : Education was represented as the mean successful years of formal education of the service personnel of a unit.

Staff Personal Quality : The level of personal quality of each service personnel was estimated for 20 selected qualities by their respective immediate supervisors on a 5-point scale ranging from 1 to 5. The selected qualities were initiative, intelligence, clear thinking, personality, farsightedness, acumen, perseverance, originality, tact, discipline, self-confidence, co-operation, bravery, carefulness, self-sacrifice, patience, inquiring mind, speaking ability, writing ability and honesty. The total scores ranged from 0 to 100 for each respondent and was aggregated at the level of primary administrative unit. The ranges of scores from 0 to 33.3, 33.4 to 66.7 and 66.8 to 100.00 were considered as below average, average and above average level of personal quality of staff.

Staff Work Experience : Work experience was represented as the mean years of active and regular service of all respondents of a unit expressed in years of service.

Staff Extension Work Experience : It was the period of total work experience expressed in man month spent on extension work.

Inservice Training of Staff : It was the mean period of inservice training received by an individual of a unit expressed in Man Days.

Extension Training of Staff : It was the mean period of specialized inservice training on extension education in manday received by the staff of a unit.

Staffs Organizational Tenure : It was the average years the incumbents served the organization as on 30th June, 1983.

Staff Behavioural Variables

Staffs Professional Commitment : Professional commitment is perceived as the identification into the professional activities an individual is formally and informally engaged in. Formal membership to professional association or society was considered as a measure of professional commitment.

The percent of service personnel of a unit having active membership to professional associations or societies was taken as extent of professional commitment among the service personnel of a unit.

Level of Motivation : Motivation is perceived as a mental state of willingness to make personal sacrifice for the fulfilment of organizational objectives. In order to measure the level of motivations 8 probable sacrifices were identified and ordered in importance such as extra time spent, extra responsibility, helping colleagues out of turn, personal problem in work, personal comfort, social activities, extra honorarium for extra labour, personal income and was assigned weight from 1 to 8 respectively. Each service personnel was asked to express his willingness to make each of these sacrifices. The responses

were categorized as positive and negative and were weighted as 1 and zero (0) respectively. The level of motivation was measured as sum of the product of the responses for all sacrifices the service personnel were willing to make. The scores ranged from 0 to 45 for each individual and were aggregated at the level of a unit. The ranges of score from 1 to 15, 16 to 30 and 31 to 45 signify low, medium and high level of motivation respectively.

Job Satisfaction : Job satisfaction is defined as the extent to which a staff member is satisfied with motivating and hygenic factors as identified by Herzberg (Sandhu, 1977). The motivating factors were scope of achievement, utilization of personal capability, creative work, freedom of expression, promotion, recognition and reward. The hygenic factors were organizational structure, organizational policy, physical condition of work, social status associated to work, equitable and adequate salary, job security, professional advancement and supervisors behaviour. The service personnel evaluated their extent of satisfaction for each of those factors on a 5-point scale ranging from 1 to 5; one denoting for high dissatisfaction and 5 for high satisfaction. The scores ranged from 14 to 70 and were aggregated. The ranges of scores from 14 to 33, 34 to 51 and 52 to 78 signify low, medium and high level of job satisfaction respectively. The scale was tested and was found to be reproducible ($F=0.119$ NS), internally consistent ($r=0.52^{***}$ to 0.76^{***}) and highly reliable ($\alpha=0.89$) (Table 8).

Absence from Duty Station: The absence from duty station was measured as number of staff days a staff member was out of duty

station for the purpose of training, leave, suspension, etc.

Anxiety -Stress : It is defined as staff members perception of being disturbed by job related problems (Ivancevich and Dunnelly, 1975). In order to estimate the level of anxiety-stress 10 job related problems or source of anxiety were selected. These were failure to achieve target, misuse of organizational resources, loss of seniority, maintenance of personal assets and liabilities, loss of scope of professional advancement, loss of legitimate claims, loss of public image, deterioration of boss sub-ordinate relation and loss of interpersonal relation among colleagues. The service personnel evaluated their extent of anxiety stress for each of those problems on a 5-point scale ranging from 1 to 5, one(1) denoting no anxiety and 5 high level of anxiety. The total scores ranged from 10 to 50 and were aggregated at various levels. The ranges of scores from 10 to 23, 24 to 37 and 38 to 50 signify low, medium and high level of anxiety-stress respectively. The scale was tested and was found to be reproducible ($f=0.383$ NS), internally consistent ($r=0.53***$ to $0.82***$) and highly reliable ($\alpha=0.89$) (Table 8).

Intra-Organizational Conflict: It was conceptualized as some form of interpersonal and intergroup strain or action which violates norms of co-operation but do not alter the authority and responsibility structure of the organization (Pondy, 1969, Walter, et al. 1969). The level of intra-organizational conflict was measured as how frequently the field extension branch of the organization faced problems of interference, overstatement,

distortion of information, obstruction of flow of information, inconsistent philosophy and distrust with each of the 5 branches of the organization namely, administration, finance, research, training and employee union. The total scores ranged from 30 to 150 and were aggregated at the level of primary administrative unit. The ranges of scores from 30 to 70, 71 to 110 and 111 to 150 signify low, medium and high level of intra-organizational conflict respectively. The scale was tested and was found to be reproducible ($F=0.104$ NS), internally consistent ($r=0.76$ *** to 0.85 ***) and highly reliable ($\alpha=0.93$) (Table 8).

Resource Variables

Clients Resource Variables

Clients Input Need Fulfilment : Input need is perceived as the amount of seeds, fertilizers and biocides that were needed by a client, as perceived by him. The extent of fulfilment was measured as the percent of needed amount of purchased inputs made available to him through different sources.

Clients Credit Need Fulfilment : Similar to input need fulfilment credit need fulfilment was measured as percent of the amount of credit needed by a client met through both institutional and non-institutional sources of credit.

Institutional Resource Variables

Man Power Need Fulfilment : It was measured as the

percent of sanctioned positions of a primary administrative unit was made available for work in 1982-83.

Travel Allowance : It is the amount of expense incurred on account of travel by supervisory staff of a primary administrative unit expressed in thousand Taka in 1982-83.

Logistic Supports : It is the expense incurred on account of providing logistic support to the office of a primary administrative unit expressed in thousand Taka as in 1982-83.

Contingent Expenses: It is the amount of expenses incurred to meet the contingent expenses of a primary administrative unit in 1982-83. It includes the expenses on educational activities also.

Expenses per Client Family : The operating cost of national, regional and zonal offices were distributed in proportion to the number of Upazilla or Sub-Zones and added to the total operational expenses of the Upazilla or Subzones. The total expense was then divided by the number of client families of the unit.

PART C : PERFORMANCE AND ITS MICRO AND MACRO MODELS

- CHAPTER VI : PERFORMANCE OF AGRICULTURAL EXTENSION ORGANIZATIONS
- CHAPTER VII : ENVIRONMENTAL DETERMINANTS OF PERFORMANCE
- CHAPTER VII : STRATEGIC DETERMINANTS OF PERFORMANCE
- CHAPTER IX : MANAGEMENT DETERMINANTS OF PERFORMANCE
- CHAPTER X : STAFF DETERMINANTS OF PERFORMANCE
- CHAPTER XI : RESOURCE DETERMINANTS OF PERFORMANCE

VI. PERFORMANCE OF AGRICULTURAL EXTENSION ORGANIZATIONS

Introduction

Theoretical models of performance and its determinants have been postulated earlier with six major components namely environment, strategy, management, staff, resources and performance. Each of them is a multivariate variables. Prior to explore the determinants of performance an attempt has been made in this chapter to examine the performance evaluation model with particular reference to :

1. magnitudes of behavioral and economic changes occurred among the clients of agricultural extension organizations,
2. extent of the attainments of goals as well as performance of agricultural extension organizations,
3. variation in the attainments of goals as will as performance of agricultural extension organizations,
4. magnitudes and directions of relationships among the attainments of different goals,

Significant variation, if any would provide a strong basis for examining the explanatory variables. The magnitude and directions of relations among goal attainments may provide the basis of testing the basic assumption of the proposed AKSTPILL Model of performance evaluation.

Table 9 : Attainment of Attitude Change by Primary Administrative Units of Agricultural Extension Organizations

Primary Administrative Units	Magnitude of Attitude (Scores : 27-81)	Attainment (% of Potential Level)
Agricultural Extension Organization : Upazilas		
1. Panchagarh	64.30	79.36
2. Atoari	65.00	80.25
3. Kaharol	64.21	79.17
4. Bochaganj	67.97	83.88
5. Khetlal	64.67	79.88
6. Bogra Sadar	78.83	91.25
7. Kahalo	62.38	77.00
8. Bagherpara	72.09	89.00
9. Keshabpur	62.93	77.64
10. Kaliganj	69.41	85.62
11. Jhenaidah	62.88	77.58
12. Gouripur	67.33	83.12
13. Muktagacha	63.45	78.28
14. Fulbaria	65.56	80.91
15. Jamalpur Sadar	68.57	84.61
16. Jhenaigati	71.79	88.64
17. Dewanganj	68.36	84.27
18. Lakhipur	64.14	79.08
19. Ramganj	70.54	87.04
20. Feni	68.10	84.12
Sugarcane Extension Organisation : Subzones		
21. Khochabari	68.25	84.25
22. Baliadangi	65.04	80.33
23. Pirganj	71.62	88.38
24. Milgate B (RJSM)	71.44	88.16
25. Rajshahi A	68.81	84.88
26. Sarda	67.73	83.64
27. Miligate A (KSM)	71.67	88.58
28. Allardanga	70.80	87.46
29. Madhupur	69.35	85.46
30. Milgate A (ZBSM)	74.13	91.61
31. Melanda	67.71	83.62
32. Nandina	68.40	84.55
Grand Mean	67.65	83.51
Standard Deviation	5.85	6.08
MSS : Between Units	301.07 ***	466.32 ***
MSS : Within Units	34.20	52.76

Attainments of Goals

Attainments of goals as components of performance of the organizations have been examined separately to have deeper insight into the performance and its componential elements.

Attitude Change

The average attitudinal scores was found to be 67.65 (+5.85) (Table 9). Clients of agricultural extension organizations seemed to have marginally positive attitude toward the technologies being promoted by the organizations (67.6 to 81.0). Considering the highest scale value of 81.0 as potential level the aggregate attainments of the goal changing clients' attitude was 83.51 percent (+6.08). On an average a technology has been introduced 17.27 years ago. Hence the rate of change of attitude was found to be 4.83.% per year.

The change of attitude was not similar among different technologies (Table 10). Attitude score for a single technology

Table 10 : Magnitude and Attainment of Attitude Change by Different Technologies

Technologies	: Years of	: Mean Magni-	: Attain-
	: Introduc-	: tude of	: ment
	: tion	: Attitude	: (%)
A. Transplanted Aman Paddy			
1. Recommended Varieties	25	7.68	85.33
2. Model Seed Bed	15	6.79	75.44
3. Optimum Spacing	14	7.82	86.89
4. Optimum Seedling Age	25	6.84	76.00
5. Balanced Fertilization	20	7.77	86.33
6. Top Dressing of Urea	15	7.80	86.67
7. Use of Trace Elements	8	5.38	59.77
8. Pest Control Measures	15	7.78	86.44
9. Timely Harvest	30	7.95	86.67
Mean	18.56	7.42	82.48

B. Sugarcane

1. Recommended Varieties	15	7.85	87.22
2. Early Plantation	18	7.59	84.33
3. Trench Method	15	7.74	86.00
4. Sett Treatment	20	7.32	81.33
5. Soil Treatment	12	7.01	77.89
6. Balanced Fertilization	16	8.16	90.67
7. Top Dressing of Urea	15	8.32	92.44
8. Rouging	18	7.80	86.87
9. Pest Control Measures	15	7.87	87.44

Mean	16.0	7.74	86.03

ranged from 3 to 9. The range of scores from 3.00 to 4.50, 4.51 to 7.50 and 7.51 to 9.00 was defined as negative, neutral and positive respectively. The paddy growers were found to have the highest positive attitude towards timely harvest followed by optimum spacing, top dressing of urea, pest control measures, balanced fertilization, recommended varieties; while their attitude toward the age of seedlings, model seed bed preparation and use of trace elements was still not positive (Table 10). They were however not negative to any of the selected technologies of paddy cultivation. On the other hand sugarcane growers demonstrated positive attitude toward all selected technologies. They were more positive toward top dressing of Urea followed by balanced fertilizations, pest control measures, recommended varieties, rouging, trench method of planting, early plantation, sett treatment and soil treatment for sugarcane cultivation (Table 10). It seemed that sugarcane extension service attained more change in attitude of its clients as compared to agricultural extension service.

Significant variation was also observed among the primary administrative units, Upazillas and Subzones in bringing the change of attitude among their clients (0.001 level) (Table 9). The attainment ranged from 77.00% to 91.61% of the potential level. The units' were grouped as good, fair and poor performers.¹ Among the Upazillas Bogra Sadar, Bagherpara, Jhenaigati and Ramganj were good; Bochaganj, Kaliganj, Gouripur, Jamalpur Sadar, Dewanganj and Feni were fair and the remaining Upazillas were found to be poor performers in terms of changing the attitudes of their clients (Chart 2). Among sugar mill subzones Pirganj. Millgate-B (RJSM), Millgate -A (KSM). Allardanga and Millgate-A (ZBSM) were good and the remaining subzones were fair performers except Baliadangi which was found to be a poor attitude changer.

-
1. Magnitudes of performance was grouped by using Duncan New Multiple Range Test and presented in Chart 1. Since groups overlapped and varied in attaining different goals dividing lines were drawn at 25.69 and 28.94. Units below an aggregate goal attainment of 25.69 were grouped as poor performers, between 25.10 to 28.93 as fair performers and units having average score of 28.94 and above were good performers, although performance of all of them were below 40% of the potential level.

CHART 2: GOAL ATTAINMENTS & PERFORMANCE DIFFERENTIAL AMONG PRIMARY ADMINISTRATIVE UNITS OF EXTENSION ORGANIZATIONS

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Category	Unit	OU 1	OU 2	OU 3	OU 4	OU 5	OU 6	OU 7	OU 8	OU 9	OU 10	OU 11	OU 12	OU 13	OU 14	OU 15	OU 16	OU 17	OU 18	OU 19	OU 20	OU 21	OU 22	OU 23	OU 24	OU 25	OU 26	OU 27	OU 28	OU 29	OU 30	OU 31	OU 32	OU 33	OU 34	OU 35								
FX189: ATTITUDE CHANGE ATTAINMENT	UNITS	K	J	L	H	9	F	E	K	D	E	D	K	D	E	K	D	E	K	D	E	K	D	E	K	D	E	K	D	E	K	D	E	K	D	E	K	D	E					
	UNITS	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D				
	UNITS	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	
FX197: KNOWLEDGE TRANSFER ATTAINMENT	UNITS	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	
	UNITS	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W
	UNITS	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W
FX188: SKILL DEVELOPMENT ATTAINMENT	UNITS	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	
	UNITS	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W
	UNITS	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W
FX186: TECHNOLOGY DIFFUSION ATTAINMENT	UNITS	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	
	UNITS	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W
	UNITS	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W
FX198: PRODUCTIVITY INCREASE ATTAINMENT	UNITS	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W			
	UNITS	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V		
	UNITS	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V		
FX203: INCOME INCREASE ATTAINMENT	UNITS	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V				
	UNITS	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U			
	UNITS	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U			
FX205: LEVEL OF LIVING IMPROVEMENT	UNITS	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V				
	UNITS	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U			
	UNITS	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U			
FX220: PERFORMANCE	UNITS	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X				
	UNITS	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W			
	UNITS	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W	V	U	T	S	R	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A	Z	Y	X	W			

GOOD PERFORMERS

FAIR PERFORMERS

POOR PERFORMERS

NOTE: GROUPING IS BASED ON DUNCAN'S NEW MULTIPLE RANGE TEST

Table 11 : Attainment of Knowledge Transfer by Primary Administrative Units of Agricultural Extension Organizations.

Primary Administrative Units	Magnitude of Knowledge (Scores: 0 to 90)	Attainment (% of Potential Level)
Agricultural Extension Organisation : Upazillas		
1. Panchagarh	25.00	27.76
2. Atoari	14.83	16.42
3. Kaharol	31.25	34.75
4. Bochaganj	25.34	28.19
5. Khetlal	20.13	22.29
6. Bogra Sadar	55.42	61.67
7. Kahalo	24.04	26.67
8. Bagherpara	30.66	30.03
9. Keshabpur	13.57	15.11
10. Kaliganj	35.16	39.09
11. Jhenaidah	10.42	11.50
12. Gouripur	12.90	14.25
13. Muktagacha	25.90	28.78
14. Fulbaria	15.25	16.94
15. Jamalpur Sadar	28.29	31.49
16. Jhenaigati	32.93	36.54
17. Dewanganj	7.45	8.45
18. Lakhipur	14.86	16.63
19. Ramganj	38.46	42.75
20. Feni	31.33	34.71
Sugarcane Extension Organization: Subzones		
21. Khochabari	48.55	54.00
22. Baliadangi	14.21	15.83
23. Pirganj	22.24	24.71
24. Millgate B (RJSM)	39.92	44.32
25. Rajshahi A	26.69	29.56
26. Sarda	28.55	31.68
27. Millgate A (KSM)	41.50	46.12
28. Allardarga	31.23	34.73
29. Madhupur	17.65	19.59
30. Millgate A (ZBSM)	50.70	56.39
31. Melenda	23.67	26.33
32. Nandina	37.15	41.25
Grand Mean	21.13	30.15
Standard Deviation	13.86	19.43
MSS: Between Units	3444.29***	4259.88***
MSS: Within Units	192.06	236.71

Knowledge Transfer

The second component goal of the organizations is to transfer technological knowledge from its sources to its users, so that they can apply technologies with perfection and confidence. The estimates showed that the aggregate knowledge level of all clients was 21.13 (± 13.86) (Table 11). Considering the highest value of the scale (90) as potential level, the extension organizations in general could transfer only 30.15% ($\pm 19.43\%$) of potential technological knowledge among their clients. Based on the average years of introduction of a technology the rate of the transfer of potential knowledge was 1.75%. It reflects a very inadequate and ineffective educational process of agricultural extension organizations. It further showed that attainment of knowledge transfer was lagging behind the attainment of change of attitude.

The mean levels of knowledge of different technologies showed wide variation (Table 12). It was revealed that about 23.1% to 87.3% farmers had zero level of knowledge of different technologies of paddy cultivation (Table 12). The largest number of farmers (87.3%) were ignorant about the use of trace elements followed by model seed bed preparation (72.2%), balanced fertilizer (56.4%), top dressing of Urea (51.9%), optimum seeding age (41.6%), optimum spacing (39.6%), recommended varieties (23.2%), and timely harvest (23.1%). As regard sugarcane cultivation technologies the largest number of cane growers were

Table 12 : Magnitude and Attainment of Knowledge Transfer by Different Technologies

Technologies	Knowledge level		Attainment (% of Potential Level)
	Zero Level (% of Clients)	Mean Score	
Transplanted Aman Paddy			
1. Recommended Varieties	23.2	4.91	54.44
2. Model Seed Bed	72.2	1.02	11.33
3. Optimum Spacing	39.6	3.43	38.11
4. Optimum Seeding Age	41.6	2.99	33.22
5. Balanced Fertilization	56.4	2.29	25.44
6. Top Dressing of Urea	51.9	2.66	29.56
7. Use of Trace Element	87.3	0.56	6.22
8. Pest Control measures	43.9	3.16	35.11
9. Timely Harvest	23.1	4.00	44.44
Mean	48.8	2.78	27.81
Sugarcane			
1. Recommended Varieties	36.3	3.46	38.44
2. Early Plantation	8.9	5.32	59.11
3. Trench Method	34.0	3.70	41.11
4. Sett Treatment	40.9	2.62	21.11
5. Soil Treatment	34.0	3.56	39.56
6. Balanced Fertilization	39.4	4.50	50.00
7. Top Dressing of Urea	30.9	3.37	37.44
8. Rouging	55.6	2.33	25.89
9. Pest Control Measures	32.4	3.36	37.33
Mean	34.76	3.58	38.81

ignorant about rouging of diseased plants (55.6%) followed by sett treatment (40.9%), balanced fertilization (39.4%), recommended varieties (36.3%), trench method of planting (34.0%), soil treatment (34.0%), pest control measures (32.8%), top-dressing of Urea (30.9%) and early plantation (8.9%). Comparatively larger number of farmers were ignorant about recommended technologies of paddy cultivation than that of sugarcane cultivation. However, the mean level of knowledge

about technologies of paddy cultivation varied from 0.56 to 4.91 and that of sugarcane from 2.33 to 5.32 (Table 12). The highest level of knowledge was however about 50% of the potential level. It seemed that extension organizations could not succeed to transfer half of the potential level of knowledge of recommended technologies though their uses were introduced long ago.

In attaining the goal of transferring knowledge the primary administrative units (Upazilas/Subzones) varied significantly. It ranged from 8.45% in Dewanganj to 61.67% in Bogra Sadar. Among the Upazilas the good performers were Bogra Sadar, Kaliganj, Jhenaigati and Ramganj, the fair performers were Panchagarh, Kaharol, Bochaganj. Kahalo, Bagherpara, Muktagacha and Jamalpur Sadar and the remaining Upazilas were found to be poor performers (Chart 2). Among the sugarcane Subzones good performers were namely Khochabari, Millsgate-B (RJSM), Millsgate-A (RJSM), Nandina and Millsgate-A (ZBSM) and the remaining Subzones were fair performers except Baliadangi and Madhupur which were found to be poor performers in terms of transfer of technological knowledge (Chart 2).

Skill Development

The third component goal of the organizations is to develop skills of clients in applying technologies. Farmers can exploit full benefits of a recommended technology, if they become skillful in their application. The estimate showed that farmers skills in applying crop production technologies were 30.30 (+ 13.35) which was only one third (33.67%) of the potential

skill level (Table 13). The aggregate rate of attainment in developing skills remained very low about 1.95% per year. It is a reflection of poor educational process of agricultural extension organizations.

The findings showed that on an average farmers were equally unskillful in applying different recommended technologies of both paddy and sugarcane cultivation but their skillfulness had significant variation among different technologies. With regard paddy production 14.3% to 93.3% farmers showed no skill (zero level) in applying different recommended technologies (Table 14). Most farmers had no skill in using trace elements (93.3%) followed by model seed bed preparation (81.4%), balance fertilization (44.1%), etc. and very few farmers showed no skill in timely harvest (14.1). On an average the farmers had the highest skill level regarding recommended varieties (5.42) which was slightly higher than 50% of the potential level (10). This was followed by optimum age of seedling (4.78), timely harvest (4.47), optimum spacing (4.13), top dressing of urea (3.99), pest control measures (3.58), balanced fertilization (2.92), while they showed least skill in model seed bed preparation (0.85) and use of trace elements (0.31) (Table 14). Contrary 20.1% to 57.9% farmers showed no skill (zero level) of applying recommended technologies of cane production, the highest was for sett treatment and the lowest was for early plantation. However, the aggregate skill level was the highest in case of recommended

Table 13: Magnitude and Attainment of Skill Development by Primary Administrative Units of Agricultural Extension Organizations

Primary Administrative Units	Magnitude of Skills (Scores: 0 to 90)	Attainment (% of Potential Level)
Agricultural Extension Organization: Upazilas		
1. Panchagarh	28.46	31.60
2. Atoari	27.71	30.79
3. Kaharol	27.71	33.04
4. Bochaganj	32.06	35.66
5. Khetlal	23.38	26.00
6. Bogra Sadar	45.13	50.12
7. Kahalo	26.29	29.21
8. Bagherpara	31.63	35.16
9. Keshabpur	16.11	18.00
10. Kaliganj	37.44	41.66
11. Jhenaidah	22.12	24.54
12. Gouripur	32.28	35.82
13. Muktagacha	33.85	37.65
14. Fulbaria	32.56	36.22
15. Jamalpur Sadar	27.94	31.01
16. Jhenaigati	37.96	42.21
17. Dewanganj	19.36	21.54
18. Laxhipur	26.63	29.54
19. Ramganj	33.88	37.67
20. Feni	34.76	38.53
Sugarcane Extension Organization: Subzones		
21. Khochabari	41.65	46.25
22. Baliadangi	21.63	23.96
23. Pirganj	23.76	26.38
24. Millgate B (RJSM)	35.80	39.76
25. Rajshahi A	27.00	30.30
26. Sadar	24.46	27.14
27. Millgate A (KSM)	38.08	42.33
28. Allardarga	27.81	30.88
29. Madhupur	18.65	20.76
30. Millgate A (ZBSM)	42.35	47.04
31. Melenda	23.14	25.67
32. Nandina	31.50	34.95
Grand Mean	30.30	33.67
Standard Deviation	13.35	16.29
MSS: Between Units	1208.25***	1490.76***
MSS: Within Units	178.31	220.68

Table 14: Magnitude and Attainment of Skill Development by Different Technologies.

Technologies	Skill Level		Attainment (% of Potential Level)
	Zero Level (% of clients)	Mean Score	
Transplanted Aman Paddy			
1. Recommended Varieties	22.8	5.42	54.20
2. Model Seed Bed	81.4	0.85	8.50
3. Optimum Spacing	40.9	4.13	41.30
4. Optimum Seeding Age	26.0	4.78	47.80
5. Balanced Fertilization	44.1	2.92	29.20
6. Top Dressing of Urea	25.6	3.99	39.90
7. Use of Trace Element	93.3	0.31	3.10
8. Pest Control Measures	29.6	3.58	35.80
9. Timely Harvest	14.3	4.47	47.70
Mean	42.0	3.38	33.83
Sugarcane			
1. Recommended Varieties	22.8	4.75	47.50
2. Early Plantation	20.1	4.42	44.20
3. Trench Method	45.9	2.72	27.20
4. Sett Treatment	57.9	1.82	18.20
5. Soil Treatment	37.5	3.48	34.80
6. Balanced Fertilization	37.1	3.55	35.50
7. Top Dressing of Urea	52.1	2.56	25.60
8. Rouging	36.6	2.93	29.30
9. Pest Control Measures	31.7	3.70	37.00
Mean	37.97	3.33	33.27

varieties (4.75) followed by early plantation (4.42), pest control measures (3.70), balanced fertilization (3.55) and soil treatment (3.48). The least skill was associated with sett treatment (1.82) and top dressing of urea (2.56). In general farmers were more skillful in applying recommended technologies of sugarcane cultivation than that of paddy cultivation. Nonetheless the skill level could not exceed 50% of potential level in case of any recommended technology. It seemed that the organizations developed skill in applying different technologies

equally, but at a very low level.

In terms of skill development Bogra Sadar, Kaliganj, Jhenaigati, Ramganj and Feni were found to be good performers and the remaining Upazilas remained as fair and poor performers (Chart 2). On the other hand only 4 Subzones namely Khochabari, Millsgate-B (RJSM), Millsgate-A (KSM) and Millsgate-B (ZBSM) were the good performers. The highest skill development occurred in Bogra Sadar (45.13) and Millsgate-A (ZBSM) (42.35). The attainment of skill development however ranged from 18.00% in Bagherpara to 50.12% in Bogra Sadar and the difference among them was significant at 0.001 level (Table 13).

Technology Diffusion

The fourth component goal of extension organizations is to achieve universal diffusion of recommended technologies among their potential users. Technology diffusion attainment was measured in terms of area of application as percent of potential area. The potential area of use varied from farm to farm for different technologies. The aggregate potential areas of all selected technologies and area of application have been presented in Table 15. .pa

Table 15: Attainment of Diffusion of Technologies by Primary Administrative Units of Agricultural Extension Organizations.

Primary Administrative Units	Potential Area of Diffusion (Acres/Farm) ¹	Extent of Diffusion (Acres/Farm) Level	Attainment (% of Potential)
Agricultural Extension Organization: Upazilas			
1. Panchagarh	45.11	13.99	30.32
2. Atoari	31.37	8.05	25.04
3. Kaharol	35.20	6.92	21.50
4. Bochaganj	69.68	32.91	34.78
5. Khetlal	27.51	10.38	36.92
6. Bogra Sadar	17.81	11.86	65.75
7. Kahalo	21.81	7.47	37.21
8. Bagherpara	24.08	12.51	52.53
9. Keshabpur	15.69	4.43	27.39
10. Kaliganj	13.19	5.44	40.00
11. Jhenaidah	13.28	2.90	23.54
12. Gouripur	23.10	7.19	33.20
13. Muktagacha	24.40	10.52	44.02
14. Fulbaria	14.01	3.98	29.47
15. Jamalpur Sadar	17.42	8.31	49.55
16. Jhenaigati	39.44	14.69	34.75
17. Dewanganj	10.44	4.14	44.73
18. Lakhipur	25.13	6.92	26.60
19. Ramganj	2.46	1.46	42.17
20. Feni	13.96	4.90	35.78
Sugarcane Extension Organization: Subzones			
21. Khochabari	9.13	5.82	67.05
22. Baliadangi	7.89	3.36	46.25
23. Pirganj	7.19	3.85	54.14
24. Millgate B (RJSM)	14.11	8.29	62.16
25. Rajshahi A	16.85	6.94	36.31
26. Sadar	13.95	6.32	50.73
27. Millgate A (KSM)	26.18	14.57	62.62
28. Allardarga	24.85	13.31	56.69
29. Madhupur	9.82	2.14	32.65
30. Millgate A (ZBSM)	22.88	13.47	62.30
31. Melenda	8.71	5.15	50.81
32. Nandina	6.80	4.80	63.95
Grand Mean	21.91	8.79	42.25
Standard Deviation	37.67	19.34	23.79
MSS: Between Units	5368.43***	1023.96***	4720.66***
MSS: Within Units	1418.93	373.97	415.37

1. Total potential and actual area of applying all technologies in a farm.

The extent of aggregate attainment of diffusion of selected technologies was found to be 42.25% (\pm 23.79) of potential area of use. The extension organizations succeeded to diffuse the use of recommended technologies in 42.25% of potential area of use. On an average the annual rate of diffusion was 2.45%.

The variation in the attainment of diffusion goal among selected nine technologies of both paddy and sugarcane cultivation was wide. In case of recommended technologies of paddy cultivation the number of adopters varied from 8.6% (Trace Element) to 83.8% (Recommended varieties) (Table 16). On the other hand extent of application in potential land area varied from 2.15% (Trace Elements) to 56.23% (Optimum Age of Seedlings).

Table 16: Level and Attainment of Diffusion of Different Technologies.

Technologies	Diffusion			
	Years of Introduction	% of Client	% of Potential area	Rate %
Transplanted Aman Paddy				
1. Recommended Varieties	25	83.8	52.36	3.53
2. Model Seed Bed	15	22.1	11.11	1.43
3. Optimum Spacing	14	60.2	20.24	4.29
4. Optimum Seedling Age	25	80.7	56.23	3.22
5. Balanced Fertilization	20	57.0	39.82	2.87
6. Top Dressing of Urea	15	75.0	49.69	4.98
7. Use of Trace Elements	8	8.6	2.15	1.07
8. Pest Control Measures	15	82.2	33.02	5.52
9. Timely Harvest	30	71.7	50.30	2.40
Mean	18.56	60.14	37.14	2.00

Sugarcane

1. Recommended Varieties	15	77.2	63.12	5.10
2. Early Plantation	18	82.2	62.25	4.57
3. Trench Method	15	60.2	45.06	4.02
4. Sett Treatment	20	66.4	48.12	3.32
5. Soil Treatment	12	56.6	45.91	5.41
6. Balanced Fertilization	16	64.1	46.88	4.08
7. Top Dressing of Urea	15	84.6	66.25	5.63
8. Rouging	18	74.9	49.69	4.12
9. Pest Control Measures	15	71.8	50.00	4.81
Mean	16	71.7	54.63	3.41

The difference in level and extent of diffusion was more pronounced in case of pest control. Eighty-two percent of farmers adopted pest control measures but only in 33.02% of potential land area. Similarly 60.2% people adopted optimum spacing but only in 20.24% of the potential land area. In case of the recommended technologies of sugarcane cultivation the difference in number of adopters was found to be much narrower ranging from 56.6% (soil treatment) to 84.6% (Top Dressing of Urea). Variation in area of application of recommended technologies was also narrower ranging from 45.06% (Trench Method) to 66.25% (Top Dressing of Urea) of potential area of application. It implied that technologies, land and man all received much more equitable attention from Sugarcane Extension Service as compared to that of Agriculture Extension Service.

The attainment of the goal of technology diffusion varied significantly among the primary administrative units, Upazilas and Subzones (0.001 level). Among the Upazilas, three best performers were Bogra Sadar (65.75), Bagherpara (52.53%) and Jamalpur Sadar (49.55%). Kaharol was the lowest performer

(21.50%) (Chart 2). Among the Subzones the best three performers were Khochabari (67.05%), Millsgate-B (RJSM) (62.16%) and Millsgate-A (ZBSM) (62.30%). Madhupur was the lowest performer (32.65%) (Chart 2).

Productivity Increase

The fifth component goal of the extension organizations is to help their clients to increase productivity through use of new and improved technologies and management skills. The potential level of productivity was found to be Tk. 36.94 thousand per acres. Aggregate per acre productivity was estimated as Tk. 7.10 thousand (\pm 3.74) at current market price (Table 17). The attainment of the goal of productivity increase was 19.22% (\pm 10.16) of the potential level (Table 17). The extension services in general aim to reduce the gap between actual and potential productivity level. On an average extension services of Bangladesh could achieve less than one-fifth of the potential goal of increasing productivity of clients (Table 17). The rate of increase was 1.11% per year.

The magnitudes of per acre productivity of clients of different operational units were estimated and its variation was examined. The variation was found to be significant (0.001 level). Among the Upazilas per acre productivity ranged from Tk. 4.09 thousand in Jhenaidah to Tk. 11.51 thousand in Fulbaria with the range of attainment from 11.08% to 31.16% respectively. In

Table 17: Attainment of Productivity Increase by Primary Administrative Units of Agricultural Extension Organizations

Primary Administrative Units	Magnitude of Productivity	Attainment (% of Potential Level)
Agricultural Extension Organization: Upazilas		
1. Panchagarh	5.25	14.16
2. Atoari	4.96	13.42
3. Kaharol	7.93	21.38
4. Bochaganj	5.61	15.22
5. Khetlal	7.53	20.46
6. Bogra Sadar	7.13	19.29
7. Kahalo	7.17	19.38
8. Bagherpara	4.92	13.31
9. Keshabpur	5.30	14.29
10. Kaliganj	6.34	17.16
11. Jhenaidah	4.09	11.08
12. Gouripur	7.19	19.42
13. Muktagacha	10.79	29.22
14. Fulbaria	11.51	31.16
15. Jamalpur Sadar	8.66	23.39
16. Jhenaigati	5.06	13.68
17. Dewanganj	6.94	18.73
18. Lakhipur	6.36	17.29
19. Ramganj	5.58	15.08
20. Feni	9.84	26.61
Sugarcane Extension Organization: Subzones		
21. Khochabari	4.91	13.35
22. Baliadangi	4.34	11.75
23. Pirganj	7.39	20.08
24. Millgate B (RISM)	6.52	17.64
25. Rajshahi A	6.66	17.94
26. Sarda	8.53	23.05
27. Millgate A (KSM)	8.42	22.75
28. Allardarga	8.38	22.77
29. Madhupur	7.51	20.24
30. Millgate A (ZBSM)	7.56	20.48
31. Melanda	7.55	20.43
32. Nandina	7.39	20.05
Grand Mean	7.10	19.22
Standard Deviation	3.74	10.16
MSS: Between Units	101.60***	744.67***
MSS: Within Units	10.84	79.91

terms of attainment of client's productivity increase Kaharol, Muktagacha, Fulbaria and Jamalpur Sadar were found to be good performers and Panchagarh, Atoari, Bochaganj, Keshabpur, Kaliganj, Jhenaidah, Jhenaigati and Ramganj were the poor performers and the remaining Upazilas were fair performers (Chart 1). Among the Subzones per acre productivity was the highest in Sadar (Tk. 8.53 Thousand) and the lowest was in Baliadangi (Tk. 4.34 thousand) with the range of attainment from 11.75% to 23.05%. Sarda, Millsgate-A (KSM), Allardanga and Millsgate-A (ZBSM) were found to be good performers, and Khochabari and Baliadangi were the poor performers, and the remaining Subzones were fair performers (Chart 2). The attainment of productivity increase is more equitable under Sugarcane Extension Service as compared to that of Agricultural Extension Service.

Income Increase

The sixth component goal of an extension organization is to help increase per capita income of its clients through increasing productivity, diversifying source of income, and better marketing and farm management.

The potential level of per capita income was estimated as Tk. 21.64 thousands. The actual per capita income of farm families was estimated as Tk. 4.64 (+ 3.86) thousands which was found to be 20.98% of the potential level (+ 10.61%) (Table 18). In general the extension services of Bangladesh could attain about 21% of the potential goal of increasing clients per capita

Table 18: Attainment of Income Increase by Primary Administrative Units of Agricultural Extension Organizations.

Primary Administrative Units	Level of Income ('000' Tk. per capita)	Attainment (% of Potential Level)
Agricultural Extension Organization: Upazilas		
1. Panchagarh	6.74	17.46
2. Atoari	3.84	15.50
3. Kaharol	4.88	20.08
4. Bochaganj	9.73	17.38
5. Khetlal	4.60	21.25
6. Bogra Sadar	3.46	21.96
7. Kahalo	4.79	22.29
8. Bagherpara	3.70	16.47
9. Keshabpur	3.26	19.18
10. Kaliganj	4.82	19.31
11. Jhenaidah	3.87	13.77
12. Gouripur	4.35	20.42
13. Muktagacha	5.58	27.88
14. Fulbaria	3.91	33.81
15. Jamalpur Sadar	3.64	23.22
16. Jhenaigati	5.22	18.32
17. Dewanganj	3.25	22.00
18. Lakhipur	3.01	19.94
19. Ramganj	4.25	24.62
20. Feni	2.37	28.73
Sugarcane Extension Organization: Subzones		
21. Khochabari	5.08	15.25
22. Baliadangi	2.94	12.92
23. Pirganj	4.87	19.62
24. Millgate B (RJSM)	4.14	18.12
25. Rajshahi A	4.85	18.31
26. Sadar	2.81	24.86
27. Millgate A (KSM)	6.47	22.21
28. Allardanga	8.36	21.42
29. Madhupur	6.37	20.35
30. Millgate A (ZBSM)	5.68	19.83
31. Melenda	3.23	23.76
32. Nandina	3.94	20.20
Grand Mean	4.64	20.98
Standard Deviation	3.86	10.61
MSS: Between Units	117.71***	584.73***
MSS: Within Units	14.93	95.53

income. On an average rate of attainment was 1.22% of potential level. In prevailing circumstance the extension services had tremendous scope of helping the clients to increase their income.

The level of per capita income of clients of extension services by different primary administrative units were estimated and the variation was examined. Significant variation was observed among the Upazilas and Subzones in the attainment of goal of increasing clients income (0.001 level) (Table 18). The highest attainment was in Fulbaria (33.81%) and the lowest in Jhenaidah (13.77%) Upazila of Agricultural Extension Service. Among the Upazilas Kahalo, Muktagacha, Fulbaria, Jamalpur, Rangaj and Feni were good performers. Panchagarh, Atoari, Bagherpara, Keshabpur, Jhenaidah, Jhenaigati and Bochaganj were the poor performers in increasing client's per capita income and the remaining Upazilas were seemed to be fair performers (Chart 2). Among the sugarcane Subzones the attainment ranged from 12.92% in Baliadangi to 24.86% in Sarda. Sarda, Millgate-A (KSM) and Melanda Subzones were found to be good performers (Chart 2). Khochabari, Baliadangi, Millgate-B (RJSM), Millgate-A (KSM) were found to be poor performers and the remaining Subzones were fair performers. The attainment of extension goal of increasing clients income seemed to be more equitable under Sugarcane Extension Service.

Level of Living Improvement

The seventh component goal of extension organizations is to help the clients improve their level of living. The per capita level of living was measured in terms of value of all goods and services consumed in a family. The aggregate per capita level of living of all client families of extension organizations was estimated as Tk. 2.74 thousand (± 1.82) which was about 6.86% (± 6.12) of the potential level. The potential level was found to be Tk.45.00 thousand. In general the attainment of the goal of improving the level of living of their clients seemed to be very low which might have come as residual and not as an outcome of conscious efforts of the extension services.

The magnitude of level of living and extent of improvement were estimated and its variation was examined among primary administrative units. In the Agricultural Extension Service Bochaganj Upazila was the highest performer in the improvement of level of living, 14.04% of the potential level. The least performer was Feni (3.50%). Similarly Allardarga attained the highest level of improvement (12.36%) among Subzones of Sugarcane Extension Service and Sarda achieved the least (4.16%). The variation was significant at 0.001 level (Table 19).

Magnitude and Variability in Performance

In order to have a common measure a performance scale was designed by integrating extent of the attainment of each of the

Table 19: Attainment of Level of Living Improvement by Primary Administrative Units of Agricultural Extension Organizations

Primary Administrative Units	Level of Income ('000' Tk. per capita)	Attainment (% of Potential Level)
Agricultural Extension Organization: Upazilas		
1. Panchagarh	3.16	9.98
2. Atoari	2.25	5.68
3. Kaharol	4.02	7.22
4. Bochaganj	3.46	14.40
5. Khetlal	2.92	6.80
6. Bogra Sadar	2.78	5.12
7. Kahalo	2.33	7.09
8. Bagherpara	2.11	5.47
9. Keshabpur	2.83	4.82
10. Kaliganj	2.71	7.12
11. Jhenaidah	2.50	5.72
12. Gouripur	2.43	6.44
13. Muktagacha	2.43	8.26
14. Fulbaria	2.75	5.79
15. Jamalpur Sadar	2.55	5.38
16. Jhenaigati	2.95	7.72
17. Dewanganj	2.97	4.81
18. Laxhipur	2.77	4.45
19. Ramganj	2.80	5.28
20. Feni	1.57	3.50
Sugarcane Extension Organization: Subzones		
21. Khochabari	2.33	7.52
22. Baliadangi	1.92	4.35
23. Pirganj	3.93	7.21
24. Millgate B (RJSM)	2.15	6.12
25. Rajshahi A	2.01	7.17
26. Sarda	1.86	4.16
27. Millgate A (KSM)	4.52	9.57
28. Allardanga	3.96	12.36
29. Madhupur	4.56	9.42
30. Millgate A (ZBSM)	3.31	8.40
31. Melenda	2.40	4.77
32. Nandina	2.19	5.83
Grand Mean	2.74	6.86
Standard Deviation	1.82	6.12
MSS: Between Units	14.17***	170.08***
MSS: Within Units	2.92	32.68

component goals into a single scale ranging from 0 to 70 scores. The range of scores from 0 to 23, 24 to 47 and 48 to 70 was perceived as low, medium and high performance.

The aggregate level of performance of all extension services was found to be 27.16 (± 6.08)k which was only 38.79% (± 8.69) of the potential level. It falls marginally in the medium range of performance (Table 20). It showed that there was enormous scope for increasing the performance of extension organizations of Bangladesh.

The aggregate magnitude of performance scores were estimated for different primary administrative units and their variability was tested. The performance variation was significant among the Upazilas and Subzones. The best performers were Bogra Sadar Upazila of Agriculture Extension and Millgate-A (ZBSM) Subzone of Sugarcane Extension Service. The aggregate level were 35.08 and 34.04 respectively (Table 20), which was 50.12% and 48.63% of the potential level of performance. The average level of performance of all units remained within the medium range of performance. Among the Upazilas Bogra Sadar, Ramganj and Feni were good performers (Chart 2). Panchagarh, Atoari, Kaharol, Keshabpur, Gouripur, Dewanganj and Lakhipur were poor performers and the remaining Upazilas were fair performers. Among Subzones of Sugarcane extension service, Baliadangi and Madhupur were poor performers, and Khochabari, Millagate-B (RJSM), Allardarga, Millgate-A (KSM), Millgate-A (ZBSM) and Nandina were good performers. Remaining Subzones were fair performers.

Table 20: Performance of Primary Administrative Units of Agricultural Extension Organizations

Primary Administrative Units	Aggregate Goal Attainment (Scores:0 to 70)	Performance (% of Potential Level)
Agricultural Extension Organization: Upazilas		
1. Panchagarh	24.60	35.14
2. Atoari	22.25	32.78
3. Kaharol	25.04	35.77
4. Bochaganj	27.31	39.02
5. Khetlal	24.71	35.30
6. Bogra Sadar	35.08	50.12
7. Kahalo	25.71	36.73
8. Bagherpara	28.06	40.09
9. Keshabpur	21.14	30.20
10. Kaliganj	28.44	40.62
11. Jhenaidah	20.19	28.85
12. Gouripur	24.78	35.39
13. Muktagacha	28.83	41.18
14. Fulbaria	26.84	38.35
15. Jamalpur Sadar	28.39	40.55
16. Jhenaigati	27.54	39.34
17. Dewanganj	24.18	34.54
18. Lakhipur	22.91	32.73
19. Ramganj	29.54	42.20
20. Feni	28.94	41.34
Sugarcane Extension Organization: Subzones		
21. Khochabari	31.90	45.57
22. Baliadangi	23.00	32.85
23. Pirganj	27.67	39.52
24. Millgate B (RJSM)	31.16	44.51
25. Rajshahi A	25.69	36.70
26. Sarda	27.96	39.93
27. Millgate A (KSM)	32.62	46.61
28. Allardarga	29.96	42.80
29. Madhupur	24.29	34.71
30. Millgate A (ZBSM)	34.04	48.63
31. Melenda	26.86	38.37
32. Nandina	30.60	43.71
Grand Mean	27.16	38.79
Standard Deviation	6.08	8.69
MSS: Between Units	329.59***	672.62
MSS: Within Units	26.36	53.80

It seemed that in general level of performance was relatively low as compared to potential level and was significantly variable among the organizations. Therefore there was scope to improve level of performance in general as well as to reduce variations in performance among the primary administrative units by giving more attention to poor performers.

Empirical Test of AKSTPILL Model of Performance Evaluation

As postulated earlier performance of agricultural extension organizations was evaluated by using AKSTPILL Model which represents the attainment of professional goals viz. attitude change, knowledge transfer, skill development, technology diffusion, productivity and income increase and level of living improvement. The attainments of the goals were assumed to be hierarchical and unidirectional.

Goals have been measured at two levels. The first four at the program level and the last three at much broader than program level. Significant relationships were expected amongst four proximate program goals. Similar relationship is also expected amongst the broader goals. Similar relationship is also expected between proximate and broader goals, as proximate goals are aimed toward attainment of the broader goals. The absence of such relationship is the manifestation of program deficiency or of trade off between proximate and broader goals.

Examination of the correlation matrix showed that attitude change was highly significantly and positively associated with knowledge transfer, skill development and technology diffusion both at primary and aggregated data level (Table 21). Aggregation seem to strengthen the relationship for all the variables. It suggests that attitudinal change is basic to the other program goals.

Knowledge transfer had similar, even higher relationship with skill development and technology diffusion. While attitudinal change is basic, it is the extent of knowledge transfer that determines the impact on skill development and technology diffusion.

Skill development and technology diffusion are also positively and significantly related but the strength of relationship was less possibly indicating that for technology diffusion skill development is absolutely essential, but there are other factors which limits or expands the opportunities for technology diffusion.

When primary data was used the three broader goals showed significant correlations among themselves but at the aggregated level relationships continued to be high and significant only between productivity increase and income increase. Recalling that productivity increase was measured in terms of percentages of the highest per acre productivity attained in value added terms and income increase was measured in terms of percentage of the highest per capita per family income

Table 21: Inter-relationships Among Attainments of Goals of Agricultural Extension Organization (N = 887).

	Attitude change	Knowledge transfer	Skill development	Diffusion of Technology	Productivity increase	Income increase	Level of Living improvement
Attitude change	1.000	0.551 *** (0.669 ***)	0.580 *** (0.559 ***)	0.426 *** (0.659 ***)	-0.017 (0.029)	-0.022 (-0.063)	0.052 (0.229)
Knowledge transfer		1.000	0.739 *** (0.826 ***)	0.538 *** (0.705 ***)	0.012 (0.075)	0.040 (-0.040)	0.143 *** (0.062)
Skill development			1.000	0.489 *** (0.478 ***)	0.008 (0.130)	-0.019 (0.047)	0.167 (-0.044)
Diffusion of technology				1.000	0.024 (0.106)	0.010 (0.001)	0.038 (0.005)
Productivity increase					1.000	0.849 *** (0.832 ***)	0.161 *** (0.116)
Income increase						1.000	0.088* (0.098)
Level of living improvement							1.000

Note: Figures in the parentheses are r values when primary data is aggregated at primary operational units (N = 32).

from agricultural and non-agricultural sources. It appears that for most families non-agricultural incomes were small or randomly distributed and that program activities were generally equally relevant to their principal agricultural activities.

Improvement of level of living was measured as percentage of the highest level attained in terms of per capita value of all goods and services consumed. At the desegregate level, as expected it had significant and positive relationship with income increase and highly significant and positive relationship with productivity increase. It appears that productivity increase (due to program effect) seemed to have greater influence on level of living improvement rather than income increase in broader sense. At the aggregate level the relation continues to be positive but not significant, even with increase in absolute value.

Considering the relationship between proximate and broader goals interpretation of relevant results face some difficulty. Productivity increase had consistently positive but not significant relationship with all proximate goals at the aggregate level. At the desegregate level attitudinal change display a negative relationship. What is important to note that the relationships are not significant.

In terms of desegregated level positive relationship was observed with all proximate goals of which relationships with knowledge transfer and skill development came out as highly significant. At the aggregate level none of the relationships was significant and the relation with skill development became

negative suggesting diversion of resources from consumption.

In case of income increase none of the relationships was significant. But the direction of relationships were is contradictory at times. At the desegregated level it was more consistent than at the aggregated level. There appears a weak hypothesis that attitudinal change may involve contradictory pulls in respect of productivity per acre and non-agricultural income. Similar may be the case with knowledge transfer and skill development. However, since the relationships are not significant it is appropriate to treat; them as measurement influence of no significance.

Attainment of component goals of extension work did not display hierarchical and unidirectional relationships. The relationships among the attainments of behavioral goals such as attitude change, knowledge transfer, skill development and diffusion of technologies were rather circular. The same was found to be true among the attainments of productivity and income increase. The productivity and income increase seem to be independent of behavioral changes implying dominant role of other variables of environment and organizations. Similarly the attainment of level of living improvement is influenced by neither the behavioral or economic changes. It seems that some of the income and productivity increase withhold from consumption and some other forces influences the improvement of level of living.

Summary

Performance of agricultural extension organizations was estimated as an aggregate attainments of seven professional goals as percent of their potential levels of attainments. The goals were attitude change, knowledge transfer, skill development, technology diffusion, productivity increase, income increase and level of living improvement. The mean level of performance of the organizations was found to be 38.79% which fall within the range of medium level of performance. The present level of performance is a cumulative outcome of 17.27 years of efforts as the major technologies currently pursued on an average were introduced 17.27 years ago. Judging from this stand point the average rate of attainments of all goals was 2.25% per year.

All goals were however not equally attained. The behavioral goals were attained more than the economic goals (Table 22). The estimates showed that the organizations succeeded to change the attitude of their clients to a marginally positive level which was 83.5% of the potential level of change. They also succeeded to transfer knowledge and skill by only about one-third of the potential level. The attainment of technology diffusion was however two-fifth of its potential area of application or use. The organizations could help their clients to increase their productivity and income by one-fifth of their potential levels. The attainment in improving clients level of living was very low about 6.86% of the potential level. As a result the overall performance remained two-fifth of the potential level. The rates

of attainments of professional goals ranged from 0.40% (level of living) to 4.83% (attitude change) (Table 22).

Table 22: Aggregate Attainments of Component Goals of Agricultural Extension Organizations

Component Goals	Potential level	Attained level	Attainment (% of pot. level)	Rate of attainment (% performs)
1. Attitude Change (Scores: 27 to 81)	81.00	67.65	83.51	4.83
2. Knowledge Transfer (Scores: 0 to 90)	90.00	27.13	30.15	1.75
3. Skill Development (Scores: 0 to 90)	90.00	30.30	33.67	1.95
4. Technology Diffusion (Acres/Farm)	20.91	8.79	42.29	2.45
5. Productivity Increase (000 Tk./Acres)	36.94	7.10	19.22	1.11
6. Income Increase (000 Tk./Capital)	22.11	4.64	20.99	1.22
7. Level of Living Improvement (000 Tk./Capital)	40.09	2.75	6.86	0.40
Performance (Scores: 0 to 70)	70.00	27.15	38.79	2.25

The attainments of goals as well as the overall performance were not equal among the primary administrative units of the organizations, the Upazilas and Subzones. The variations were highly significant (0.001 level) in the attainment of each goal as well as performance. Among the primary administrative units of agriculture Bogra Sadar was found to be the best performer and Jhenaidah was the poorest performer. Among the Subzones of Sugarcane Extension Organization Millgate-B of Zeal-Bangla Sugar

Mills was the best performer and Baliadangi of Thakurgaon Sugar Mills was the poorest performer. The best performers were not the best in attaining all the goals. There is therefore a great scope of maximizing the aggregate level of performance of agricultural extension organizations as well as to reduce the variation in performance by giving more attention to poor performing primary administrative units.

It was observed that attainment of different component goals were not hierarchical and unidirectional in the present program context of agricultural extension services. Relationships among behavioral goal attainments were circular. So also the economic goals. However, the relation between the attainments of behavioral and economic goals was weaker as the behavioral goals were not consistently pursued along with economic goals in terms of content and priority in the programs. Therefore extension goals needs rationalization and pursued for the attainment of all goals concurrently to increase overall performance of the organizations.

In the following few chapters efforts were made to search and identify the explanatory variables of differential goal attainments as well as performance of the organizations. It was also endeavored to estimate the magnitude and direction of individual and combined contributions of individual and group of explanatory variables to goal attainments as well as performance at different levels of interaction and aggregation.

VII : ENVIRONMENTAL DETERMINANTS OF PERFORMANCE

Prior to test the proposed management model as a whole each component needs thorough examination to understand the nature of its discrete variables and their relationships. Environment is the first component of the proposed model of maximizing performance of the organizations.

Environment as a macro-system consists of agro-ecological, economic, socio-psychological, political and organizational subsystems conceptualized as micro-systems. Each of those micro systems is broken down into discrete homogeneous variables. Those variables singly or in group are assumed to have significant influence on the attainments of goals as well as performance of the organizations. Their magnitudes, variability, inter-relationships, associations at single and aggregate levels with the attainment of different goals as well as associations with and factor contributions to performance were estimated, examined and presented in this chapter.

Agro-ecological Micro Environment

Agro-ecological micro-environment is characterized by abundant solar energy (139.88 sunny days per year (± 1.06), high rainfall (193.15 cm per year (± 29.1), considerable environmental risk (± 3.90), substantial low productive capacity of land (24.12% of land being double/triple cropped area (± 7.61), low irrigation coverage (19.70 % of arable land (± 35.68) and average accessibility (4.72% miles per square mile (± 2.84)). The magnitude of these variables showed wide and significant variations among

the primary administrative units of the organizations, Upazillas or sub-zones (Appendix-F)

Among the agro-ecological variables productive capacity of land showed significant positive associations with rainfall ($r = 0.652^{**}$) and environmental risk ($r = 0.360^{*}$) (Table 23). The regions with high rainfall had more land of higher productive capacity as well as high environmental risk. The regions of high rainfall showed negative association with accessibility ($r = -0.366^{*}$) as higher rainfall hinders road development. The negative correlation between productive

Table 23 : Inter-relationships Among Variables of Agro-ecological Micro Environmental System

Variables	x9	x10	x11	x12	x13	x14
x9 : Solar Energy	1.000	0.111	0.186	0.215	-0.064	0.068
x10 : Rainfall		1.000	0.248	0.652**	-0.093	-0.366*
x11 : Environmental Risk			1.000	0.360*	-0.170	-0.050
x12 : Productive Capacity of land				1.000	0.029	-0.438*
x13 : Irrigation Coverage					1.000	-0.446**
x14 : Accessibility						1.000

capacity of land and accessibility ($r = -0.438^{*}$) was a manifestation of significant colinearity between rainfall and productive capacity of land. Irrigation coverage had also significant negative association with accessibility implying expansion of irrigation in drier regions where building of road network is comparatively easier.

Agro-ecological variables had generally no significant association with the attainments of behavioral goals, except between productive capacity of land and skill development which displayed positive and significant relationship ($r=0.358^*$). It seemed that people having more productive land tended to acquire more skills. Attainments of the goals of increasing clients productivity and income had significant positive associations with rainfall, environmental risk and productive capacity of land (Table 24). These seem to be logical on the ground that productive capacity of land, associated with higher rainfall hence more environmental risk showed association with more productivity and income of farmers. Irrigation coverage had consistently positive association with the attainments of all goals but significantly with improvement of level of living only. Irrigation though failed to increase productive capacity of land and productivity and income, provides an overall condition of improving level of living. Accessibility has shown considerably negative but insignificant association with attainment of all goals, except knowledge transfer and level of living improvement. It may be recalled that accessibility is negatively associated with productive capacity of land and irrigation coverage. Hence the displayed relationship were negative but not significant. The positive associations noted above were possibly due to clients mobility and interaction with outside community.

Table 24. Relationships with and Contributions of Variables of Agro-ecological Micro System to Goal Attainments and performance of Agricultural Extension Organizations

Agro-ecological Variables	Goal Attainments							Performance		
	Attitude Change	Knowledge Transfer	Skill Development	Technology Diffusion	Productivity Increase	Income Increase	Level of Living Improvement	R ²	Linear	Quadratic
x9 : Solar Energy	0.131	0.084	0.097	0.195	0.037	0.058	-0.159	0.135	0.018	0.021
x10 : Rainfall	0.044	-0.041	0.102	-0.049	0.259	0.413*	-0.281	0.084	0.010	0.012
x11 : Environmental Risk	-0.180	0.115	0.032	0.158	0.438**	0.438**	-0.147	0.200	0.040	0.040
x12 : Productive Capacity of Land	0.266	0.199	0.354*	0.254	0.359*	0.389*	-0.077	0.363*	0.132*	0.133
x13 : Irrigation Coverage	0.131	0.034	0.060	0.011	0.222	0.107	0.501**	0.097	0.009	0.010
x14 : Accessibility	-0.094	0.037	-0.101	-0.060	-0.169	-0.182	0.049	-0.071	0.005	0.011
Aggregate Agro-ecological Micro System	0.264	0.182	0.296*	0.242	0.464**	0.453**	0.101	0.117	0.014	0.020

Among the agro-ecological variables productive capacity of land had significant positive association with performance and its factor contribution was also significantly positive.¹ It alone explained 13.20% variability in performance. It substantiated the assumptions that higher is the productive capacity of land, better is the performance of agricultural extension organizations. It implies that for quick impact extension efforts may be concentrated in the regions of more productive land and organize long term land development programs to increase its future effectiveness in less productive areas. Performance exhibited no significant relationship with solar energy, rainfall, environmental risk, irrigation coverage and accessibility. Therefore, the supporting hypotheses that more is the availability of solar energy, rainfall, irrigation coverage or lower is the environmental risk, greater is the performance of agricultural extension organizations may not be accepted. In other words performance of agricultural extension organizations was independent of so far energy, rainfall, irrigation, accessibility or environmental risk.

-
1. The linear performance function with productive capacity of land was :

$$P = 22.249 + 0.170 \times 12$$

(0.080)

$$R = 0.363 \quad (\overline{R^2} = 0.103) *$$

Where ; p= performance of Agricultural
Extension Organization
x12 Productive capacity of land

The estimate showed that for each 5.88% increase of land having potential of two or more crops in a year, extension organizations could increase one percent of their performance.

The explanatory power of the variables of agro-ecological micro-system ceteris paribus to performance variability among the agricultural extension organizations was not significant (Table 25). Their cumulative explanatory power was only 19.80%. Marginal contribution of none of the variables was significant at this stage of interaction. The significant contribution of productive capacity of land (13.20%) was possibly absorbed by rainfall, irrigation, coverage and environmental risk because of existence of multi colinearity among them.

Table 25: Marginal Contributions of Variables of Agro-ecological Micro-system to Performance of Agricultural Extension Organizations

Agro-Ecological Variables	: Regression : Coefficients	: Standard : Errors
x9 : Solar Energy	0.003 NS	0.021
x10 : Rainfall	-0.027 NS	
x11 : Environmental Risk	0.083 NS	0.180
x12 : Productive Capacity of Land	0.246 NS	0.123
x13 : Irrigation Coverage	0.033 NS	0.048
x14 : Accessibility	0.182 NS	0.297
Constant	22.711	
R	0.445 NS	3.552
$R^2 (R^2) -$	0.198 (0.006)	

The aggregate agro-ecological micro-system showed positive associations with the attainments of all goals, significantly with the attainments of such goals as clients skill development ($r=0.296^*$), productivity ($r=0.464^{**}$) and income increases ($r=0.453^{**}$). Its association with as well as marginal contribution to performance was however not significant as individual variables separately showed positive and negative

influences on the attainments of different goals (Table 24).

Therefore the minor hypothesis of :

" Performance of agricultural extension organizations is directly and significantly influenced by agro-ecological environment in which they operate " (1.1)

may not be accepted. On aggregation the explanatory power of the variables reduced from 19.80% to 1.40% due to counter balancing positive and negative influences (Tables 24,25).

Economic Environment

Clients of extension services had an operational farm size of 4.80 acres on average (± 7.31) largely farmed by owners (72.5%) and characterized by high subsistence pressure (0.62 acre/capita land ± 0.69), scarce draft power (2.50 acre/pair of bullock ± 1.88), surplus family labour (213.37 mandays/acre ± 474.14), and considerable degree of commercial orientation of production (47.97% ± 29.69), substantial product market difficulty (15.26 ± 3.87). All of these variables of economic environment showed significant variation among the primary administrative units, Upazillas or Subzones (0.01 to 0.001 levels) (Appendix -F).

The correlation matrix exhibited that primary administrative units (Upazillas or Subzones) having larger operational farms had less draft power ($r=-0.714$ **) less family labour availability ($r=-0.722$ **) and more commercial orientation of production ($r=0.576$ **). But they experienced more product market difficulty ($r=0.384$ *) (Table 26). As would be expected smaller farms used more family labour, experienced more subsistence pressure, produced more for home consumption and thus experienced less

product market difficulty . Owner farming seemed to be associated more with small farm, using more of family labor, less draft power, less marketing of their production and had less product market difficulty.

Table 26 : Inter-relationships among Variables of Economic Micro Environmental System

Variables	x15	x16	x17	x18	x19	x20	x21
			**	**	**	**	*
x15:Operational Farm Size	1.000	-0.286	0.938	0.714	-0.722	0.576	0.384
x16:Tenurial Structure		1.000	-0.254	-0.053	0.074	-0.199	-0.323
x17:Subsistence Pressure ¹ (Land/Capita)			1.000	0.687	-0.684	0.510	0.252
x18:Draft Power ¹ Availability (Land per pair of bullock)				1.000	-0.433	0.531	-0.069
x19:Family Labor Availability					1.000	-0.426	-0.181
x20:Commercialization						1.000	0.318
x21:Product Market Difficulty							1.000

1: Read these variables oppositely.

Prevalence of larger farms, having more draft power and displaying commercial orientation of production created more favorable conditions conducive for the attainment of behavioral goals; while subsistence pressure, family labor availability tended to hinder their attainments but helped better attainments of economic goals (Table 27). Owner farming tended to help attain all goals. On the other hand product market difficulty tended to hinder attainments of all extension goals. The economic conditions were therefore providing variable, both positive and negative conditions which either helped or hindered

attainments of behavioral and economic goals.

The variables of economic micro-system showed no significant associations with performance (Table 27). The performance of the organizations seemed to be independent of economic variables. Therefore, the supporting hypotheses that larger or more is or are the operational farm size, owner farmers, draft power availability, clients family labour, commercial orientation of production or lower is the subsistence pressure or the product market difficulty, better is the performance of agricultural extension organizations may be rejected. It was earlier assumed that more family labors are available, better will be the performance. Although relationship was not significant ($r=-0.135$ NS), its direction showed a negative association. Perhaps performance of agricultural extension organizations was constrained by unemployment or under employment situation in the client system. As a single factor none of the variables exhibited significant explanatory power to performance variability, except product market difficulty. The influence of product market difficulty seemed to be non-linear (Table 27) implying that upto certain degree of product market difficulty the performance of agricultural extension organizations increasingly increased; beyond which the rate of decrease was reduced. ¹

1. The estimated quadratic function was :

$$P = 8.206 + 2.945x_{21} - 0.1060(x_{21})^2$$

(1.517) (0.0489)

$$R = 0.432* \quad (\bar{R}^2 = 0.131)$$

(3.321)

Where; P=Performance of Agricultural Extension Organizations
 x_{21} =Product Market Difficulty.

Table 27: Relationships with and Contributions of Variables of Economic Micro System to Goal Attainments and Performance of Agricultural Extension Organizations

Variables of Economic Micro-System	Goal Attainments							Performance		
	Attitude Change	Knowledge Transfer	Skill Development	Technology Diffusion	Productivity Increase	Income Increase	Level of Living Improvement	R ²	Linear	Quadratic
x15: Operational Farm Size	0.131	0.182	0.182	0.156	-0.290	-0.479**	0.462**	0.122	0.015	0.033
x16: Tenurial Structure	0.282	0.049	0.065	0.044	0.307*	0.426**	-0.022	0.156	0.024	0.024
x17: Subsistence Pressure (Land/Capita)	0.071	0.147	0.137	0.102	-0.292'	-0.460**	0.440**	0.093	0.010	0.010
x18: Draft Power Availability (Land pair of Bullock)	0.240	0.276	0.304*	0.309*	-0.071	-0.273	0.364*	0.291	0.085	0.151
x19: Family Labours Availability	-0.141	-0.187	-0.242	-0.062	0.168	0.389*	-0.387*	-0.135	0.018	0.060
x20: Commercialization	0.285	0.296*	0.082	0.388*	-0.046	-0.259	0.326*	0.276	0.076	0.180
x21: Product Market Difficulty	-0.232	-0.121	-0.305*	-0.044	-0.275	-0.362*	0.087	-0.245	0.060	0.187*
Aggregate Economic Micro System	0.084	0.285	0.155	0.339*	-0.161	-0.399*	0.425**	0.540**	0.292**	0.309**

The explanatory power of the variables of economic micro-system alone was not significant at this level of interaction (Table 28). Marginal contributions of individual variables were also not significant. Although not significant extension tended to perform better with larger farms with more per capita land holding. Similarly, product market difficulty tended to hinder performance of the organizations. Family labor availability does not make any influence on performance.

Table 28 : Marginal Contributions of Variables of Economic Micro-System to Performance of Agricultural Extension Organizations

Variables	Regression Coefficients	Standard Errors
X15 : Operational Farm Size	0.760 NS	0.942
X16 : Tenurial Structure	0.029 NS	0.042
X17 : Subsistence Pressure (Land/Capita)	-4.998 NS	5.773
X18 : Draft Power Availability	0.113 NS	1.142
X19 : Family Labor Availability	-	-
X20 : Commercialization	0.068 NS	0.045
X21 : Product Market Difficulty	-0.420 NS	0.264
Constant	26.516	
R	0.492 NS	3.453
R^2 (R^2) -	0.242 (0.061)	

The effect of aggregate economic micro system seemed to be positive to the attainments of behavioral goals and negative to that of the economic goals. But, its net influence on performance was significantly positive explaining 29.20% of performance

variability¹ (Table 27). Therefore, the minor hypothesis of :

" Performance of agricultural extension organizations is directly and significantly influenced by economic environment in which they operate." (1.2)

may not be rejected. Unlike agro-ecological environment the contribution of economic environment increased through aggregation as compared to interaction. The increase was 5.0% (Table 27,28). The variables of economic environment seemed to generate positive synergy toward performance of the extension organizations.

Socio-psychological Environment

Clients of agricultural extension organizations had large families (8.06 \pm 3.42) with low literacy (35.35% \pm 25.96) and formal education (26.34% \pm 3.42), low intensity of exposure to mass communication (27.3%), low organizational participation (20.2%) and cooperative membership (29.5%) with fewer leadership experience (7.1%) and slightly positive attitude toward social changes (23.52 \pm 2.58. About one-third of them (31%) developed client-patron relationship with the extension workers. The clients family size, literacy, formal education and attitude toward change had significant variation among the primary administrative units (Upazilas or Subzones) (Appendix-F). The intensity and distribution of clients having mass communication

1. The estimated linear function was :

$$P = 62.618 + 2.094 \times 10^{**} \\ (0.595)$$

$$R = 0.540 \quad (\bar{R}^2 = 0.269) ** \\ (13.757)$$

Where ; P = Performance of Agricultural Extension Organisations
X10= Aggregate Economic Environment

exposure, organizational participation, cooperative membership, leadership experience and client-patron relationship with extension personnel also showed significant variation among the primary administrative units (Appendix-F).

Among the variables of socio-psychological environment clients' literacy, formal education and mass communication exposure seemed to be significantly and positively associated. Where literacy and formal education was high, client-patron relation between extension workers and their clients was also high (Table 29). It seemed that more of the educated clients established client-patron relation with change agents ($r=0.436^*$). Clients of larger family, more literacy, education, mass communication exposure, organizational participation and leadership experience seemed to be less responsive to change. Perhaps they were more confident about their own ideas and action.

With few exceptions all socio-psychological variables tended to be conducive to the attainments of goals of attitude change, knowledge transfer, skill development, technology diffusion and level of living improvement; while impeding attainment of economic goals of productivity and income increase (Table 30). The intensity of memberships to cooperative seemed to help attain all goals positively. Education beyond certain stage tended to create demotivation for the present level and type of agricultural work which is labor intensive and not knowledge intensive. This was evident from its negative association with the attainment of economic goals. However,

Table 30: Relationships with and Contributions of Variables of Socio-Psychological Micro System to Goal Attainments and Performance of Agricultural Extension Organizations

Variables of Socio-Psychological Micro-System	Goal Attainments							Performance		
	Attitude Change	Knowledge Transfer	Skill Development	Technology Diffusion	Productivity Increase	Income Increase	Level of Living Improvement	R ²	Linear	Quadratic
x22: Farm Family Size	0.110	0.050	-0.066	0.111	-0.026	-0.052	-0.101	0.028	0.001	0.040
x23: Client Literacy	0.165	0.477**	0.302*	0.339*	-0.102	-0.325*	0.219	0.365*	0.133*	0.185
x24: Clients Formal Education	0.219	0.439**	0.298*	0.187	-0.089	-0.318*	0.270	0.308*	0.095	0.140
x25: Clients Mass Comm. Exposure	0.185	0.426**	0.438**	0.293	0.057	-0.083	0.269	0.410*	0.168*	0.198*
x26: Clients Organizational Participation	-0.076	0.123	0.086	0.061	-0.000	-0.063	0.279	0.104	0.011	0.022
x27: Clients Cooperative Membership	-0.075	0.159	0.123	0.137	0.131	-0.025	0.134	0.175	0.031	0.031
x28: Clients Leadership Experience	0.017	0.073	0.091	0.109	-0.020	-0.167	0.022	0.077	0.006	0.010
x29: Client-Patron Relationship	0.383*	0.517**	0.347*	0.426**	0.001	-0.034	-0.171	0.481**	0.233**	-
x30: Attitude Toward Change	0.230	-0.011	0.230	0.117	-0.123	0.002	0.027	0.041	0.002	0.013
Aggregate Socio-Psychological Micro-System	0.182	0.591**	0.403**	0.436*	-0.021	-0.218	0.149	0.373*	0.139*	0.140

performance of the organizations tended to be influenced positively by all socio-psychological variables, significantly by literacy ($r=0.365^*$), formal education ($r=0.308^*$), mass communications exposure ($r=0.410^*$) and client-patron relation between clients and change agents ($r=0.483^{**}$). As a single variables marginal contributions of literacy, mass communication exposure and client-patron relation were significantly positive¹. The explanatory power of mass communication exposure increased at second order of relationship indicating that certain intensity of mass communication exposure among the clients is essential to increase the performance of extension organizations.

1 a) The estimated linear function was as follows:

$$P=23.268+0.110 \times 23^* \\ (0.051)$$

$$R=0.365 \quad (\bar{R}^2=0.104)^* \\ (3.371)$$

Where; P=Performance of Agricultural Extension Organizations
X 23=Clients Literacy

It was estimated that the organizations could increase one percent of their performance for each 9.09% increase of literacy among their clients.

b) The estimated performance function was :

$$P=25.072+0.068 \times 29^{**} \\ (0.225)$$

$$R=0.483 \quad (\bar{R}^2=0.207)^{**} \\ (3.172)$$

Where; P=Performance of Agricultural Extension Organizations
X29=Client - patron relationship

c) The estimated linear function was as follows

$$P=24.95+0.084 \times 25^* \\ (0.034)$$

$$R=0.410 \quad (\bar{R}^2=0.140)^* \\ (3.304)$$

Were; P=Performance of Agricultural Extension Organizations
X25 = Mass Communication Exposure

The estimate showed that for each increase of 10% clients having mass communication exposure, agricultural extension organizations could increase 0.84% of their performance.

Agricultural extension organizations therefore require to promote literacy and use of mass media among their clients through joint programs with concerned agencies to improve their own performances.

Significant positive contribution of Client - Patron relation between the extension workers and their clients is indeed a serious problem. The problem seemed to be acute in crop based extension organizations like sugarcane extension as inputs and subsidized services were also channelized to farmers through the extension workers. Appropriation of a part of the benefits of inputs or services from the clients is indeed unethical, as extension is a free public service for rural population. A situation has already developed. Without such relation performance of the organizations could not be increased. It could possibly be reduced through a massive motivational program, change of working policies and procedures and creating mass awareness about the terms of services.

The explanatory power of variables of socio-psychological micro-system ceteris paribus to performance was not significant (Table 31). Intensity of clients having literacy, education, mass communication exposure and client-patron relationship singly made significant contributions to performance. But in an interacting situation their marginal contributions no longer remained significant due to multicollinearity. At this level of interaction marginal contribution of intensity of mass communication exposure was significant. Clients mass communication exposure indeed play a vital role in increasing the

Table 31 : Marginal Contributions of Variables of Socio-psychological Micro-System to Performance of Agricultural Extension Organizations.

Socio-psychological Variables	Regression Coefficients	Standard Errors
x22: Farm Family Size	0.565 NS	0.520
x23: Client Literacy	0.179 NS	0.098
x24: Clients Formal Education	-0.192 NS	0.135
x25: Clients Mass Commn. Exposure	0.122 *	0.055
x26: Clients Orgal. Participation	-0.135 NS	0.073
x27: Clients Coop. Memberships	0.047 NS	0.038
x28: Clients Leaderships Experience	-	-
x29: Client-Patron Relationship	0.049 NS	0.025
x30: Attitude Toward Change	0.455 NS	0.325
Constant	7.104	
R_2 (R ²) -	0.693 NS	2.981
R^2 (R ²) -	0.480 (0.300)	

magnitude of performance of extension organizations.

The influence of aggregate socio-psychological micro-system was positive to the attainments of behavioral but negative to that of the economic goals of extension work, indicating deficiency of extension programs in respect of overall farm management as it was narrowly focused to diffusion at a few technologies of selected food crops. However, its influence on performance was positive and significant¹ (Table 30). Therefore,

1. The linear function was :

$$P=77.804+0.525x_{11}*$$

(0.239)

$$R=0.373 \quad (R^2=0.110)*$$

(15.173)

Where, P=performance of Agricultural Extension Organizations
 x_{11} =Aggregate Socio-psychological Micro System.

the minor hypothesis of :

"Performance of agricultural extension organizations is directly and significantly influenced by socio-psychological environment in which they operate". (1.3)

may not be rejected. Their explanatory power was however reduced from 48.00% to 13.90% due to aggregation as compared to interaction (Table 30, 31). The positive and negative influence seemed to counter balance the aggregate influence, although the net influence remained significantly positive.

Political Environment

Very few of the clients of agricultural extension organizations were politically conscious (7%); but most of them were participative in political processes (90.4%) and exert medium range of socio-political influence on extension program administration (18.50 \pm 6.02). These variables of political environment had significant variation among primary administrative units of the organizations (Appendix-F).

Political environment was expected to manifest through clients political consciousness, participation in political processes and influence on the extension program administration. Among these three variables political consciousness seemed to exert influence on program administration positively ($r=0.441^{**}$) (Table 32). But increased intensity of participation in political processes reduced the socio-political influence on program administration ($r=-0.425^{**}$).

Table 33: Relationships with and Contributions of Variables of Political and Organisational Micro Systems to Goal Attainments and Performance of Agricultural Extension Organizations

Variables of Political and Organizational Micro-Systems	Goal Attainments							Performance		
	Attitude Change	Knowledge Transfer	Skill Development	Technology Diffusion	Productivity Increase	Income Increase	Level of Living Improvement	R²	Linear	Quadratic
<u>Political Micro-System</u>										
x31: Clients Political Consciousness	-0.094	0.204	0.042	0.259	0.056	-0.055	-0.149	0.172	0.030	0.030
x32: Client Political Participation	-0.086	-0.089	0.085	-0.158	-0.049	0.039	-0.125	0.097	0.009	0.009
x33: Socio-Political Influence	-0.018	-0.044	-0.132	0.105	0.182	0.031	0.239	0.023	0.000	0.041
Aggregate Political Micro-System	0.020	0.124	0.020	0.202	0.114	-0.017	-0.059	0.119	0.014	0.014
<u>Organizational Micro-System</u>										
x34: Inter-Organizational Relation	-0.123	0.020	-0.009	-0.042	-0.183	-0.036	-0.179	-0.042	0.002	0.051
x26: Inter Organizational Conflict	0.252	0.342*	0.273	0.253	0.108	-0.059	0.090	0.327*	0.107	0.257*
Aggregate Organizational Micro-System	0.026	0.348*	0.279	0.240	0.098	-0.075	0.071	0.291	0.084	0.289*

explanatory power was also reduced from 3.80% to 1.40% (Table 33, 34). Therefore the minor hypothesis of :

Table 34: Marginal Contributions of Variables of Political Micro-system to Performance of Agricultural Extension Organizations.

Variables of Political Environment	Regression Coefficients	Standard Errors
x31: Clients Political Consciousness	0.081 NS	0.089
x32: Clients Political Participation	-0.030 NS	0.073
x33: Socio-political Influence	-0.053 NS	0.129
Constant	30.213	
R	0.194 NS	3.677
R^2 (R^2) -	0.038 (-0.065)	

" Performance of agricultural extension organizations is directly and significantly influenced by the political environment in which they operate". (1.4).

may not be true. The extension organizations seemed to perform equally irrespective of the intensity of clients having political consciousness, participation or of magnitude of socio-political influence they exert upon the program administration.

Organizational Environment

The organizational environment was assumed to be manifested through relation and conflict with concerned organizations. In general the agricultural extension organizations had neither warm nor bitter relation with other organizations concerned with agricultural development work in general. The primary administrative units however showed wide variation in terms of their relation and conflict with concerned organizations (Appendix-F).

The magnitude of relationship between inter-organizational relation and conflict tended to be positive though not significant ($r=0.236$ NS) (Table 33). Their influence on the attainment of different goals was variable but not significant. Conflict rather than relation tended to make positive contribution to goal attainments as well as performance of the organizations. The second order of contribution of conflict to performance was found to be significant.¹ Therefore, the hypothesis of greater is the inter-organizational relation, better is the performance may be rejected. Rather opposite tended to be true as relationship tend to promote conformity to informal standard of performance. On the other hand the hypothesis of lower is the conflict better is the performance may also be rejected. However, the second order of significant relationship implies that conflict, to a certain level increased performance beyond which it was likely to effect performance negatively.

Neither the explanatory power of the variables of organizational environment nor their marginal contributions were significant at this level of interaction (Table 35).

1. The estimated quadratic performance function was :

$$P = -30.467 + 1.427x_{35} - 0.0085(x_{25})^2$$

(0.556) (0.0035)

$$R = 0.507* \quad (\overline{R^2} = 0.206)$$

(3.175)

Where; P=Performance of Agricultural Extension Organizations
 x_{35} =Inter-organizational Conflict

Table 35: Marginal Contributions of Variables of Organizational Micro-system to performance of Agricultural Extension Organizations

Variables	:Regression :Coefficients:	: Standard : Errors
x34: Inter-organizational Relation	-0.037 NS	0.052
x35: Inter-organizational Conflict	0.090 NS	0.045
Constant	23.399	
R	0.349 NS	3.452
R^2 (R^2)	0.122 (0.061)	

The aggregate influence of the existing organizational environment seemed to be positive on the attainment of the goals of extension work, except improvement of level of living. Its association with knowledge transfer was significant (Table 33). Perhaps different organizations were supplementing transfer of knowledge. Its relationship with performance however was significant and was of second order. It implied that upto a certain level of performance the existing environment had been contributing increasingly, beyond which the rate of contribution decreased. Therefore the minor hypothesis of:

"Performance of agricultural extension organizations is directly and significantly influenced by organizational environment in which they operate" (1.5).

may be partially true.

1. The quadratic function was as follows:

$$P = -198.752 + 49.843x_{13} - 2.0228(x_{13})^2$$
(16.501) (0.6992)

$R = 0.538^*$ ($R^2 = 0.241$)
 (14.015)

Where P= Performance of Agricultural Extension Organizations
 x_{13} = Aggregate Organizational Micro-system

Environmental Determinants of Performance

Five variables namely productive capacity of land, client literacy, product market difficulty, clients mass communication exposure, client - patron relationship and interorganizational conflict, singly had significant marginal contributions to the performance of agricultural extension organizations. The contribution of product market difficulty was negative and non-linear; but its influence was absorbed when interacting with other variables of the organizational environment.

It was further observed that in a interacting situation the explanatory power of the variables of none of the different micro-systems of environment alone was significant, except agro-ecological micro-system. It seemed that only agro-ecological environment plays a dominant role in determining level of performance of agricultural extension organizations. At the higher level of interaction, the magnitude and direction of influence may also be changed. Hence all environmental variables were step-wise regressed to estimate the explanatory power of environmental variables as a whole, and their factor contributions to performance as well as attainment of component goals (Table 36).

Twenty-two environmental variables explained 92.93% variation in the performance of agricultural extension organization ($R=0.964^{**}$) (Table 36). Significant contributions came from eight variables, namely productive capacity of land, irrigation coverage, tenurial structure (owner farming), draft

Table 36: Marginal Contributions of Environmental Variables to Performance and Attainments of Goals of Agricultural Extension Organizations

Micro-Environmental Variables (X1-X35)	Goal Attainments									
	Attitude Change	Knowledge Transfer	Skill Development	Diffusion of Technology	Productivity Increase	Income Increase	Level of Living Improvement	Performance		
	(x1)	(x2)	(x3)	(x4)	(x5)	(x6)	(x7)	(x8)	(x9)	(x10)
x9: Solar Energy	-0.003(0.78) (0.021)	-0.043(0.47) (0.352)	-0.041(0.53) (0.037)	-0.070(0.85)** (0.029)	-0.029(2.40) (0.025)	-0.010(0.34) (0.007)	-0.009(0.04) (0.018)			
x10: Rainfall	-0.022(0.94) (0.032)	-0.124(4.23) (0.104)	-0.089(1.50) (0.049)	-0.041(3.23) (0.114)	0.033(3.07) (0.036)	-0.025(3.54) (0.024)				
x11: Environmental Risk	-0.124(7.76) (0.165)	0.084(6.91)** (0.305)	0.411(12.10)** (0.125)	-0.423(3.62) (0.524)	0.404 (13.72)** (0.174)	0.070(1.28) (0.042)				
x12: Productive Capacity of Land	0.195(9.02) (0.103)	0.084(6.91)** (0.305)	0.411(12.10)** (0.125)	1.289(9.91)** (0.378)	-0.062(0.41) (0.106)	-0.092(2.16) (0.38)	0.237(9.38)** (0.079)			
x13: Irrigation Coverage	0.058(2.26) (0.048)	0.229(4.23) (0.108)	0.094(0.41) (0.079)	0.181(5.62)** (0.048)	0.115(6.77)** (0.041)	0.020(25.07) (0.015)	0.076(4.21)** (0.033)			
x14: Accessibility	-0.467(5.86) (0.383)	0.200(0.13) (0.444)	-1.104(1.25) (0.504)	0.200(0.13) (0.444)	-0.104(1.25) (0.504)	0.128(4.44) (0.213)	-0.044(0.30) (0.213)			
x15: Operational Farm Size	1.627(2.50) (0.278)	2.621(2.82) (0.936)	0.207(6.89)** (0.178)	0.391(2.35) (0.178)	0.158(7.89)** (0.044)	0.181(2.90)** (0.016)	5.814(2.90)** (1.345)			
x16: Technorial Structure	0.128(9.05)** (0.044)	0.427(5.40)** (0.127)	0.207(6.89)** (0.178)	0.391(2.35) (0.178)	0.158(7.89)** (0.044)	0.181(2.90)** (0.016)	0.123(4.51)** (0.032)			
x17: Subsistence Pressure (Lans/Capital)	-0.195(1.66) (0.395)	-17.206(1.64) (1.875)	-3.170(0.43) (4.368)	-13.779(0.06) (59.172)	6.297(5.02)** (1.356)	-36.965(12.83)** (8.86)	-2.039(2.10) (2.500)			
x18: Draft Power Availability (Land/Pair of Bullock)	0.044(3.49)** (0.017)	0.019(0.21) (0.063)	0.099(2.14) (0.051)	0.099(2.14) (0.051)	2.899(2.27)** (1.217)	-1.487(1.71)** (0.553)	2.159(3.24)** (0.867)			
x19: Family Labour Availability	0.102(11.22) (0.053)	-0.175(3.81) (0.150)	-0.248(2.75)** (0.073)	0.349(7.46) (0.174)	0.128(3.37)** (0.053)	0.007(0.23) (0.013)	0.016(0.38) (0.004)			
x20: Commercialization	0.102(11.22) (0.053)	0.102(11.22) (0.053)	0.102(11.22) (0.053)	0.102(11.22) (0.053)	0.102(11.22) (0.053)	0.102(11.22) (0.053)	0.102(11.22) (0.053)			
x21: Product Market Difficulty	0.102(11.22) (0.053)	0.102(11.22) (0.053)	0.102(11.22) (0.053)	0.102(11.22) (0.053)	0.102(11.22) (0.053)	0.102(11.22) (0.053)	0.102(11.22) (0.053)			
x22: Clients Family Size	0.102(11.22) (0.053)	0.102(11.22) (0.053)	0.102(11.22) (0.053)	0.102(11.22) (0.053)	0.102(11.22) (0.053)	0.102(11.22) (0.053)	0.102(11.22) (0.053)			
x23: Client Literacy	0.102(11.22) (0.053)	0.102(11.22) (0.053)	0.102(11.22) (0.053)	0.102(11.22) (0.053)	0.102(11.22) (0.053)	0.102(11.22) (0.053)	0.102(11.22) (0.053)			

Table 35. contd.

System	Environmental Variables (19 - x25)	Goal Attainments									
		Methods Change (x2)	Knowledge Transfer (x3)	Goal Development (x4)	Diffusion of Technology (x5)	Productivity Increase (x6)	Income Increase (x7)	Level of Living Improvement (x8)	Performance (x1)		
x24: Clients Formal Education		0.444(1.02) (0.426)	0.197(0.53) (0.188)	-1.328(2.95)* (0.443)	0.105(1.39) (0.153)			0.092(1.79) (0.935)	-0.041(1.54) (0.994)		
x25: Clients Mass Communication Exposure		-0.072(2.18) (0.044)		0.252(19.15)* (0.063)				-0.026(2.30) (0.014)	0.000(9.03) (0.044)		
x26: Client Organizational Participation				-0.244(7.95)* (0.147)				-0.128(1.44) (0.067)	-0.031(1.66) (0.064)		
x27: Clients Cooperative Membership				0.112(4.48) (0.063)				0.058(1.93) (0.041)	0.041(0.94) (0.033)		
x28: Client Leadership Experience				-0.549(2.03) (0.323)				0.165(0.78) (0.152)	-0.588(4.21) (0.357)		
x29: Client - Patron Relationship		0.075(14.67)** (0.024)	0.205(26.78)** (0.076)	0.070(2.65) (0.079)	0.291(18.42)** (0.081)			-0.042(1.53) (0.021)	-0.001(0.70) (0.005)		
x30: Clients Attitude Toward Change		1.424(2.14)** (0.481)	2.204(2.16) (1.230)	1.068(5.72) (0.544)	1.093(1.38) (1.481)			-0.454(1.47) (0.433)	0.064(0.21) (0.120)		
x31: Clients Political Consciousness				1.148(5.85)** (0.321)				0.538(3.59)** (0.133)	0.792(2.70) (0.544)		
x32: Clients Political Participation				0.296(2.59) (0.248)				0.228(5.81)** (0.103)	0.292(10.84) (0.099)		
x33: Socio-Political Influence		-0.057(6.15) (0.096)	-1.122(10.22)* (0.412)	-0.054(4.35)** (0.171)	-0.387(10.70) (0.438)			0.259(4.09)** (0.077)	0.011(0.18) (0.019)		
x34: Inter-Organizational Relation								0.103(1.18) (0.077)	0.018(4.24) (0.027)		
Organizational Environment		0.096(2.40) (0.051)		0.114(0.83) (0.067)	-0.119(10.53) (0.176)			0.292(10.84) (0.099)	0.011(0.18) (0.019)		
Contacts		12.316	-115.072	-35.074	-128(7.757)			-24.281	-11.134		
Multiple R		0.918**	0.931**	0.975**	0.925**			0.891**	0.917**		
Adjusted R ²		0.626	0.655	0.807	0.533			0.586	0.620		

Note: Figures in Parentheses: Standard Error and Underneath Contribution *; **; *** mean 0.05, 0.01, and 0.001 levels of significance respectively.

power in-availability, client-patron relationship, clients political consciousness, political participation and socio-political influence, which explained 60.0% variability in performance of which 3.34% was contributed negatively by socio-political influence on extension program administration. In interacting with other environmental variables the influence of intensity of clients having literacy, product market difficulty, mass communication exposure and inter-organizational conflict was absorbed by irrigation coverage, tenurial structure, draft power in-availability. Clients political consciousness, clients political participation and socio-political influence, which were not having significant contribution to performance singly became significant factor when interacted with other environmental variables.

On closer examination of the regression model it was observed that client-patron relationship was the largest contributor (23.28%) but its contribution was absorbed by clients mass communication exposure, literacy, political consciousness, commercial orientation of production and the contribution was increased by irrigation coverage, rainfall, client political participation, clients leadership experience, per capita land holding and clients attitude toward change. In other words clients of a unit having larger land holding with more irrigation, political participation, leadership experience and positive attitude toward change were developing more client patron relationship with extension agents.

Following client-patron relationship larger contributors were mass communication exposure (9.02%), literacy (6.22%) and formal education (5.64%), but their contributions were absorbed by such variables as irrigation coverage, clients political consciousness, political participation, leadership experience, and organizational participation. It indicated that organizational participation, leadership experience, political consciousness and participation compensate part of the influence of clients literacy and formal education.

In view of the change of marginal contributions of some of the variables in an interacting situation at the level of total environmental conditions some of the hypotheses established earlier need to be amended. These are as follows:

1. While all environmental variables interact, then more is the productive capacity of land, better is the performance of agricultural extension organizations. (1.1.4)
2. When all environmental variables interact, then more is the irrigation coverage, better is the performance of agricultural extension organizations. (1.1.5)
3. When all environmental variables interact, then more are the number of owner farmers, better is the performance of agricultural extension organizations. (1.2.2)
4. When all environmental variables interact, then less is the draft power availability, better is the performance of agricultural extension organizations (1.2.4)
5. When all environmental variables interact, then more are the number of clients having client-patron relation with extension agents, better is the performance of agricultural extension organizations. (1.3.8)
6. When all environmental variables interact, then more are the number of politically conscious clients, better is the performance of agricultural extension organization. (1.4.1)
7. When all environmental variables interact, then more are number of clients having political participation, better is the performance of agricultural extension organizations.

8. When all environmental variables interact, then lower is the magnitude of socio-political influence over program management, better is the performance of agricultural extension organizations. (1.4.3)

Environmental Determinants of Goal Attainments

Performance is an aggregative dependent variable of attainment of different goals. Hence factor contributing behavior of environmental variables to different goal attainment may not be similar to that of performance. As examined earlier correlation coefficients between environmental variables and attainment of different goals indicated such variable magnitude and directions of relationships.

When all environmental variables were step wise regressed with attainment of each goal it was observed that, though of variable magnitudes, the explanatory power of environmental variables to differential attainments of each goal was significant (Table 36). Among those variables 18,19,23,21,16,18 and 24 variables explained 84.27%, 86.68%, 95.06%, 88.17%, 79.92%, 84.09% and 95.65% variability in the attainment of the goals of attitude change, knowledge transfer, skill development, technology diffusion, productivity increase, income increase and level of living improvement. The factor contributing behavior exhibited marked variation. Different variables contributed significantly to the attainment of different goals. Their impact were often not reflected to their performance, as it was an aggregative variable.

Such variables as rainfall, accessibility, product market difficulty, cooperative membership, leadership experience and inter-organizational relationship exhibited no significant relation to the attainments of any of the goals. There was no singular variable which had significant influence on the attainment of all goals as well as on performance. But some variables like productive capacity of land, tenure structure (owner farmers), draft power availability, client-patron relationship, clients political consciousness, participation and influence significantly contributed to the attainment of some goals as well as performance. Some variables like environmental risk, operational farm size, commercial orientation of production, clients literacy and education, attitude toward change exhibited positive as well as negative contribution to the attainment of different goals. Consequently their influence on performance was not significant due to pull of opposite forces. Development programs aiming at removal or reduction of the influences of these opposite forces may help maximise the performance at the organizations.

Aggregate Environmental Macro System

Associations of the aggregate environmental macro-system with the attainment of goals were positive except in case of income increase which was negative but not significant (Table 37). The attainment of such goals as knowledge transfer, skill development and diffusion of technology were significantly and positively influenced by prevailing environment. Its association with and factor contribution to performance was significant. It

Table 37: Influence of Aggregate Environmental Macro-System on Goal Attainments and Performance of Agricultural Extension Organizations.

Attainments of Goals	Correlation Coefficient
Attitude	0.231 NS
Knowledge Transfer	0.639 **
Skill Development	0.461**
Technology Diffusion	0.547**
Productivity Increase	0.083 NS
Income Increase	-0.177 NS
Level of Living Improvement	0.255 NS
Performance	0.519 **
R * R : Linear	= 0.269 **
Quadratic	= 0.278 **

explained 26.90% performance variability¹. The explanatory power did not increase through quadratic function. Therefore, the major hypothesis of :

Performance of agricultural extension organizations is directly and significantly influenced by environment in which they operate" (1.0).

may not be rejected. In other words overall environmental condition was favorable and was positively and significantly influencing the performance of agricultural extension organizations inspite of some of its variables set mutually opposite conditions.

1. The estimated linear function was as follows :

$$P = 13.973 + 0.556 \times 39^{**}$$

(0.167)

$$R = 0.519 \quad (\overline{R^2} = 0.245)**$$

(13.974)

Where : P = Performance of Agricultural Extension Organization
X39 = Aggregate Environmental Macro-system.

Summary

Agricultural extension organizations of Bangladesh had been operating in an agro-ecological environment of abundant solar energy, high rainfall with considerable environmental risk due to flood and drought, low irrigation coverage and average accessibility. Economic environment is characterized by small farms, of largely owner farming, high subsistence pressure, scarce draft power, surplus family labor, considerable commercial orientation of production with substantial product market difficulty. Clients were having large families, low literacy and formal education, low exposure to mass communication, fewer membership to cooperatives and leadership experiences and having slightly positive attitude to change. About one-third of them developed client-patron relation with extension workers. Very few of them are politically conscious but most of them participate in political process exerting medium range of influence on extension program administration. The organizations had neither warm nor bitter relation with the concerned public agencies.

In reality the environmental variables were not independent of each other. Some degree of colinearity was observed between productive capacity of land and irrigation coverage, operational farm size and subsistence pressure, commercial orientation of production and product market difficulty, client literacy and formal education, organizational participation and membership to cooperatives. Conceptually, some of the environmental variables have causal relationships to others. Among them productive

capacity of land showed association to rainfall but no relation with irrigation coverage implying irrigation expansion could not improve productive capacity of land substantially, possibly due to failure to change cropping pattern and to adopt soil conservation practices. Commercial orientation of production was impeded by rainfall and subsistence pressure, family labor availability and attitude toward change and promoted by operational farm size, draft power availability, client literacy, formal education and mass communication exposure. Clients of larger farms with more commercial production were experiencing more product market difficulty.

Literacy and formal education promoted mass communication exposure which in turn promoted organizational participation and membership to cooperative. Literate and formally educated clients developed more client-patron relation with the extension workers. Politically conscious, owner farmers with leadership experiences were exercising more socio-political influence on extension programs administration.

Environmental variables ceteris paribus explained 92.93% performance differential. However only six environmental variables such as productive capacity of land, product market difficulty, client literacy, clients mass communication exposure, client-patron relation and inter-organizational conflict contributed significantly to explain performance differential. But its relation with product market difficulty and inter-organizational conflict was non-linear. All other factor had

linear contributions to performance, while in an interacting situation among environmental variables, the contributions of irrigation coverage, Tenurial structure (owner farming), draft power availability, clients political consciousness and participation, and socio-political influence also became significant. Among them socio-political influence on program administration was negative.

The contribution of environmental variables to component goal attainments were also not equitable. Environmental variables explained 84.27% variability in the attainment of attitude change with the largest positive contribution from client-patron relation and commercial orientation of agriculture production. About 86.68% variability in the attainment of knowledge transfer was explained by the environmental variables with largest contribution from client-patron relation and client literacy. About 96.06% of variability in the attainment of skill development could be explained by environmental variables in which the greatest positive contribution came from clients mass communication exposure and productive capacity of land. In attaining technology diffusion clients literacy and client patron relation made the largest contribution. About 79.92% variability in attaining increase of clients productivity was explained by environmental variables with the largest contribution from irrigation coverage, owner farming and environmental risk. The latter might be manifestation of productive capacity of land and risk coverage. About 84.09% variation in the attainment of goal of increasing clients income could be explained by environmental

variables with the largest impediment coming from the smaller farm size; but significant positive contribution came from productive capacity of land, irrigation and owner farming. About 95.65% variability in attaining clients level of living improvement by the environmental variables in which the largest contribution came from the productive capacity of land and the impediment from subsistence pressure.

Inspite of the prevailing mutually opposite conditions, influence of aggregate environmental macro system was positive for the attainment of all goals of extension work, except in case of increasing clients income. Its association was significant for the attainment of the goals of knowledge transfer, skill development and diffusion of technologies. Its association with and contribution to performance was also significant.

VIII STRATEGIC DETERMINANTS OF PERFORMANCE

Introduction

The second component of the proposed model of management is the strategy of the organization. It is perceived as a macro system of concepts based on which programs are designed and implemented. Strategies of agricultural extension organizations relate to models and approaches of extension work, technologies, clients and management of the organizations itself. Each of these sub-sets is perceived as micro strategic system broken into a number of discrete variables. Eleven strategic variables were included in the study. Their variability was tested. Associations of those variables with the attainments of component goals as well as performance and their explanatory power to performance differential singly, in interaction and aggregation at micro and macro levels were estimated, examined and presented in this chapter.

Models and Approaches

Strategies in respect of models and approaches were characterized by multiplicity of models, both pure and integrated, low functional exclusivity (46.62% \pm 24.22) and selective client contact (21.87% \pm 19.26). Functional exclusiveness and contact with client showed significant variation among the primary administrative units of the organizations, Upazilla or Sub-zones (Appendix-6).

There were significant associations among those strategic variables (Table 38).

Table 38: Inter-relationships Among Strategies Relating to Models and Approaches of Agricultural Extension Organizations

Model and Approach Variables	Model Integration x36	Function Exclusivity x37	Universality in Contact x38
X36: Model Integration	1.000	-0.748 **	0.770 **
X37: Functional Exclusivity		1.000	-0.741 **
X38: Universality in Contact			1.000

Integrated models were functionally less exclusive to extension work ($r=-0.748^{**}$), but they were more universal in contact ($r=0.770^{**}$). The organizations adopting a pure model like T&V had chosen to remain functionally exclusive to extension work with selective client approach ($r=-0.741^{**}$). It seemed to be a contradiction. When an organization is functionally exclusive to extension work it could adopt the strategy of universal contact as they were free from multiplicity of functions. Such contradiction is not likely to generate greater synergy in an organization as it limits the scope of more contact and by being selective it loses credibility to the majority of clients.

The attainment of the goals of changing clients attitude and diffusion of advocated technologies significantly increased under integrated model of extension work (Table 39). It tended to attain all goals positively except skill development. Perhaps skill development received lower priority which might have been pulled back rapid increase of the attainments of economic goals.

Table 39 Relationships with and contributions of Models and Approaches to Goal Attainments and performance of Agricultural Extension Organizations.

Models and Approaches	Goal Attainment							Performance		
	Attitude Change	Knowledge Transfer	Skill Development	Technology Diffusion	Productivity Increase	Income Increase	Level of Living Improvement	R ²	Linear	Quadratic
x36:Model Integration (Dummy)	0.420*	0.174	-0.038	0.521**	0.112	0.055	0.017	0.294	0.086	0.125
x37:Functional Exclusivity	-0.289	-0.233	0.082	-0.505**	-0.043	0.073	-0.057	-0.264	0.070	0.077
x38:University in Contact	0.289	0.077	-0.024	0.543**	0.000	-0.045	0.068	0.256	0.066	0.244*
Aggregate Strategic Micro System of Approaches	0.293	0.161	-0.009	0.523**	-0.002	-0.040	0.061	0.140	0.020	0.056

1. Model Integration was excluded from aggregation as it was a dummy variables.

As the organizations became more functionally exclusive the attainment of both behavioral and economic goals decreased, significantly the goal of productivity increase. This is obvious in a society where institutions were neither adequately developed nor efficient in meeting input and credit needs of their clients. As the extension organizations became more universal in contact the attainment of all goals tended to be increased, significantly the goal of increasing productivity. However it tended to decrease attainment of technology diffusion and level of living improvement possibly due to dispersion of efforts.

None of those three strategies singly was found to have significant influence on the performance of the organizations and their marginal contributions were also not significant. Therefore, the relevant supporting hypotheses that greater or more is the integration of models, functional exclusivity or universality in contact, better is the performance of agricultural extension organizations may not be true. Functional exclusivity tended to decrease the performance, though not significantly as other needs of the clients could not be made effectively. The explanatory power of universality of contact to performance differential increased considerably and became significant at second order of relationship¹.

1 The estimated quadratic function was:

$$P = 23.330 + 0.356x_{38} - 0.005(x_{38})^2$$

(0.121) (0.002)

$$R = 0.494 \quad (R^2 = 0.192) *$$

(3.202)

Where; P=Performance of Agricultural Extension Organizations
 x_{38} =Universality in Contact

It implies that the level of performance increased at an increasing rate upto certain level of direct contact with clients beyond which rate of increase slowed down due to dispersion of efforts.

The explanatory power of models and approach strategies alone to performance differential was not significant (Table 40).

Table 40: Marginal Contributions of Models and Approach Variables to Performance of Agricultural Extension Organizations

Variables	Regression Coefficients	Standard Errors
X36: Model Integration	0.942 NS	1.440
X37: Functional Exclusivity	-0.018 NS	0.062
X38: Universality in Contact	0.007 NS	0.057
Constant	25.817	
R_2	0.302 NS	3.573
R^2 (\bar{R}^2)	0.091 (-0.006)	

Marginal contribution of none of the strategic variables was also significant. The second order of significant influence of universality in contact was also absorbed by model integration as integrated models were more universal in contact than pure models. Perhaps models and approach alone does not make significant difference in performance unless other variables interact.

The aggregate effect of those strategies tended to be positive in the attainment of change of attitude, transfer of knowledge and improvement of level of living significantly

(Table 39). But their influence seemed to be negative to the attainment of skill development and increase of client productivity and income. Its association with and factor contribution to the performance was not significant. Therefore the minor hypotheses of:

"Performance of agricultural extension organizations is directly and significantly influenced by the approaches they adopted".(2.1)

may not be accepted. Due to their inherent contradictions and mutually opposite influences on the attainment of goals, the adopted strategies relating to models and approaches failed to generate greater synergy for better performance.

Technological Strategies

The technological strategies of the agricultural extension organizations were characterized by choice of moderately adoptable technologies (21.86 \pm 1.92) and narrow focus of technological package (18.21 \pm 5.16). Both of these strategic variables had significant variation among the primary administrative units, Upazallas or Subzones (Appendix-6).

The choice of more adoptable technologies and extend of coverage to life and profession of clients seemed to be independent as their relationship was not significant ($r=0.290$ NS) (Table 41).An organization may therefore promote highly adoptable technologies covering more areas of life and profession of their clients.

Table 41: Inter-relationship Among Technological Strategies

Technological Strategies	x39	x40
x39: Technology Adoptability	1.000	0.290
x40: Technology Diversity		1.000

The influence of technology adoptability as well as diversity was not similar to the attainment of all goals. It seemed to be opposite to the attainment of behavioral and economic goals (Table 42). The attainment of the goals of attitude change, knowledge transfer, skill development and diffusion of technologies increased with the increase of the adoptability of advocated technologies. But its associations with the attainments of economic goals were not significant, rather negative to the attainment of increasing clients income and level of living. It might have occurred due to choice of technologies which have little or no, even negative impact on the overall productivity and income. Technological diversity also had positive influence on behavioral goal attainments, significantly the attainment of goals of transferring knowledge and developing skills among clients. Its association with the attainment of all economic goals were also not significant but consistently negative. Their negative associations were the manifestation of dispersion of efforts to too many things. It implies that some degree of concentration is essential for the attainment of economic goals of extension work.

Table 42 : Relationships with and Contributions of Variables of Technological Strategies to Goal Attainments and Performance of Agricultural Extension Organizations.

Variables of Technological Strategies	Goal Attainment							Performance		
	Attitude Change	Knowledge Transfer	Skill Development	Technology Diffusion	Productivity Increase	Income Increase	Level of Living Improvement	R ²	Linear	Quadratic
	r	r	r	r	r	r	r	r	r	r
x38: Technology Adoptability	0.500**	0.566**	0.635**	0.389*	0.064	-0.016	-0.038	0.566**	0.320**	0.347**
x39: Technological Diversity	0.244	0.484**	0.451**	0.163	-0.324*	-0.089	-0.159	0.322*	0.104	0.104
Aggregate Micro System of Technological Strategies	0.316*	0.651**	0.670**	0.344*	-0.159	-0.059	-0.120	0.281	0.079	0.106

percent of their performances.

Both adoptability and diversity of technology had significantly positive association with performance. It substantiated the hypotheses that higher is adoptability or diversity of technologies, better is the performance of agricultural extension organizations. The factor contribution of adoptability of technologies was also significantly linear¹. Its explanatory power did not increase appreciably through quadratic function. The factor contribution of diversity of technologies was however not significant, as its relation with performance was marginally significant. Therefore, extension can improve its performance by promoting diffusion of a certain degree of multiple technologies with higher adoptability.

In an interacting situation the adopted technological strategies explained 34.70% performance variability ($R=0.589^{**}$) and the marginal contribution of technology adoptability was significant. It was not the diversity but adoptability which predominantly determines the level of performance (Table 43). In order to achieve economic goals of extension work some degree of technological diversity seemed to be essential.

The aggregate strategic micro-system of technologies showed significant positive association with the attainment of all

1 The estimated performance function was:
$$P = -3.556 + 1.406^{**} \times 39$$
$$(0.378)$$

$$R = 0.566^{**} \quad (\bar{R}^2 = 0.297)$$
$$(2.986)$$

Where; P=Performance Agricultural Extension Organizations
X39=Technology Adoptability

The estimate showed that for an increase of 2.36% of adoptability extension organizations could increase one percent of their performances.

behavioral goals but its associations with that of economic goals

Table 43: Marginal Contributions of Variables of Technological Strategies to Performance of Agricultural Extension Organizations

Variables	Regression Coefficients	Standard Errors
X39: Technology Adoptability	1.282**	0.389
X40: Technological Diversity	0.167 NS	0.152
Constant	-3.894	
R^2	0.589**	2.976
\bar{R}^2 (\bar{R}^2)	0.347 (0.302)	

were consistently negative though the relationships were not significant. Because of its mutually opposite influences on behavioral and economic goals its association with and factor contribution to performance was not significant (Table 42). Therefore the minor hypothesis of:

"Performance of agricultural extension organizations is directly and significantly influenced by technological strategies they adopted". (2.2)

may not be true. Both narrow focus and diversity of technological packages seemed to have opposite influences on performance. Hence extension need to trade off at a point of diversity which would maximize its performance.

Client Strategies

The client strategies of the agricultural extension organizations was characterized by marginally medium range of client orientation in program development and operation (15.22

+5.57) with very low client representation in decision making processes (5.22% of total participation +11.70). Client orientation and participation of clients in decision making process had significant variation among the primary administrative units, Upazilla or Subzones (Appendix-G).

Client orientation was found to have significantly negative association with client participation ($r=-0.325*$) (Table 44).

Table 44: Inter-relationships Among Variables of Client Strategies

Variables	X41	X42
X41: Client Orientation	1.000	-0.325 *
X42: Client Participation (decision Making)		1.000

In other words the organizations having higher client orientation did not feel necessity for more client participation. Therefore, they made little or no provision of client representation in decision making processes assuming that what ever being decided was done for the interest of their clients.

Both client orientation and participation showed positive and negative associations to the attainment of both behavioral and economic goals. The relationships were however not significant except in case of client participation and the attainment of the goal of diffusing technologies, which was significantly positive ($r=0.370*$) (Table 45). As a single factor their associations with and marginal contributions to performance of the organizations were also not significant, but positive (Table 45). Therefore the supporting hypotheses of higher is the client

Table 45 : Relationships with and Contributions of Client Strategies to Goal Attainments and Performance of Agricultural Extension Organizations.

Variables of Client Strategies	Goal Attainment							Performance		
	Attitude Change	Knowledge Transfer	Skill Development	Technology Diffusion	Productivity Increase	Income Increase	Level of Living Improvement	R ²	Linear	Quadratic
x41: Client Orientation	-0.118	0.157	0.273	-0.116	0.024	-0.076	-0.100	0.076	0.006	0.024
x42: Client Participation	0.178	0.136	-0.041	0.370*	-0.097	-0.267	-0.272	0.144	0.021	0.112
Aggregate Micro System of Client Strategies	-0.179	0.182	0.286	-0.089	0.029	-0.111	-0.057	0.203	0.041	0.043

orientation or client participation, greater is the performance of agricultural extension organizations may not be true.

When variables of client strategies interact their explanatory power as well as marginal contributions to performance differential were also not significant (Table 46).

Table 46: Marginal Contributions of Variables of Client Strategies to Performance Agricultural Extension Organizations

Variables	Regression Coefficients	Standard Error
X41: Client Orientation	0.179 NS	0.251
X42: Client Participation	0.033 NS	0.034
Constant	22.353	
R_2	0.194 NS	3.614
$R^2 (R^2)$	0.038 (-0.024)	

It seems that client strategy above is not likely to increase the performance of agricultural extension organizations significantly.

The influence of aggregate client strategic micro-system was not significant, showing both positive and negative directions of associations with the attainment of both behavioral and economic goals. Therefore the minor hypothesis of

"Performance of agricultural extension organizations is directly and significantly influenced by the client strategy they adapted". (2.3)

may not be true. These evidences clearly indicated that client strategic micro system was in a state of confusion having no clear sense of direction toward attainment of goals of the organizations.

Management Strategies

The management strategies and styles of an organization is manifested through the degree of participativeness, coerciveness, performance aspiration and professionalization. The management strategies of agricultural extension organizations was characterized by low level of participativeness (24.65 \pm 11.65), considerable coerciveness (21.10 \pm 5.90), medium level of performance aspiration (33.74 \pm 6.95) and medium range of professionalization (47.4%). The estimates showed that participativeness, coerciveness, performance aspiration and professionalization had significant variations among the primary administrative units of the organizations (Appendix-G).

Among those strategic variables participativeness showed significant positive association with performance aspiration ($r=0.414^{**}$) indicating that a democratic style of management enhance performance aspiration among professional staff. Oppositely a coercive or autocratic style tended to keep the professional staff at a low profile of performance aspiration (Table 47). A significantly positive association was observed between professionalization and coerciveness. But its association with performance aspiration was negative. It implies that organizations having more professionally educated persons were more coercive ($r=0.351^{*}$). There seemed to have colinearity between participativeness and performance aspiration, and professionalization and coerciveness. Management strategies seemed to create mutually opposite conditions within the organizations.

Table 47: Inter-relationships Among Variables of Management Strategies of Agricultural Extension Organizations

Variables	Participativeness x43	Coerciveness x44	Performance Aspiration x45	Professionalization x46
x43: Participativeness	1.000	0.091	0.414**	0.125
x44: Coerciveness		1.000	-0.184	0.351*
x45: Performance Aspiration			1.000	-0.160
x46: Professionalization				1.000

Participativeness showed both positive and negative associations with the attainment of behavioral and economic goals, but none of the associations were significant. Participativeness, a measure of democratic decision making seemed to be non-directional having opposite direction of influences to the attainment of different goals. However, its association with performance was positive, but not significant. Coercive management strategies had negative associations with the attainment of behavioral goals, significantly with that of knowledge transfer and diffusion of technologies. Its associations with the attainment of economic goals were positive but relationships were not significant. Coercive strategy also showed significant negative relation with performance of the organizations ($r=-0.335^*$), but its explanatory power to performance differential, both linear and quadratic, was not significant as the relation was marginally significant. It seemed that in a coercive situation staff tend to sacrifice the

attainment of intangible behavioral goals. As a result overall performance of the organizations were negatively influenced, though not significantly.

Performance aspiration showed positive association with the attainments of behavioral goals, and negative associations with that of economic goals, significantly with the attainment of increasing clients income ($r=-0.356^*$). Consequently, its association with performance was not significant but positive and its explanatory power to performance differential, both linear and quadratic was not significant. This is likely to be manifestation of priority over behavioral changes and narrow focus of the extension programs. Hence the supporting hypotheses of more is the participativeness, coerciveness or performance aspiration, better is the performance may not be true. The influences of professionalization on the attainment of both behavioral and economic goals were negative, significantly with the attainments of such goals as attitude change ($r=-0.372^*$), knowledge transfer ($r=-0.326^*$) and technology diffusion ($r=-0.578^{**}$). Consequently, its association with performance of the organizations was significantly negative ($r=-0.443^{**}$). Its explanatory power to performance differential was significant.

Table 48 : Relationships with and Contributions Variables of Management Strategies to Goal Attainments and Performance of Agricultural Extension Organizations.

Variables of Management Strategies	Goal Attainment							Performance		
	Attitude Change	Knowledge Transfer	Skill Development	Technology Diffusion	Productivity Increase	Income Increase	Level of Living Improvement	R ²	Linear	Quadratic
x#3: Participativeness	-0.100	0.096	0.166	-0.076	0.088	-0.054	-0.072	0.036	0.001	0.005
x#4: Coerciveness	-0.087	-0.380*	-0.197	-0.386*	-0.053	0.041	0.088	-0.355*	0.112	0.149
x#5: Performance Aspiration	0.128	0.194	0.176	0.254	-0.212	-0.356*	-0.005	0.160	0.026	0.033
x#6: Professionalization	-0.372*	-0.326*	-0.106	-0.579**	-0.288	-0.107	-0.020	-0.443**	0.196**	0.224*
Aggregate Micro System of Management Strategies	-0.276	-0.328*	-0.106	-0.579**	-0.288	-0.107	-0.018	0.205	0.042	0.216*

The influence was linear as the explanatory power did not increase appreciably through quadratic function¹. This is a contradiction to conventional believe that higher is the professionalization, greater is the performance of the organizations. Further correlation studies showed that organization having more staff with professional qualification were less universal in contact ($r=-0.732^{**}$), promote low adoptable technologies ($r=-0.375^{*}$), low in client participation ($r=-0.552^{**}$), all of which had significantly positive association with performance. They also tended to be functionally exclusive to educational activities ($r=0.682^{**}$) and more coercive in management ($r=0.351^{*}$) which showed significant negative associations with performance. The displayed behavioral pattern of professionals might be the outcome of heterophily between the professionals and their clients, a dysfunctional aspect of professional education which need serious investigation.

Explanatory power of management strategies ceteris paribus to performance differential was not significant, because of their mutually opposite influences (Table 49).

1 The estimated linear function was as follows:

$$P=29.507-0.050 \times X_{46} \\ (0.018)$$

$$R=0.443 \quad (R^2=0.170)^* \\ (3.246)$$

Where; P=performance of Agricultural Extension Organizations
X₄₆=Professionalization

The estimate showed that 0.50% performance level is decreased for each 10% increase of professionally qualified staff.

Table 49: Marginal Contributions of Variables of Management Strategies to Performance of Agricultural Extension Organizations

Variables	Regression Coefficients	Standard Errors
x43: Participativeness	0.064 NS	0.132
x44: Coerciveness	-0.310 NS	0.272
x45: Performance Aspiration	0.031 NS	0.261
x46: Professionalization	-0.043 *	0.021
Constant	33.020	
R_2	0.494 NS	3.319
R^2 (R^2)	0.244 (0.132)	

However, marginal contribution of professionalization remained significant as it singly displayed. It was further observed that when management strategies interact, negative influence of coerciveness increased many fold absorbing the positive influences of participativeness and performance aspiration.

The aggregate management micro strategic system showed negative associations with the attainments of all component goals of extension significantly with the attainment of the goals of transferring knowledge ($r=-0.328*$) and achieving diffusion of technologies ($r=-0.578**$). Its relation with performance of the organizations was also negative though it was not significant (Table 48). Its linear explanatory power to performance was not significant. The second order of influence was however significant¹. The negative influence is the manifestation of

¹ The estimated quadratic function was as follows

$$P=118.460-1.403**x_{17}+0.0168*(x_{17})^2$$

(0.511) (0.0066)

$$R=0.465* \quad (R^2=0.162)$$

(14.727)

Where, P=Performance of Agricultural Extension Organizations
x₁₇=Aggregate Management Strategies

mutually opposite influences of different management strategies. It seemed that current strategies instead of creating positive had been generating negative synergy pulling down the performance at an increasing rate to a certain level beyond which rate of decrease is arrested due to the influence of some other variables of the organizations.

Strategic Determinants of Performance

The strategic variables have been examined at individual and group levels to estimate their magnitude and direction of relationships with performance both at independent and interacting situation. As all adopted strategies were concurrently operative the ceteris paribus assumption was further relaxed and all strategic variables were farther step-wise regressed with performance to estimate their marginal contributions at macro-system level of interaction (Table 50).

Estimates showed that eight strategic variables, ceteris paribus explained 55.20% variability in performance ($R=0.743^{**}$). Inclusion of universality in contact, client participation in decision making, participativeness in management did not increase explanatory power of the regression model. Four variables namely technology adoptability, technological diversity, client orientation and coerciveness contributed positively and their cumulative contribution was 43.00%, while other four variables namely extension models, functional exclusivity, performance aspiration and professionalization contributed negatively and

Table 50: Marginal Contributions of Strategic Variables to Performance and Attainments of Goals of Agricultural Extension Organizations.

Macro-System	Goal Attainments									
	Strategic Variables (x1) - x16)	Attitude Change (x2)	Knowledge Transfer (x3)	Skill Development (x4)	Diffusion of Technology (x5)	Productivity Increase (x6)	Income Increase (x7)	Level of Living Improvement (x8)	Performance (x9)	
Models										
x36: Extension Model (d)		2.191(7.57)*	-11.652(4.04)	-5.077(2.94)						-2.266(2.78)
		(0.928)	(5.628)	(3.199)						(1.411)
x37: Functional Exclusivity										
			-0.419(4.45)	-0.120(0.72)	-0.092(0.47)					-0.074(1.60)
			(0.249)	(0.132)	(0.191)					(0.058)
x38: University of Contact										
			-0.037(0.07)	-0.028(0.13)	0.162(3.03)	-0.081(0.17)				
			(0.175)	(0.103)	(0.176)	(0.064)				
Techno Logical Strategies										
x39: Technology Adoptability		0.987(24.95)	3.444(32.04)	3.192(49.39)*						
		(0.454)	(11.960)	(11.199)						
x40: Technological Diversity										
		0.312(4.01)	1.919(11.88)*	0.757(1.77)	1.296(11.51)*					
		(0.156)	(0.648)	(0.413)	(0.547)					
Client Strategies										
x41: Client Orientation										
		1.467(2.76)	0.563(1.34)	0.513(0.32)						
		(0.687)	(0.543)	(0.167)						
x42: Client Participation										
		0.046(0.31)								
		(0.111)								
Management Strategies										
x43: Participativeness										
		-0.144(0.28)								
		(0.450)								
x44: Coerciveness										
		0.315(2.79)	0.379(0.21)	0.459(1.27)						
		(0.288)	(0.913)	(0.603)						
x45: Performance Aspiration										
		-0.837(11.72)	-0.341(0.74)	-0.341(0.74)						
		(0.951)	(0.568)	(0.992)						
x46: Professionalization										
		-0.260(9.02)*	-0.157(3.51)	-0.157(3.51)						
		(0.127)	(0.081)	(0.101)						
Constant		65.160	-22.760	-31.739	7.624	42.735	50.139	3.408		13.660
Multiple R		0.627**	0.618**	0.767**	0.717**	0.662*	0.662*	0.373 NS		0.742**
Adjusted R ²		0.303	0.490	0.419	0.373	0.258	0.215	-0.160		0.356

Note: Figures in the Parentheses: Underneath - standard Error and Right Side - Percent Contribution
*, **, ***, mean 0.05, 0.01, 0.001 levels of significance respectively

their cumulative contribution was 12.22%. Only the marginal contribution of professionalization remained significant (6.22%). The largest contributor of performance was technology adoptability (32.01%) but its influence was sharply absorbed by professionalization and technological diversity to the extent that the influence became insignificant. It may be noted that professionalization shifts to persuasion of less adoptable technologies, ignores client participation, functionally more exclusive to educational activities with narrow technological base and adopts more coercive means in management. Under such condition positive influence of more adoptable technologies became insignificant. Further technological diversity may also disperse efforts to more areas as a result even more adoptable technologies failed to contribute to performance. In other words agriculture extension organizations failed to harvest the benefit of more adoptable technologies due to increased professionalization which resulted in a condition of coercive and non-participative situation with narrow focus on educational programs. This condition generally emerges in absence of empathy among professionals toward staff and clients, as stated earlier.

Strategic Determinants of Goal Attainments

As examined earlier extension strategies exhibited both positive and negative associations to the attainment of different goals. Their magnitude and directions of factor contributions to attainment of different goals may thus vary considerably and may or may not be manifested on the performance of the organizations.

To reveal their factor contributing behavior at this macro level of interaction all strategic variables were step wise regressed with the attainment of each goal separately. Strategic variables exhibited significant explanatory power of variable magnitudes to the attainment of different goals (Table 50). Analyses showed that 4, 11, 9, 7 and 4 strategic variables explained 39.31%, 66.91%, 58.83% 51.41%, 42.51% and 31.58% of the variability in the attainment of the goal of attitude change, knowledge transfer, skill development, technology diffusion, productivity and income increase respectively. They exhibited no significant explanatory power to the attainment of goal of level of living improvement. Perhaps extension strategies had no relevance to or aimed at the improvement of clients level of living. Comparatively strategic variables showed higher explanatory power to the attainment of behavioral goals than that of economic goals.

Most of the strategies significantly contributed to the attainment of behavioral goals only. Often their contributions to the attainment of behavioral and economic goals were in opposite direction. Consequently their contributions to performance were not significant. However factor contributions of professionalization were significantly negative to both behavioral and economic goals as well as performance of the organizations. The management strategy of professionalization seemed to be the dominating force which created management conditions leading to decline in performance.

Aggregate Strategic Macro-System

The associations between aggregate strategic macro-system variable with the attainments of all component goals as well as performance of agricultural extension organizations were negative, significantly with the attainment of the goal of diffusing technologies ($r=-0.483^{**}$) and increasing productivity of clients ($r=-0.296^{*}$) (Table 51).

The linear explanatory power of aggregate strategic macro-system was not significant but its explanatory power became

Table 51: Influence of Aggregate Strategic Macro system on Goal Attainments and Performance of Agricultural Extension Organizations

Attainments of Goals	Correlation Coefficient
Attitude Change	-0.210 NS
Knowledge Transfer	-0.178 NS
Skill Development	0.031 NS
Diffusion of Technologies	-0.483 **
Productivity Increase	-0.296 *
Income Increase	-0.086 NS
Level of Living Improvement	-0.023 NS
Performance	-0.111 NS

R * R ; Linear = 0.012 NS
Quadratic=0.296 *

significant when quadratic function was used¹. Therefore the major hypothesis of

1. The estimated quadratic function was:

$$P=278.920 - 3.892^{**} X 40 + 0.0198^{**}(X40)^2$$
(1.199) (0.0062)

$$R=0.519 * (\bar{R}^2=0.219)$$

(14.213)

Where : P= Performance of Agricultural Extension Organizations
 X 40 = Aggregate Strategic Macro-System

"performance of agricultural extension organizations is directly and significantly influenced by the strategies they adopted" (2.0)

may not be true. To a certain extent the apposite seemed to be true, i.e. performance of the agricultural extension organizations was inversely influenced by the magnitude of currently adopted strategies. After certain level, the rate of decrease seemed to be reduced due to interaction with other organizational variables. It should be noted here that models and approaches, technology and client strategies showed both positive and negative influences to the attainment of different goals, but management strategies displayed consistently negative contributions to the attainments of all goals as well as performance of the organizations. The consistently negative contributions of the aggregate strategic macro-system was possibly due to the overriding influence of management strategy which displayed mutually inconsistent conditions within the organizations.

Summary

The agricultural extension organizations adopted a multitude of models and approaches which were characterized by low functional exclusivity, selective client contact, narrow technological base, medium range of adoptable technological package, very low client orientation and very low client representation in decision making process. Their management strategies were characterized by low participativeness, considerable performance aspiration and coercion with average degree of professionalization.

Some of the strategies of agricultural extension organizations were not independent to each other. Integrated models were found to have more universal contact but less exclusive to extension function. Adoptability of technologies was independent of diversity of technological advice. Client orientation and participation showed an inverse relation which implied that organization having more client orientation allowed fewer clients to represent in the decision making process. Among the management strategies participativeness had positive association with performance aspiration. But professionalization resulted more coercion in management.

As a single factor model integration, functional exclusivity, technological diversity, client orientation, participativeness, coercion and performance aspiration had no significant influence on performance. It seemed that those strategies were not goal directed. The influence of adoptable technologies on performance was positively significant and linear. But professionalization had significantly linear but negative influence on performance due to its strong positive associations with functional exclusivity and coercion in management which had negative influence on performance. The influence of universal contact with client was significantly non-linear implying that certain degree of universality in contact is essential for better performance of the organizations.

In an interacting situation at micro system level strategies, relating to models and approaches, clients and management of the organizations, had no significant power to

explain performance differential due to mutually opposite influences of different strategies on the performance as well as the attainments of different goals. The influence of technological strategies were however positive and significant. On aggregation none of the micro system of approach, technology, client and management strategies singly exhibited significant influence on performance due to counter balancing or inconsistent influences on performance as well as goal attainments. When all strategic variables interacted only eight variables could explain 53.88% performance differential due to their low variability at the operational unit level and mutually opposite influences on performance. The contribution of technological adoptability become positive and together with technology diversity explained 41.37% performance differential but their contribution was absorbed by professionalization which was significantly associated with selective contact and coerciveness. The latter two strategies contributed negatively to the performance. The professionals seemed to fail to harvest the benefit of adoptable technologies due to their negative behavioral pattern to management. The influence and contribution of strategic variables were not alike in the attainment of different component goals of extension work. Only four variables such as model integration, technology adoptability, technological diversity and management coerciveness explained 39.31% variability in the attainment of the goal of changing clients attitude. Among them model integration made significant contribution. The contribution of other three variables were also manifested

through model. About 66.91% variability in transferring knowledge was explained by strategic variables and significant contributors were technological diversity and professionalization. The former contributed positively and latter contributed negatively. Though technology adoptability made the largest contribution, its influence was neutralized by professionalization. In skill development about 58.82% variability was explained by nine variables with the largest and significant positive contribution from technology adoptability. About 51.41% variability in attaining technology diffusion was explained by seven variables. Technology diversity made significant positive contribution but largest negative contribution came from professionalization as professionalization was significantly and negatively associated with model (integrated), universality in contact, promoting highly adoptable technologies and client participation in decision making. Four variables such as client participation, management participativeness, professionalization and performance aspiration explained only 31.58% variability in the attainment of income increase but all of them, except participativeness contributed negatively. The strategic variables had no explanatory power to differential attainment of level of living improvement. By and large models and approaches and management strategies contributed negatively to all goal attainments as well as overall performance and that of technology and clients contributed consistently positively.

IX. MANAGEMENT DETERMINANTS OF PERFORMANCE

Introduction

Agriculture and Sugarcane Extension Services of Bangladesh are expected to have been designed and staffed and programs have been planned, implemented and controlled in such a way as to achieve the goals of behavioral and economic changes among their clients. In this process the organizations have emerged with certain distinct attributes, here termed as variables, which may promote or impede their performance. On a priori assumptions 27 variables were included relating to five functional micro processes of management namely, planning, organizing, staff management, implementing and controlling. Their magnitude, variability, influences and factor contributions to performance as well as the attainment of each of the seven professional goals were examined at different levels of interactions and aggregations and presented in this chapter.

Planning Process

Three variables related to planning process were selected. These were program soundness, staff participation and role conflict. The first focused on the goodness of the planned program as measured in terms of extent of observance of ideal process of program planning. The second focused on the pulling of experiences of professional staff in designing a program which would meet the needs of their clients and accord commitment for its implementation. The third is the manifestation of the extent

of consistency of planned activities. Analysis showed that planning process of agricultural extension organizations is characterized by moderate levels of program soundness (35.41 \pm 10.41), staff participation in programming (29.19 \pm 11.35) and role conflict (25.59 \pm 3.85). The magnitude of program soundness, staff participation and role conflict showed significant variations among the primary administrative units, Upazilla or Subzones (Appendix-H).

The variables of planning process were not independent of each other. Program soundness displayed significantly positive correlation with staff participation ($r=0.594^{**}$) and negative relation with role conflict ($r= -0.536^{**}$). Role conflict also had inverse relation with staff participation ($r=-0.516^{**}$) (Table 52)

Table 52: Inter-relationship among the Variables of Planning Micro-process.

Variables of Planning Micro-process	x47	x48	x49
x47: Program Soundness	1.000	0.594**	-0.536**
x48: Staff participation		1.000	-0.516**
x49: Role Conflict			1.000

There seemed to have high colinearity between staff participation and program soundness. A sound program planning is resulted staff participation which together reduced role conflict among staff.

None of the variables of program planning displayed significant association with the attainment of goals except the relationship between role conflict and the attainment of attitude change ($r=0.307^*$) which was also marginally significant (Table 53). Their associations with and factor contributions to

Table 53 : Relationships with and Contributions of Variables of Planning Micro Process to Goal Attainments and Performance of Agricultural Extension Organizations.

Variables of Planning Micro-process	Goal Attainment							Performance		
	Attitude Change	Knowledge Transfer	Skill Development	Technology Diffusion	Productivity Increase	Income Increase	Level of Living Improvement	R ²	Linear	Quadratic
47:Program Soundness	0.085	0.123	-0.034	-0.143	-0.147	-0.157	-0.117	0.077	0.006	0.006
48:Staff Participation	-0.137	0.046	0.167	-0.143	-0.027	-0.104	-0.030	-0.002	0.000	0.027
49:Role Conflict	0.307*	0.050	0.051	0.128	0.180	0.095	0.271	0.160	0.001	0.005
Aggregate of Planning Microprocess Strategies	0.182	0.175	0.210	0.132	0.158	0.027	0.278	0.221	0.049	0.052

performance of the organizations were also not significant. Therefore, the supporting hypotheses of more is the program soundness or staff participation in programming or lower is the role conflict, better is the performance of agricultural extension organizations may not be true. The direction of relationship however showed that role conflict tended to contribute positively to the attainments of all goals as well as performance of the organizations. Certain magnitude of role conflict may help staff endeavour to overcome problems and hence perform better. Program soundness and staff participation in programming exhibited positive influence on the attainment of behavioral goals and negative influence on that of economic goals. It is likely to occur when behavioral changes receive priority over economic changes.

The variables of planning process ceteris paribus had no significant explanatory power in respect of performance differential (Table 54).

Table 54: Marginal Contributions of Planning Process Variables to performance of Agricultural Extension Organizations

Planning Process Variables		Regression Coefficient		Standard Errors
x47:	Program Soundness	0.156	NS	0.145
x48:	Staff Participation	-		-
x49:	Role Conflict	0.551	NS	0.414
	Constant	7.582		
	R	0.251	NS	3.565
	R^2 (\bar{R}^2)	0.063 (0.002)		

The marginal contribution of none of the variables was significant. In an interacting situation marginal contributions

of both program soundness and role conflict increased substantially, while that of staff participation in program planning became altogether insignificant beyond tolerance limit. It appears that staff participation, in contrary to expectation has failed to improve quality of programs.

The planning process as an aggregate variable also had no significant associations with the attainment of any of the goals of the organizations but the relationships were consistently positive. Its association with as well as marginal contribution to performance of the organizations were not significant but positive (Table 53). Therefore, the minor hypothesis of:

"Performance of agricultural extension organizations is directly and significantly influenced by their planning process" (3.1).

may not be accepted. All those evidences tend to prove that current practices of planning alone seem to have contributed little toward performance of the organizations.

Organizing Process

The structural variables of the organizations were size of primary administrative unit, size of client per working unit, span of supervision, strategic and tactical authority, formalization and flexibility. The design of the organizations was manifested through the magnitudes of these structural variables which were expected to have influence on the nature, operation and performance of the organizations. These variables are the output of the organizing process which is characterized by large primary operational units (96.88 sq. miles \pm 48.87),

large size of clients per extension worker (676 families ± 395), large span of supervision (23.62 ± 15.57), medium range of strategic (25.34 ± 9.13) and tactical (28.91 ± 8.67) authority high formalization (39.73 ± 3.88) and a substantial degree of flexibility (24.82 ± 4.98). Except formalization all other structural variables had significant variation among the primary administrative units (Appendix-H). Formalization seemed to be equally high among all units.

Some of the structural variables had significant inter-relationships. Size of primary administrative units had significantly high correlation with span of supervision ($r=0.676^{**}$). Larger administrative units did not have proportionately more working units resulting in smaller clients per extension worker (Table 55). Similarly significantly high correlation existed between strategic and tactical authority ($r=0.717^{**}$). Both went hand in hand. When span of supervision increased the organizations became more flexible ($r=0.322^*$). Formalization displayed consistently negative relations with all other structural properties of the organizations, significantly with size of clients per extension workers ($r=-0.362^*$). In other words organizations became more formal when number of clients per extension workers increased.

Table 55. Inter-relationships Among Variables of Organizing Micro Process

Variables	x50	x51	x52	x53	x54	x55	x56
x50: Size of Primary Adv. Unit	1.000	0.220	0.676**	0.127	0.181	-0.210	0.170
x51: Size of Clients		1.000	0.148	0.283	0.162	-0.362*	0.237
x52: Span of Supervision			1.000	0.190	-0.005	-0.211	0.322*
x53: Strategic Authority				1.000	0.717**	-0.233	0.011
x54: Tactical Authority					1.000	-0.130	0.040
x55: Formalization						1.000	-0.203
x56: Flexibility							1.000

Structural variables displayed inconsistent influences on the attainment of different goals of the organizations. Size of primary administrative units (Upazillas and Subzones) had negative associations with the attainments of most of the goals, significantly with the attainment of knowledge transfer ($r = -0.32^*$) (Table 56). It seemed that larger is the administrative unit, lower is the transfer of knowledge. Size of clients per extension worker (size of working units: blocks and units) had much more profound and negative influence on the attainments of goals. It displayed significantly negative influence on the attainments of both behavioral and economic goals, such as attitude change, knowledge transfer, diffusion of technologies

Table 56 : Relationships with and Contributions of Variables of Organizing Micro Process to Goal Attainments and Performance of Agricultural Extension Organizations.

Variables of Organizing Micro-process	Goal Attainments							Performance		
	Attitude Change	Knowledge Transfer	Skill Development	Technology Diffusion	Productivity Increase	Income Increase	Level of Living Improvement	R ²	Linear	Quadratic
x50: Size of Primary Administrative Unit	-0.288	-0.302	-0.066	-0.210	-0.012	-0.124	0.013	-0.168	0.028	0.032
x51: Size of Clients	-0.470	-0.316	0.131	-0.658	-0.306	-0.163	0.039	-0.471	0.222	0.240
x52: Span of Supervision	-0.051	-0.035	0.198	-0.102	0.298	0.354	-0.185	0.061	0.004	0.027
x53: Strategic Authority	-0.167	-0.017	0.216	-0.226	0.076	0.176	-0.239	-0.035	0.001	0.013
x54: Tactical Authority	-0.183	-0.001	0.179	-0.029	-0.135	-0.027	-0.100	-0.012	0.000	0.001
x55: Formalization	0.230	0.169	-0.044	0.433	-0.022	-0.057	-0.082	-0.217	0.047	0.047
x56: Flexibility	-0.131	0.058	0.260	-0.165	0.007	0.091	-0.230	0.036	0.001	0.083
Aggregate Organizing Micro-process	-0.395	-0.294	-0.018	-0.566	-0.098	0.058	-0.056	-0.302	0.091	0.119

and productivity increase (Table 56). Size of client per extension worker seemed to be more crucial than size of administrative units.

Span of supervision had significant positive influence on the attainments of the goals of productivity ($r=0.298^*$) and income ($r=0.354^*$) increases. Perhaps with the increase of span of supervision the supervisors tended to give more attention to few tangible goals of increasing productivity and income. Formalization displayed significant positive association with the attainment of diffusion of technologies ($r=0.433^*$). It seemed that in promoting rapid rate of diffusion the organizations need to be more formal in management.

The structural variables of the organizations had both positive and negative associations with performance. But most of those relationships and their marginal contributions to performance were not significant, except size of clients per extension worker. Therefore, hypotheses that smaller size of primary administrative unit, smaller size of clients per extension worker, smaller span of supervision, more strategic and tactical authority, higher formalization or more flexibility result better performance may not be true. Association with as well as marginal contribution of only size of clients per extension worker to performance was significant but negative¹.

1. The estimated linear function was:

$$F = 30.071 - 0.425 \times S1^{**}$$

(0.145)

$$R = 0.471^{**} \quad (\bar{R}^2 = 0.196)$$

(3.194)

Where F = Performance of Extension Organizations
 $\times S1$ = Size of Clients per Extension Worker

The explanatory power of the size of clients per extension worker in respect of performance differential did not increase appreciably when quadratic function was used. The linear influence was more significant. The estimates showed that for an increase of 235 client families per extension worker the performance of the organizations decreased by one percent. It substantiated the hypothesis that smaller the size of clients per extension worker, greater the performance of agricultural extension organizations.

When all variables interact organizing process ceteris paribus had no significant power to explain differential performance. However, magnitude and direction of contributions changed in some cases (Table 57). The positive contribution of size of primary operational units changed to negative one. The influence of formalization substantially reduced but that of flexibility, span of supervision and magnitude of tactical authority increased substantially. In an interacting situation negative contribution of size of clients per extension agent still remained significant. It seems that size of clients predominates over all other structural variables.

The aggregate organizing micro process showed negative associations with the attainments of all goals, significantly with the attainment of attitude change ($r=-0.395^*$) and diffusion of technologies ($r=-0.566^{**}$). Its association with performance was also significantly negative ($r=-0.302^*$). But its marginal contribution to performance was not significant as correlation

Table 57: Marginal Contributions of Variables of Organizing Micro-process to Performance of Agricultural Extension Organizations

Organizing Micro Process Variables	Regression Coefficients	Standard Errors
x50: Size of primary administrative unit	-0.034 NS	0.018
x51: Size of clients per extension worker	-0.396 *	0.168
x52: Span of supervision	0.101 NS	0.059
x53: Strategic authority	-0.041 NS	0.187
x54: Tactical authority	0.168 NS	0.224
x55: Formalization	0.169 NS	0.367
x56: Flexibility	0.140 NS	0.294
Constant	16.861	
R	0.607 NS	3.216
R^2 (R^2)	0.369 (0.185)	

was marginally significant. The use of quadratic function could not increase its explanatory power (Table 57). Therefore the minor hypothesis of:

" Performance of agricultural extension organizations is directly and significantly influenced by their organizing process". (3.2)

may not be true. It seemed that the organizing micro process and its outcome of structural organization contributed negatively to performance.

Staff Management Process

Relating to staff management process four variables were included in the study, namely salary level, incentive, transfer frequency and managerial succession. The professional staff received an average annual salary of Tk.13.73 thousand ($+5.21$) with an average annual incentive of Tk.400.00 ($+750$) only. The staff were transferred at an interval of 3.51 ($+3.85$) years and their managers were transferred more frequently (2.75 years of interval $+1.71$). All the variables of staff management process showed significant variation among the primary administrative units except managerial succession (Appendix-H).

Some of the variables of staff management process had significant correlation. Salary of professional staff displayed significant positive associations with incentive ($r=0.453^{**}$) and staff transfer ($r=0.410^{**}$). It seemed that staff with higher salary (i.e. older staff) received more incentive as incentives were proportionate to salary. Older managers and staff as they received more salary and incentive were equally more frequently transferred (Table 58).

Table 58. Inter-relationships among Variables of Staff Management Micro-Process.

Variables of Staff Magt. Micro-Process	x57	x58	x59	x60
x57: Salary Level	1.000	0.453**	0.410**	-0.320*
x58: Incentive		1.000	0.402*	-0.406*
x59: Transfer Frequency			1.000	-0.255
x60: Managerial Succession				1.000

Transfer of extension managers and staff tended to display an inverse relation i.e. where managers were more frequently transferred, the interval of staff transfer decreases. The relationship was however not significant. The pattern of relationship gave evidence of strong colinearity between salary and incentive of staff.

Staffs' salary level displayed both positive and negative associations to the attainments of behavioral and economic goals (Table 59). but the relationships were not significant except with the attainment of the goal of changing clients attitude; which was significantly positive ($r=0.314*$). Higher salaried staff therefore paid more attention to attitude change. Its association with and factor contribution to performance was not significant. Incentive displayed consistently positive influence on the attainments of all goals, significantly with that of attitude change ($r=0.440*$), knowledge transfer ($r=0.323*$) and diffusion of technologies ($r=0.554**$). Consequently, its association with and marginal contribution to performance was significantly positive and the influence was linear¹. It substantiated the hypothesis that higher the incentive of staff, better the performance of agricultural extension organizations. Less frequently the staff were

1. The estimated linear function was as follow:

$$P=26.060 + 0.246* \times 57 \\ (0.105)$$

$$R=0.394* \quad \overline{R^2}=0.218 \\ (3.328)$$

Where; P=Performance of Agricultural Extension Organizations
 $\times 57$ = Incentive

Table 59 : Relationships with and Contributions of Variables of Staff Management Micro-Process to Goal Attainments and Performance of Agricultural Extension Organizations.

Variables of Staff Management Process	Goal Attainment							Performance		
	Attitude Change	Knowledge Transfer	Skill Development	Technology Diffusion	Productivity Increase	Income Increase	Level of Living Improvement	R ²	Linear	Quadratic
x57: Salary Level	0.314*	0.072	-0.116	0.291	0.035	-0.165	0.244	0.124	0.015	0.030
x58: Incentive	0.440**	0.323*	0.020	0.554**	0.159	0.016	0.247	0.394*	0.155*	0.158
x59: Transfer Frequency	0.274	0.242	0.068	0.357*	-0.161	-0.252	0.071	0.217	0.047	0.047
x60: Managerial Succession	-0.253	-0.139	-0.166	-0.409*	-0.205	-0.056	-0.152	-0.297*	0.088	0.089
Aggregate Staff Management Micro-process	0.268	0.237	-0.117	0.378*	0.042	-0.109	0.229	0.254	0.064	0.141

transferred, more was the attainment of behavioral goals, particularly that of diffusion of technologies. However its influence on the performance of organizations was not significant. Perhaps the present interval of staff transfer was not significantly favorable for better performance. The managerial succession however had inverse relation with the attainments of all goals as well as performance of the organizations. The displayed relation was not enough to explain performance differential significantly. Therefore the supporting hypotheses that higher staffs' salary, lower frequency of staff transfer and managerial succession would result better performance of the organizations may not be accepted.

The explanatory power of staff management dimensions ceteris paribus was not found to be significant (Table 60). Their marginal contributions were also not significant. But some changes in magnitude and direction of contribution were observed. Individually salary level of staff had positive contribution which became negative when interacting with other variables. Its influence was possibly absorbed by frequent transfer of staff. In other words higher salaried staff contributes little or negatively, if they are frequently transferred.

The aggregate staff management micro process variable was found to have no significant association with the attainments of all goals of the organizations. The directions of influences were both positive and negative to behavioral and economic

Table 60: Marginal Contributions so Variables of Staff Management Micro-Process to Performance of Agricultural Extension Organizations

Staff Management Micro Process Variables	Regression Coefficients	Standard Errors
x57: Salary Level	-0.222 NS	0.368
x58 : Incentive	0.215 NS	0.131
x59 : Transfer Frequency	0.226 NS	0.533
x60 : Managerial Succession	-0.360 NS	0.396
Constant	29.666	
R^2	0.437 NS	3.433
\bar{R}^2 (\bar{R}^2)	0.192 (0.071)	

goals. Its relation with and factor contribution to performance was also not significant (Table 59). Therefore, the minor hypothesis of:

"Performance of agricultural extension organizations is directly and positively influenced by their staff management process". (3.3)

may not be true. It was further observed that the power of aggregate staff management micro-process to explain differential performance reduced from 19.10% to 6.40% due to inconsistent and opposite influences of discrete variables. The process of staff management therefore failed to contribute positively and significantly toward increasing the performance of the organizations.

Implementation Process

The implementation process variables were coordination, supervision, supervisors mobility, horizontal communication, relation and task oriented supervisory leadership. These dimensions generally determine the conduct of the organization, thereby, influence the performance. On an average the implementation process of agricultural extension organizations was characterized by medium level of coordination (20.55 \pm 4.07), 97.16 staff hours of supervision of primary administrative units per year (\pm 79.41), 15.52 staff days per month of primary supervisors mobility (\pm 4.27), average level of horizontal communication (12.77 \pm 2.38) and average level of both task (19.34 \pm 5.57) and relation (14.59 \pm 5.35) oriented supervisory leadership. The magnitude of these variables showed significant variations among the primary administrative units (Appendix-H).

The selected variables of implementing process were not found to be independent of each other except supervisors' mobility i.e. coordination, communication and supervision from upper hierarchies failed to influence mobility of primary supervisors (Table 61).

Intensity of supervision of primary administrative units was found to increase level of coordination ($r=0.425^{**}$) and more coordination promoted more horizontal communication among field staff ($r=0.405^{**}$) and task orientation of supervisory leadership of the primary administrative units ($r=0.322^*$), the Upazillas and Subzones due to frequent contact and interaction. Relation

Table 61: Inter-relationships Among Variables of Implementation Micro-Process.

Variables of Implement. / Micro-Process	x61	x62	x63	x64	x65	x66
x61: Coordination	1.000	0.425**	0.138	0.405*	-0.130	0.322*
x62: Supervision		1.000	0.161	0.415**	-0.206	0.146
x63: Supervisors Mobility			1.000	-0.112	-0.059	0.044
x64: Horizontal Communication				1.000	-0.264	0.260
x65: Supervisory Leadership (RO)					1.000	-0.310*
x66: Supervisory Leadership (TO)						1.000

orientation of supervisory leadership displayed inverse relation with all dimensions of implementation process, significantly with task orientation ($r=-0.310^*$). It seemed that relation oriented supervisory leadership tended to undermine program implementation. The opposite was true for task orientation of supervisory leadership. It appears that significant multicollinearity exists among supervision, coordination and horizontal communication which might reinforce program implementation and thereby influence performance of the organizations.

The variables of implementation process displayed both positive and negative relations with the attainments of both behavioral and economic goals of the organizations (Table 62). But most of the relations were not significant. Magnitude of

Table 62 : Relationships with and Contributions of Variables of Implementation Micro-Process to Goal Attainments and Performance of Agricultural Extension Organizations.

Variables of Implementation Micro-Process	Goal Attainment							Performance		
	Attitude Change	Knowledge Transfer	Skill Development	Technology Diffusion	Productivity Increase	Income Increase	Level of Living Improvement	R²	Linear	Quadratic
	r	r	r	r	r	r	r	r	r	r
x61: Coordination	-0.107	0.278	0.154	0.313*	-0.051	-0.218	-0.218	0.220	0.048	0.066
x62: Supervision	0.284	0.028	-0.146	0.163	-0.013	-0.066	0.035	0.069	0.005	0.008
x63: Supervisors Mobility	0.240	0.138	-0.021	0.359*	0.027	-0.048	0.066	0.133	0.034	0.034
x64: Horizontal Communication	0.105	0.076	0.052	0.012	-0.024	0.017	-0.147	0.059	0.003	0.016
x65: Supervisory Leadership (RO)	-0.078	-0.024	0.149	-0.042	0.151	0.111	-0.299*	0.017	0.000	0.002
x66: Supervisory Leadership (TD)	0.102	0.192	0.121	0.019	-0.143	-0.189	0.026	0.097	0.009	0.070
Aggregate Implementation Micro-process	0.328*	0.142	-0.018	0.394*	0.053	-0.022	0.077	0.168	0.028	0.034

coordination ($r=0.313^*$) and supervisors mobility ($r=0.359^*$) showed significant positive associations with the attainment of the goal of technology diffusion due to more organized contact with the clients. Inverse relations between relation orientation of supervisory leadership and the attainment of behavioral goals, significantly with level of living improvement ($r=-0.299^*$) was an evidence of sacrificing intangible goals when there was overconfidence on the subordinate staff due to relation oriented supervisory leadership. The variables of the program implementation appears to set mutually opposite conditions for goal attainments because of the lack of the sense of clarity and goal direction in the implementation process.

None of the variables of the implementation micro process displayed significant relation with or factor contribution to performance of the organizations but the relationships were consistently positive. Therefore supporting hypotheses that more on higher is the level of coordination, supervision, supervisor's mobility, horizontal communication, task oriented leadership better is the performance of the organizations not be true. The influence of these variables might have been manifested through intensity of educational process to which they are generally directed to.

Regression analysis showed that even under interacting situation their power to explain performance differential was not significant (Table 63). The marginal contributions of individual variables were also not significant. The direction and

magnitudes of influences however changed. The marginal contributions of coordination, supervisors mobility and relation oriented supervisory leadership appreciably increased, though the contribution remained insignificant when interacted with supervision i.e. supervision had influenced coordination and mobility of primary supervisors and their relation with staff. The contribution of intensity of supervision reduced to be negative. Its influence were absorbed by coordination and mobility of supervisory staff of primary administrative units.

Table 63: Marginal Contributions of Variables of Implementation Micro Process to Performance of Agricultural Extension Organizations

Implementation Micro Process Variables	Regression Coefficients	Standard Errors
x61: Coordination	0.356 NS	0.376
x62: Supervision	-0.002 NS	0.009
x63: Supervisors Mobility	0.135 NS	0.160
x64: Horizontal Communication	-	-
x65: Supervisory Leadership (Relation Orientation)	0.089 NS	0.297
x66: Supervisory Leadership (Work Orientation)	0.069 NS	0.298
Constant	15.278	
R^2	0.279 NS	3.735
\bar{R}^2 (\bar{R}^2)	0.078 (-0.099)	

Aggregate variable of implementation process showed both positive and negative associations with the attainments of different goals. Its influences on the attainments of the goals of attitude change ($r=0.328^*$) and technology diffusion ($r=0.394^*$)

were significantly positive (Table 62). Because of mutually opposite influences of different variables on different goal attainments, its association with and factor contribution to performance were not significant but positive. Therefore, the minor hypothesis of:

"Performance of agricultural extension organizations is directly and significantly influenced by their implementation process". (3.4)

may not be accepted. Either in interaction or aggregation the program implementation process alone could not influence performance of the organizations significantly.

Educational Process

The agricultural extension organizations on an average organized 255.11 staff hours of educational activities in an working unit annually (+421.03) with an annual per capita client participation of 41.43 man hours (+61.78); but the quality of participation was very low (21.53 +8.36). The magnitude of all variables of the educational processes showed significant variation among the primary administrative units (Appendix-H).

The magnitude of educational activities and client participation seemed to be independent but quality of participation showed positive and significant relation with client participation ($r=0.452^{**}$) (Table 64). It seemed that as the clients participate more, the quality of their participation increased substantially.

Table 64: Inter-relationships Among Variables of Educational Micro Process

Variables of Educational Micro-Process	x67	x68	x69
x67: Level of Educational Activities	1.000	0.017	0.092
x68: Client Participation		1.000	0.452**
x69: Quality of Participation			1.000

The magnitude of educational activities showed positive association with the attainment of behavioral goals, significantly with that of diffusion of technologies ($r=0.302^*$) (Table 65). But its influence on economic goals were negative, significantly with the attainment of goals of increasing clients income ($r=-0.304^*$). It is a reflection of deficiencies of extension programs interms of contents of educational activities. It provides farther evidence of high priority of few selected technologies, the diffusion of which results a decline of overall productivity and income of clients. Client participation in educational activities and the quality of their participation showed significant and positive influence on behavioral changes but its influences on the attainments of economic goals was negative. In other words, higher attainments of the behavioral goals of narrowly focused crop development programs tended to decline overall productivity of clients. This is possibly the root cause of slow response to technological changes in integrated commodity development programs, like intensive cane development program.

The association of client participation and quality of their

participation with and their factor contributions to performance were highly significant (Table 65). Client participation and quality of their participation singly explained 19.60% and 30.90% performance variation respectively ¹. It substantiated the supporting hypotheses that higher the magnitude of client participation or quality of their participation, better the performance of agricultural extension organizations. The influence over performance was linear which was not substantially increased when quadratic function was used.

1(a) The estimated linear function was:

$$P = 25.193 + 0.048 * X_{68}$$

(0.018)

$$R = 0.443 * \frac{X_{68}^2}{(3.247)} \quad (R = 0.169)$$

Where ; P = Performance of Agricultural Extension Organizations
 X_{68} = Client Participation in Educational Activities

Estimates showed that agricultural extension organizations could increase 1% of their performance by increasing 20.84 mhs. average participation of their clients.

(b) The estimated linear function was:

$$P = 21.154 + 0.275** * X_{69}$$

(0.096)

$$R = 0.556** * \frac{X_{69}^2}{(3.010)} \quad (R = 0.286)$$

Where, P=Performance of Agricultural Extension Organizations
 X_{69} = Quality of Client Participation.

Estimate showed that for each increase of 10% quality of participation the extension organizations could increase 1.38% of their performance

Table 65 : Relationships with and Contributions of Variables of Educational Micro-Process to Goal Attainments and Performance of Agricultural Extension Organizations.

Variables of Educational Micro-process	Goal Attainment							Performance		
	Attitude Change	Knowledge Transfer	Skill Development	Technology Diffusion	Productivity Increase	Income Increase	Level of Living Improvement	R ²	Linear	Quadratic
x67:Level of Educational Activities	0.151	0.225	0.214	0.302*	-0.206	-0.304*	0.109	0.214	0.046	0.159
x68:Client Participation	0.334*	0.613**	0.635**	0.137	-0.186	-0.129	0.054	0.443**	0.196*	0.205*
x69:Quality of Participa.	0.410*	0.659**	0.510**	0.341*	-0.000	0.090	-0.174	0.556	0.309**	0.328*
Aggregate Educational Microprocess	0.182	0.623**	0.597**	0.169	-0.138	-0.074	-0.016	0.457**	0.209**	0.216

Regression analysis showed that the variables of the educational process in interaction could explain 38.40% performance variability and marginal contribution of quality of participation was highly and positively significant (Table 66). It seemed that quality of participation, as measured in terms of intensity of interaction in the educational activities is the principal determinant of performance at this level of interaction. Some of the influences of participation might have been manifested through quality of participation due to existence of colinearity among them.

Table 66: Marginal Contributions of Educational Micro Process Variables to Performance of Agricultural Extension Organizations

Educational Micro Process Variables	Regression Coefficients	Standard Errors
x67 : Level of Educational Activities	0.020 NS	0.017
x68 : Client Participation	0.027 NS	0.018
x69 : Quality of Participation	0.216 **	0.084
Constant	20.451	
R	0.620 **	2.942
R^2	0.384 (0.318)	

The educational process as an aggregative variable of the organizations displayed positive and negative influences on the attainments of behavioral and economic goals due to the same reason of narrow priority and coverage as stated earlier (Table 65). Its association with and factor contribution to performance

were also significantly positive¹. Therefore the minor hypothesis of:

"Performance of Agricultural Extension Organizations is directly and significantly influenced by their educational process". (3.5)

may not be rejected. The power of aggregative educational process to explain the performance differential reduced from 38.40% to 20.09% due to mutually opposite direction of influences on behavioral and economic goals of extension work.

Controlling Process

The selected variables of controlling process were span, magnitude and dispersion of control and magnitude of punishment for deviation from the norms of conduct. The controlling process was characterized by wide span (32.38 per supervisor (+17.51), low magnitude (27.96 +8.94) but fairly dispersed control (70.51) and very low level of punishment (32.31 +24.47)). The magnitude of control variables showed wide and significant variation among the primary administrative units (Appendix - H).

The magnitude and dispersion of control and punishment seemed to be independent of span of control (Table 67). Magnitude and dispersion of control showed significantly positive

1. The estimated linear function was as follows:

$$P = 88.624 + 0.682^{**} X_{22} \\ (0.242)$$

$$R = 0.457^{**} (\bar{R}^2 = 0.182) \\ (14.545)$$

Where P= Performance of Agricultural Extension Organizations
X₂₂= Educational Process

Table 67: Inter-relationships Among Variables of Control Micro Process

Variables Control Micro-Process	x70	x71	x72	x 73
x70 : Span of Control	1.000	0.020	0.016	0.090
x71 : Level of Control		1.000	0.874**	-0.209
x72 : Dispersion of Control			1.000	-0.166
x73 : Severity of Punishment				1.000

association ($r=0.874^{**}$). As the magnitude of control increased the control function became more dispersed. The opposite may also be true. Both of them however showed inverse relation with punishment, though the relationship was not significant. It appears that with the increase of magnitude and dispersion of control the intensity of punishment tended to decrease possibly due to corrective measures taken at proper stages.

The variables of controlling process displayed both positive and negative associations with the attainments of both behavioral and economic goals (Table 68). All variables of controlling process exhibited negative influences with the attainments of the goals of attitude change, knowledge transfer and diffusion of technologies and positive influence on that of skill development and productivity increase. It implies that increased control tended to help attain tangible goals more but impede attainments of intangible goals.

All variables, except span of control, displayed negative direction of influences on the performance of the organizations, but their associations were not statistically significant. As a single factor their power to explain performance differential, both linear and quadratic, was not significant.

Regression analysis showed that explanatory power of control variables in interaction as well as the marginal contributions of each of the variables were not significant (Tables 69). When they interact, their marginal contributions substantially decreased and that of level of control went beyond tolerance limit. It seemed control variables failed to contribute toward performance rather impeding it under interacting situation.

When variables of controlling process were aggregated its associations with the attainment of the intangible goals such as attitude change, knowledge transfer, diffusion of technologies and improvement of clients level of living became negative, though the relationships were not significant (Table 68). But its associations with attainments of tangible goals such as skill development, productivity and income increases were positive, significantly with that of productivity ($r=0.341^*$) and income increase ($r=-0.358$). It seems that control process had opposite directions of influences on the attainment of different goals.

The association of aggregative control process with the performance was significantly negative ($r=-0.316^*$) (Table 67). But its marginal contribution to performance of the organizations was not significant. Its power to explain performance differential, both linear and quadratic, was also not significant. Therefore the minor hypothesis of :

"Performance of agricultural extension organization is directly and significantly influenced by their controlling process. (3.6)

Table 68: Relationships with and Contributions of Variables of Controlling Micro Process to Goal Attainments and Performance of Agricultural Extension Organization

Staff Management Process Variables	Goal Attainments							Performance		
	Attitude Change	Knowledge Transfer	Skill Development	Technology Diffusion	Productivity Increase	Income Increase	Level of Living Improvement	R ²	F	Prob
x70: Span of Control	-0.080	-0.050	0.141	-0.096	0.268	0.321*	-0.146	0.034	0.001	0.001
x71: Level of Control	-0.236	-0.022	0.028	-0.284	0.026	-0.036	0.077	-0.114	0.013	0.015
x72: Dispersion of Control	-0.309*	-0.073	0.030	-0.371*	0.109	-0.084	0.095	-0.147	0.022	0.038
x73: Severity of Punishment	-0.251	-0.193	0.074	-0.192	0.217	-0.200	-0.020	-0.086	0.007	0.022
Aggregate Controlling Micro-Process	-0.190	-0.184	0.111	-0.223	0.341*	-0.358*	-0.057	-0.316*	0.100	0.100

Table 69: Marginal Contributions of Variables of Control Micro Process to Performance of Agricultural Extension Organizations

Control Micro Process Variables	Regression Coefficients	Standard Errors
x70 : Span of Control	0.010 NS	0.038
x71 : Level of Control	-	-
x72 : Dispersion of Control	-0.010 NS	0.012
x73 : Severity of Punishment	-0.017 NS	0.028
Constant	28.182	
R	0.191 NS	3.679
R^2	0.036 (-0.067)	

may not be accepted. Control process lead to attainment of tangible goals at the cost of intangible goals possibly due to program deficiency. Consequently its contribution to performance became negative. It requires rationalization of the programs for better performance of the organizations.

Management Process Determinants of Performance

Among the management process variables namely size of clients per extension worker, incentive, client participation in educational activities quality of client participation singly had significant linear associations with performance and their marginal contributions were also significant.

The contribution of size of client was negative and that of incentive, quantity and quality of client participation were positive. The variables when interacted or aggregated at micro process level, could not explain performance differential significantly, except in case of educational process. The

direction magnitude of contributions may change at macro level of interaction or aggregation. Relaxing the ceteris paribus assumption further all variables of management were step wise regressed. The analysis showed that 21 variables ceteris paribus explained 93.32% variation in performance ($R=0.966^{**}$) (Table 70). Inclusion of any other variables did not increase the explanatory power of the regression model. Among those variables marginal contributions of only four variables were significant. These were size of client per extension worker, staffs annual salary level, supervisors mobility, and relation orientation of supervisory leadership. All of them contributed negatively. It was observed earlier that contributions of incentive, clients quantity and quality of participation individually had significant influence but in an interacting situation their contributions became insignificant. While contribution of staff salary and relation orientation of supervisory leadership became significant though their individual contributions were not significant. It seems that higher paid staff, i.e. older staff with relation orientation leadership predominates over all other variables of management process. But both of them exhibited negative influences on performance. In this situation the following hypotheses were amended:

1. When all management variables interact, higher is the level of salary of staff, lower is the performance of agricultural extension organization. (3.3.1)
2. When all management process variables interact, more is the relation orientation of supervisory leadership, lower is the performance of agricultural extension organizations. (3.4.5)

Table 76: Marginal Contributions of Management Macro-Process Variables to Goal Attainments and Performances of Agricultural Extension Organizations

Micro-Processes	Goal Attainments									
	Attitude Change (a2)	Knowledge Transfer (a3)	Skill Development (a4)	Diffusion of Technology (a5)	Productivity Increase (a6)	Income Increase (a7)	Level of Living Improvement (a8)	Performance		
Planning Process										
a47: Programme Soundness	0.513(0.29) (0.492)	0.594(1.01) (0.359)	0.534(0.80) (0.437)					0.373(0.48) (0.253)		
a48: Staff Participation	0.005(0.51)** (0.186)				-0.403(1.20) (0.240)	-0.874(1.57)** (0.215)				
a49: Role Conflict	2.043(4.24)** (0.499)	1.627(2.40) (0.668)			-0.653(1.01) (0.528)	-2.499(2.10)** (0.532)	0.045(0.47) (0.150)	0.481(0.23) (0.445)		
Organizing Process										
a50: Size of Primary Move. Unit	0.03(0.14) (0.029)	-0.029(0.48) (0.052)			-0.041(0.57) (0.023)	-0.077(0.22)** (0.020)				
a51: Size of Client/EN	-0.536(2.13) (0.172)	-2.092(20.05)** (0.686)	-1.804(14.54)** (0.435)	-2.928(42.74)** (0.788)	-0.997(0.56)** (0.319)	-1.488(8.84)** (0.271)		-0.276(0.00)** (0.278)		
a52: Span of Supervision	-0.408(1.14)* (0.125)	-0.633(0.32) (0.414)	-0.129(1.66) (0.074)	-0.557(1.24) (0.419)	0.591(0.02)** (0.173)	0.633(12.57)** (0.141)				
a53: Strategic Authority	0.395(1.02)* (0.158)	0.579(0.79) (0.555)	0.675(0.75)** (0.298)	-0.333(0.28) (0.435)	-0.046(0.56) (0.233)	-0.362(4.56) (0.174)	-0.993(3.70) (0.054)	0.163(1.14) (0.133)		
a54: Tactical Authority	-0.374 (0.60)* (0.210)	-1.092(0.68) (0.714)	-0.414(0.41) (0.390)		0.310(1.16) (0.277)	0.787(1.31)** (0.230)	0.077(1.92) (0.044)	-0.449(0.34) (0.282)		
a55: Formalization	0.508(2.72) (0.597)		-1.323(1.30) (0.864)	1.528(7.73) (1.270)		2.132(2.30)** (0.460)		-0.377(3.23) (0.127)		
a56: Flexibility	0.631(1.10)** (0.228)	1.175(0.45) (1.114)	1.243(0.87)** (0.397)		-0.737(0.78) (0.353)			0.601(1.02) (0.340)		
Staff Mgmt. Process										
a57: Salary Level	0.720(1.34) (0.358)	-1.547(2.02) (1.102)	-1.703(1.57)** (0.765)	-2.175(3.54) (1.112)	-0.945(1.29) (0.451)	-1.383(7.43)** (0.246)	0.107(1.12) (0.111)	-0.736(2.99)** (0.296)		
a58: Incentive	-0.538(1.01)** (0.190)	1.038(1.91) (0.574)		0.837(1.23) (0.607)	0.898(9.23)** (0.289)	0.443(2.90) (0.235)	0.101(5.73) (0.057)	0.246(2.19) (0.195)		
a59: Transfer Frequency	0.643(0.65) (0.510)							0.323 (0.33) (0.470)		
a60: Managerial Succession	-1.754(1.14)** (0.588)	-0.508(0.90) (1.405)	-0.771(0.77) (0.820)	-1.957(2.01) (1.149)	1.017(1.40) (0.593)	2.493(2.74)** (0.758)		-0.416(0.14) (0.788)		

Table 70 Contd.

Micro Processes	Goal Attainments									
	Management Skill - 173	Attitude Change	Knowledge Transfer	Skill Development	Diffusion of Technology	Productivity Increase	Income Increase	Level of Living Improvement	Performance	
Implementation Process										
s161: Skills Coordination	-0.389(0.59) (0.43)	0.988(1.04) (1.05)	0.487(0.41) (0.75)	1.092(0.80) (1.01)	-0.216(4.19) (0.42)	-0.541(4.79)** (0.56)	0.231(0.17) (0.40)			
s62: Supervision	0.025(0.12)** (0.07)		-0.013(0.17) (0.04)							
s63: Supervisor's Mobility	-0.921(4.10)** (0.24)	-1.650(0.93)** (0.64)	-0.533(0.92) (0.34)	-1.991(2.97)* (0.67)	0.097(2.18) (0.52)	0.834(0.81)** (0.27)	-0.432(3.44)** (0.20)			
s64: Horizontal Cross	-1.080(0.64) (0.64)	-1.873(1.46) (1.49)	-2.524(1.78)** (1.00)	-1.819(1.77) (1.98)	0.952(0.48) (0.82)	3.004(3.71)** (0.85)	-1.251(1.68) (0.63)			
s65: Supervisory Leadership (64)	-0.711(1.79)** (0.23)	-0.877(0.76) (0.77)	-0.468(0.43) (0.50)	-1.886(3.00)* (0.75)	-0.254(8.70) (0.82)	-0.274(2.47) (0.22)	-0.573(1.64)** (0.25)			
s66: Supervisory Leadership (72)	-0.518(2.83) (0.39)	-0.010(1.38) (1.13)	1.059(1.56) (0.55)	-0.771(0.56) (0.94)	0.965(3.13)** (0.31)	0.162(1.32) (0.10)	0.007(3.26) (0.39)			
Educational Process										
s67: Level of Edu. Activities	-0.030(0.26) (0.02)	0.034(0.20) (0.02)				0.040(0.44) (0.02)	-0.009(0.14) (0.02)			
s68: Client Participation	0.050(0.20) (0.03)	0.293(2.47)** (0.05)	0.159(46.33)** (0.02)	0.191(15.72)** (0.05)	-0.017(2.16) (0.02)	0.011(3.01) (0.02)	0.001(20.90) (0.02)			
s69: Quality of Clients Part.	0.359(2.12)** (0.12)	0.373(40.48) (0.33)			-0.327(1.07)** (0.13)	-0.519(1.35)** (0.15)	-0.080(7.07)** (0.03)			
Controlling Process										
s70: Span of Control	0.232(0.93) (0.12)	0.535(0.62) (0.12)		0.551(0.31) (0.32)	-0.240(2.41) (0.17)	-0.236(4.12) (0.12)				
s71: Level of Control		0.811(0.30) (1.21)		-0.295(2.07) (1.04)	-0.747(0.58) (0.58)	-0.502(2.45) (0.33)	-0.103(1.66) (0.11)			
s72: Dispersion of Control	-0.081(1.74)** (0.07)	-0.100(0.41) (0.07)	-0.020(0.31) (0.07)	-0.073(0.68) (0.08)	0.151(0.34)** (0.04)	0.186(0.31)** (0.03)	0.018(0.19) (0.00)			
s73: Severity of Punishment	-0.025(0.64) (0.02)	0.047(1.33) (0.08)	0.049(0.50) (0.04)		0.137(0.05)** (0.03)	0.126(0.07)** (0.02)	-0.003(3.02) (0.03)			
Constant	28.116	57.656	37.444	97.013	50.977	40.257	7.792	49.638		
Multiple R	0.598**	0.970**	0.938**	0.914**	0.952**	0.963**	0.772**	0.946**		
Adjusted R ²	0.577	0.954	0.914	0.892	0.918	0.949	0.743	0.943		

Note: Figures in the parentheses underneath standard Error; right side - percent contribution, F, t, etc. are 0.05, 0.01 and 0.001 level of significance respectively.

3. When all management process variables interact, more is the supervisor's mobility, lower is the performance of agricultural extension organizations. (3.4.3)

Some of the variables contributing positively and the others negatively. Eleven variables were contributing 60.84% positively and 11 variables contributed 32.51% negatively. It seemed that some management variables were pushing up, while others were pulling down the level of performance of agricultural extension organizations.

The highest contribution to performance of the organizations came from the client's quantity and quality of participation in educational activities. Since their mean level was very low and distribution of administrative units against participation was highly negatively skewed there is great scope of raising the level and quality of clients participation in educational activities. Variables having negative contributions such as size of clients, tactical authority, supervisors mobility, horizontal communication, need to be examined and their magnitude and variability should be reduced to maximize performance.

Management Process Determinants of Goal Attainment

Although of variable magnitudes, the explanatory power of management process variables at this level of interaction was significant to the attainment of all goals of extension work (Table 70). The levels of significance were however low in case of the attainment of the goals of increasing clients income and level at living. Twenty-five, 22, 18, 18, 21, 22 and 12 management

process variables explained 96.83%, 94.09%, 87.98%, 89.11%, 90.82%, 92.74% and 59.75% variability in the attainment of goals of attitude change, knowledge transfer, skill development, technology diffusion, productivity and income increase and level of living improvement. But their factor contributing behavior were not same to the attainment of all goals.

On close examination of factor contributing behavior of the management process variables it was revealed that some management variables were contributing only to attain behavioral changes. These were program soundness, frequency of staff transfer and supervision, size of client. Relation oriented supervisory leadership had consistently negative or no contribution to the attainment of all goals. Client participation in educational activities with exception to productivity increase had consistently positive contribution to the attainment of all goals. Some variables however contributed positively to attain behavioral goals such as staff participation in program planning, strategic authority, flexibility, coordination, quality of clients participation. Span of control contributed positively to attain behavioral goals but negatively to that of economic goals; while span of supervision, tactical authority, managerial succession, supervisor's mobility, horizontal communication and dispersion of control contributed positively to attain economic goals but negatively to that of behavioral goals. An optimum combination of management processes variables might help achieve both categories of extension goals positively. Positive and negative influences on different goals may thus counter balance

the contributions to the performance of the organizations.

Aggregate Management Macro Process

The aggregate management macro process showed both positive and negative associations to the attainments of behavioral and economic goals (Table 71). The relationships were not significant except in case of the attainment of technology diffusion which was negative ($r=-0.304^*$). Eventually its

Table 71: Influence of Aggregate Management Macro Process on Goal Attainments and Performance of Agricultural Extension Organizations.

Attainments of Goals	Correlation Coefficients (r)	
Attitude Change	-0.175	NS
Knowledge Transfer	0.108	NS
Skill Development	0.283	NS
Diffusion of Technology	-0.304	**
Productivity Increase	-0.131	NS
Income Increase	0.008	NS
-0.025	NS	
Performance	0.007	NS
R * R: Linear	= 0.001	NS
Quadratic	= 0.074	NS

association with performance was not significant but tended to be positive. Its power to explain performance, both linear and quadratic, was not significant. Therefore the major hypothesis of:

"Performance of agricultural extension organizations is directly and significantly influenced by their management process" (3.0)

may not be true. Management of the organizations seemed to fail

to articulating structures and functions positively. As stated earlier they showed variable and often opposite directions of influences on the attainments of different goals. As a result influence of aggregate management macro-process on the performance of the organizations was not significantly positive. Therefore management process variables need rationalization to maximize the performance of the organizations.

Summary

The management process of agricultural extension organizations of Bangladesh was characterized as of medium range of program soundness and participation of staff in programing with resultant medium level of role conflict. The organizations were based on large size of primary administrative units with an average of clients families of 676 per working unit. It resulted in a large span of supervision (24). The primary administrative units had average level of strategic and tactical authority with high degree of formalizaion and substantial flexibility of structure.

The mean annual salary of professional staff was Tk.13.73 thousand with an average annual incentive worth of Tk.400.00 only. The staff were transferred at an interval of 3.51 yrs. With much frequent transfer of extension managers (2.75 yrs). The magnitude of coordination was medium. The primary administrative units on an average received 97.16 staff hours supervision per year from zonal, regional and national administrators, staff officers and specialists. The supervisors

of primary administrative units went out on tour for 15.52 days per month. Horizontal communication among colleagues was at medium range and their supervisory leadership was comparatively more task oriented than relation orientation. The organizations were organizing on an average 255.11 staff hours of different educational activities per working unit with annual per capita client participation of 41.43 man hours but the quality of participation was very low. The span of control was very high (32.38 per supervisor). The magnitude of control was very low with fair dispersion. Level of punishment was also low and few.

Management process variables are not independent from each other. The magnitude of some of the variables are likely to be dependent on that of others. Among them program soundness seemed to be increased with the increase of the magnitude of strategic and tactical authority, coordination, communication and control, task and relation orientation of supervisory leadership with increasing participation of staff in programing.

A sound program resulted in greater intensity of educational activities per working unit and reduced role conflict among professional staff. Role conflict increased with the increased span of supervision and incentive. Managerial succession is increased with size of clients and flexibility which decreased the mobility of supervisors and level of educational activities at the grass root level. Magnitude of coordination increased with the increase of the magnitude of tactical authority, formalization, supervision and task and relation orientation of supervisory leadership which in turn was likely to increase staff participation in programing and program soundness,

horizontal communication and educational activities for the clients as well as decrease of transfer frequency and severity of punishment. The intensity of educational activities seemed to increase with increased magnitude of formalization, coordination, supervisors mobility and task orientation of supervisory leadership but impeded by management succession. More strategic and tactical authority resulted more control which in turn made program more sound and participative, reduced disbursement of more incentive and supervisors mobility.

Among 27 management process variables only four namely size of clients, incentive, magnitude and quality of clients participation in educational activities individually made significant linear contribution to performance, of which contribution of size of clients per extension worker was negative. When all management process variables interact the contribution of staff salary, supervisors' mobility, and relation orientation of supervisory leadership became significant but negative. The magnitude and quality of clients participation though contributed significantly but its contribution in interaction became neutralized by negative contribution of size of clients and relation orientation of supervisory leadership.

Nevertheless management variables explained 93.32% performance variability. Size of administrative unit, span and magnitude of supervision and control together with staff participation in programing had no contribution to performance. Perhaps supervision was not goal directed.

In the attainments of all professional goals of extension

work the determining management variables were size of client per extension worker and intensity and quality of clients participation in educational activities. The former made negative and latters made positive contributions to performance. Their influence was often neutralized or negated by other management variables as they had inconsistent contributions to the attainments of behavioral and economic goals. Consequently the aggregate management process variable has failed to influence performance of the organizations directly. Removal of inconsistencies and contradictions among management process variable may help maximize performance.

X. STAFF DETERMINANTS OF PERFORMANCE

Introduction

In organizational management human elements, the actors and masters of management processes, are of paramount importance. The variables relating to staff background, quality and behavior may therefore become important determinants of performance of an organization. Agricultural extension organizations provide educational services to bring behavioral and economic changes among their clients. Since both inputs and outputs of extension are mostly intangible the background, quality and behavior of staff bear special significance for effective design and operation of extension programs and hence performances of the organizations.

There are three categories of variables namely, staff background, quality and behavior, conceptualized as micro-systems. On a priori assumptions 20 staff variables were included in the study. Their variability, inter-relationships, associations with goal attainments and contributions to performance were analyzed at different levels of interactions and presented in this chapter.

Staff Background

Six variables relating to the background of staff were included in this study. These were staffs family types, family size, family income, parents occupation, rural background and elite representation. They were expected to adequately expose the socio-economic background of the staff.

The professional staff of the agricultural extension services had larger families (8.47 ± 4.04), with an annual average income of Tk. 25.266 thousands (± 15.414). About half of them had nuclear family (47.1%) and agricultural only as their parents occupation (56.0%) with only a few of them reared in villages (1.4%). About one-sixth of them represented elite class of the society (15.4%). Except family type all other background variables had no significant variation among the primary administrative units of the organizations (Appendix-I). Staff of different backgrounds seemed to be equally distributed among the primary administrative units.

Among the background variables parents occupation and rural background of staff were independent of any other background variables (Table 72). Size of family had an inverse relation with type ($r = -0.604^{**}$) and income of the families ($r = -0.489^{**}$). In other words organizations having more staff with nuclear families had less staff of larger families and more annual income. There seemed to exist strong colinearity among type, size and income of staff families. Similar inverse relationship was also observed between elite representation and size of families ($r = -0.311^*$). In other words staffs of elite background had smaller families to maintain.

None of the variables of staff background displayed significant associations with the attainments of any goal. Their associations with and contributions to performance were also not significant (Table 73).

Table 72: Inter-relationships Among Variables of Staff Background Micro System..

Variables	x74	x75	x76	x77	x78	x79
x74: Staff's Family Type	1.000	** -0.604	0.193	-0.064	-0.005	0.125
x75: Staff's Family Size		1.000	** -0.489	0.082	0.070	-0.311*
x76: Staff's Family Income			1.000	-0.089	-0.127	0.279
x77: Staff's Parents Occupation(Agriculture)				1.000	0.219	0.114
x78: Staff's Rural Background					1.000	-0.168
x79: Elite Representation						1.000

Table 73 : Relationships with and Contributions of Variables of Staff Background Micro-System to Attainments and Performance of Agricultural Extension Organizations.

No. Discrete Organizational Variables	Goal Attainments							Performance		
	Attitude Change	Knowledge Transfer	Skill Development	Technology Diffusion	Productivity Increase	Income Increase	Level of Living Improvement	R ²	F	Ratio
x74: Staff's Family Type	0.051	0.068	-0.023	0.153	0.191	0.079	-0.082	0.092	0.008	0.014
x75: Staff's Family Size	0.019	0.019	0.177	-0.058	0.203	-0.234	-0.032	-0.022	0.001	0.002
x76: Staff's Family Income	-0.022	-0.022	0.031	0.065	-0.019	-0.003	-0.064	0.008	0.000	0.020
x77: Staff's Parents Occupation (Ag.)	0.064	0.000	0.130	-0.154	-0.244	-0.117	-0.022	-0.110	0.012	0.012
x78: Staff's Rural Background	0.052	-0.216	-0.279	-0.181	0.092	0.139	0.066	-0.203	0.041	0.061
x79: Elite Representation	0.260	0.119	0.082	0.076	-0.079	-0.016	-0.045	0.102	0.010	0.015
Aggregate Staff Background Micro-System	0.145	0.038	-0.005	0.008	-0.063	-0.118	-0.027	-0.185	0.034	0.060

Therefore the supporting hypotheses concerning staff background variables that more of the staff having nuclear families, small families, agriculture as parents occupation, higher family income, rural and elite background better is the performance of agricultural extension organizations may not be accepted. Their influence seemed to be inconsistent and mutually opposite to the attainment of goals as well as performance of the organizations. The direction of influence of type, size and income of staff families had both positive and negative association with the attainment of different goals. Agriculture as parents occupation and elite representation showed positive and negative influences to the attainment of economic and behavioral goals respectively, but rural background had just reverse direction of influences.

Regression analysis showed that variables of staff background alone had neither significant power to explain performance differential at this level of interaction, nor their marginal contributions were also significant (Table 74).

Table 74 : Marginal Contributions of Variables of Staff Background Micro-System to Performance of Agriculture Extension Organizations.

Staff Background Variables	Regression Coefficients	Standard Errors
x74: Staff's Family Type	0.034 NS	0.061
x75: Staff's Family Size	0.244 NS	0.745
x76: Staff's Family Income	-0.125 NS	1.161
x77: Staff's Parents Occupation	-0.016 NS	0.051
x78: Staff's Rural Background	-0.049 NS	0.053
x79: Elite Representation	0.023 NS	0.058
Constant	28.696	
R^2	0.251 NS	3.840
$R^2 (R^2)$	0.063 (-0.162)	

In an interacting situation the marginal contributions of size and income of staff families increased substantially and the direction of their influences changed altogether. Among the variables family income, agriculture as parent's occupation and rural background had been contributing negatively to performance of the organizations. It seems that staff background variables were mutually inconsistent to the attainment of different goals and their influences on performance were also mutually opposite.

Staff background as an aggregative variables displayed both positive and negative associations with the attainments of both behavioral and economic goals (Table 73). Its association with as well as marginal contribution to performance were also not significant. Therefore the minor hypothesis of:

"Performance of agricultural extension organizations is directly and significantly influenced by the background of their staff". (4.1)

may not be true. In other words performance of the organizations is independent of the background of staff.

Staff Quality

Eight staff quality variables were included in the study namely, staff age, education, personal qualities, general and agricultural extension work experiences, in-service training on general agriculture and extension methods and organizational tenure. On an average staff were younger (32.21 years \pm 8.60) with a low level of formal education (12.68 years \pm 1.66). They had an average of 10.25 year length of service (\pm 10.02) with 7.21 years of experience in extension work (\pm 7.98) and 8.30 years of tenure

in the same organization ($+9.82$) on an average they received 51.45 manday in-service training ($+117.33$) with 9.95 manday specialized training in extension methods ($+48.69$) and possessed an average level of personal qualities (61.04 $+11.15$). The magnitude and variation of all those staff quality variables showed significant variation among the primary administrative units, Upazila or subzones (Appendix-I).

Among the staff quality variables extension work experience was independent of any other quality dimension (Table 75). Staff age displayed highly significant positive correlation with education, ($r=0.713*$) work experience ($r=0.924**$) and organizational tenure ($r=0.863**$). In other words older staff had higher education, more continuity of service in the same organization.

Organizational tenure had significantly positive association with work experience ($r=0.934**$). Higher education showed shorter organizational tenure ($r=-0.684$), as higher educated staff drift more from organization to organization. In-service training had significant positive association with extension training ($r=0.584**$) implying that staff receiving more inservice training also received more specialized on extension. Personal qualities had no association training on extension. Personal qualities had no association with other staff quality variables except inservice training ($r=0.346*$). It seemed that inservice training helped develop more personal qualities among staff. Personal qualities seemed to be independent of age, education and experience.

Table 75: Inter-relationship Among Variables Staff Quality Micro-System.

Variables	x80	x81	x82	x83	x84	x85	x86	x87
x80: Staff Age	1.000	0.713**	0.063	0.924**	0.030	0.172	0.051	0.863**
x81: Staff Education		1.000	0.171	-0.654**	-0.152	-0.091	-0.018	-0.684**
x82: Staff's Personal Qualities			1.000	-0.036	-0.177	0.346*	0.211	-0.034
x83: Staff's Work Experience				1.000	0.041	0.190	0.028	0.934**
x84: Staff's Ext.Work Experience					1.000	0.027	0.264	0.072
x85: In-service Tr.of Staff						1.000	0.584**	0.229
x86: Ext.Tr.of Staff							1.000	0.089
x87: Staff's Organizational Tenure								1.000

Staff's formal education showed consistently negative association with the attainments of all goals, significantly with that of attitude change ($r=-0.320*$) and diffusion of technologies ($r=-0.387*$) (Table 76). on the other hand organizational tenure and specialized inservice training on extension showed consistently positive associations with the attainments of all goals but the relationships were not significant. All other staff quality variables displayed positive and negative relation with both behavioral and economic goals and often their influences were in opposite directions. Personal qualities of staff had significant negative associations with the attainments of behavioral goals, but it tends to help positively to attain economic goals of the organizations. It seemed that organizations having staff with better personal qualities tended to give priority to economic changes, while sacrificed the behavioral goals.

Table 76 : Relationships with and Contributions of Variables of Staff Quality Micro-System to Attainments and Performance of Agricultural Extension Organizations.

No. Discrete Organizational Variables	Goal Attainments						Performance				
	Attitude Change	Knowledge Transfer	Skill Development	Technology Diffusion	Productivity Increase	Income Increase	Level of Living Improvement	R	R ²	Linear	Quadratic
x80: Staff Age	0.160	0.207	-0.017	0.328*	0.095	0.012	-0.130	0.216	0.047	0.057	
x81: Staff Education	-0.320*	-0.288	-0.044	-0.387*	-0.113	-0.063	-0.094	-0.305*	0.093	0.093	
x82: Staff's Personal Qualities	-0.331*	-0.194	-0.323*	-0.351*	0.043	0.035	0.127	-0.304*	0.092	0.102	
x83: Staff's Work Experience	0.184	0.136	-0.047	0.263	0.091	0.015	0.064	0.168	0.028	0.030	
x84: Staff's Ext. Work Experience	0.024	-0.043	0.090	-0.143	0.180	0.059	0.183	0.014	0.000	0.042	
x85: In-service Tr. of Staff	-0.112	0.049	-0.053	-0.105	0.268	0.111	0.273	-0.002	0.000	0.088	
x86: Ext. Tr. of Staff	0.116	0.255	0.143	0.104	0.161	0.059	0.209	0.186	0.035	0.078	
x87: Staff's Organizational Tenure	0.257	0.210	0.017	0.359*	0.078	0.006	0.124	0.241	0.058	0.072	
Aggregate Micro-System of Staff Quality	0.204	0.224	0.052	0.123	0.146	-0.014	0.242	0.456*	0.207	0.282	

Among quality variables education, personal qualities had significant but negative association with performance of the organizations. Their power to explain performance differential as well as their marginal contributions to performance were not significant as the relationships were marginally significant. Therefore all supporting hypotheses concerning the staff quality variables that more are the younger staff, total and extension work experience, technical and extension inservice training, organizational tenure or higher is the level of formal education or personal qualities, better is the performance of extension organizations may not be true.

Regression analysis showed that the staff quality variables alone could explain only 26.83% performance variation of agricultural extension organizations which was not statistically significant (Table 77). The marginal contributions of individual variables were also not significant. But magnitude and direction of marginal contributions changed substantially when interacted.

Contributions of staff age, personal quality, inservice training, extension training did not change in magnitudes and directions substantially. But negative influence and contribution staff's education was substantially reduced. Positive contribution of staff experience also increased substantially, Possibly due to interaction with other organizational variables.

Staff quality as an aggregate variable did not show significant relation with the attainments of any of the goals, but the relationships were positive except in case of increasing

Table 77: Marginal Contribution Of Variables of Staff Quality Micro-System to Performance of Agricultural Extension Organizations.

Variables of Staff Quality Micro-System	Regression Coefficients	Standard Errors
x80: Staff's Age	0.141 NS	0.478
x81: Staff's Education	-0.797 NS	1.379
x82: Staff's Personal Qualities	-0.142 NS	0.084
x83: Staff's Work Experience	-0.430 NS	0.558
x84: Staff's Ext. Work Experience	-0.033 NS	0.038
x85: Inservice Training of Staff	-0.006 NS	0.018
x86: Extension Tr. of Staff	0.054 NS	0.042
x87: Staff's Organiational. Tenure	0.347 NS	0.391
Constant	45.285	
R	0.518 NS	3.538
R^2 (R^2) -	0.268 (0.136)	

income of the clients (Table 76). However its association with performance was significantly positive and the net influence was linear and positive¹. Therefore the minor hypothesis of:

"Performance of agricultural extension organizations is directly and significantly influenced by the quality of their staff. (4.2)"

1. Linear function was as follows:

$$P = 78.706 + 0.260 ** x_{25} \\ (0.092)$$

$$R = 0.456 ** \quad \bar{R}^2 = 0.182 \\ (14.548)$$

Where, P = Performance of Agricultural extension Organizations

x_{25} = Aggregate Staff Quality

may not be rejected. In spite of inconsistent and contradictory influences on the attainment of different goals as well as performance of the organizations staff of higher qualities were contributing positively for better performance of the organizations.

Staff Behavior

The selected behavioral variables were professional commitment, motivation, job satisfaction, absence from duty station, anxiety stress and intra-organizational conflict. The behavioral pattern of staff was characterized by low level of professional commitment (24.3%) and high level of job satisfaction (35.67 \pm 10.53) with an average level of motivation (19.80 \pm 9.92) and they remained 15.51 staff days \pm 24.02 absent from duty station on different works. They were under considerably anxiety-stress (31.66 \pm 10.36) and were suffering from a low level of intra-organizational conflict (48.11 \pm 14.93). Except absence from duty station all other behavioral variables showed significant variation among the primary administrative units, Upazila or subzones (Appendix-I).

The staff behavioral variables seemed to be independent from each other's influence except motivation and anxiety (Table 7B). Highly motivated staff were found to be more anxious about personal and organizational matters ($r=0.578^{**}$). Professional commitment displayed consistently a negative relation with all the behavioral variables, but the relationships were not significant. It seemed that organizations having more staff with

Table 78: Inter-relationship Among Variables Staff Behavioral Micro-System.

Variables	x88	x89	x90	x91	x92	x93
x88:Staff's Professional Commitment	1.000	-0.109	-0.055	-0.026	-0.174	-0.071
x89:Level of Motivation		1.000	0.222	-0.234	0.578**	0.042
x90:Job Satisfaction			1.000	0.025	0.052	0.059
x91:Absense From Duty Station				1.000	-0.178	0.177
x92:Anxiety-Stress					1.000	0.022
x93:Intra-Organizational Conflict						1.000

professional commitment had lower motivation, job satisfaction, anxiety-stress and absence from duty station and experienced low intra-organizational conflict.

Though the relationships were not significant, level of staff motivation displayed consistently negative associations with the attainments of all goals of the organizations. Similarly, intra-organizational conflict showed consistently negative associations with the attainments of all goals, significantly with that of increasing clients productivity ($r=-0.354^*$) and income ($r=-0.405^*$). Professional commitment showed positive associations with the attainments of behavioral goals, significantly with that of knowledge transfer ($r=0.334^*$) and skill development ($r=0.424^*$). Its associations with the attainments of economic goals were negative, but the relationships were not significant. Similarly job satisfaction had positive associations with the attainments of behavioral

goals and negative association with that of economic goals, but none of relationships were statistically significant (Table 79).

Anxiety-stress also displayed similar pattern of relationships. Among the behavioral variables professional commitment and anxiety-stress were found to have significantly positive relation with the performance of the organizations. Their influences were linear explaining 12.10% and 12.80%

Table 79 : Relationships with and Contributions of Variables of Staff Behavioral Micro-System to Goal Attainments and Performance of Agricultural Extension Organizations.

No.	Discrete Organizational Variables	Goal Attainments							Performance		
		Attitude Change	Knowledge Transfer	Skill Development	Technology Diffusion	Productivity Increase	Income Increase	Level of Living Improvement	R ²	R	R
x88:	Staff Professional Commitment	0.011	0.382*	0.437*	0.130	-0.027	-0.060	-0.096	0.348*	0.121*	0.118
x89:	Level of Motivation	-0.146	-0.024	-0.065	-0.092	-0.053	-0.105	-0.159	-0.011	0.011	0.000
x90:	Job Satisfaction	0.013	0.096	0.095	0.035	-0.017	-0.164	-0.213	0.040	0.001	0.003
x91:	Absence from Duty Station	0.045	0.009	0.052	0.086	-0.354	-0.270	0.044	-0.056	0.003	0.006
x92:	Anxiety-Stress	0.194	0.334*	0.232	0.424*	0.063	-0.180	-0.040	0.358*	0.128*	0.162
x93:	Intra-Organizational Conflict	-0.051	-0.138	-0.191	-0.090	-0.354	-0.404	-0.155	-0.231	0.053	0.081
Aggregate Micro-System of Staff Behavior		0.061	0.505**	0.484**	0.326*	-0.048	-0.230	0.155	0.165	0.027	0.064

respectively¹. Therefore the supporting hypotheses of:

"more are the staff having professional commitment, better is the performance". (4.3)

may not be rejected. As regard anxiety-stress the proposed hypothesis was lower is the anxiety-stress among their staff, better is the performance of agricultural extension organizations. The assumption was not true. Rather opposite seemed to be true, as staff under more anxiety-stress were likely to put more efforts for better performance of the organizations². Other supporting hypotheses that higher or more is the job satisfaction or motivation or lower is the absence or intra-organizational conflict, better is the performance of agricultural extension organizations may not be true.

1. The estimated linear function was as follows:

$$P = 25.004 + 0.091 * x_{88} \\ (0.046)$$

$$R = 0.348 ** (R^2 = 0.087) \\ (3.403)$$

Where: P = Performance of Agricultural Extension organizations
x₈₈ = Professional Commitment

Estimate showed that for each increase of 11% staff having professional commitment extension organizations could increase one percent of their performance

2 The estimated linear function was as follows:

$$P = 18,189 + 0.263 * x_{92} \\ (0.12)$$

$$R = 0.358 * (R^2 = 0.099) \\ (3.381)$$

Where, P=Performance of Agricultural Extension Organizations
x₉₂=Anxiety - Stress

The behavioral variables were step-wise regressed to estimate their explanatory power and marginal contributions to performance of the organizations (Table 80). The estimates showed that the staff behavioral variables alone explained 40.70% variability in performance. Anxiety-stress and professional commitment prescribed decisive influence on determining the level of performance even under interacting situation. The estimates showed that explanatory power of staff behavioral variables excluding job satisfaction ceteris paribus was significant and could explain 29.40% variability in performance. The influence of job satisfaction in interaction went beyond tolerance limit and was excluded from the model. Satisfied staff seemed to put very low emphasis on performance.

The magnitude and direction of marginal contributions of the variables changed substantially, except in case of absence from duty station and intra-organizational conflict. Positive contribution of anxiety-stress and negative contribution of motivation increased substantially without changing direction of influence. When behavioral variables interacted the influence of both anxiety-stress and professional commitment increased in positive directions. However professional commitment in association with anxiety-stress predominated and the explanatory power of staff behavioral variables in interaction remained positive inspite of the increase of negative contribution of motivation.

Table 80: Marginal Contributions of Variables of Staff Behavioral Micro-system to Performance of Agricultural Extension Organizations

Variables of Staff Behavioral Micro-system	Regression Coefficients	Standard Errors
x88: Staff's Professional Commitment	0.106*	0.041
x89: Level of Motivation	-0.270 NS	0.165
x90: Job Satisfaction	-	-
x91: Absence From Duty Station	0.012 NS	0.069
x92: Anxiety-stress	0.452**	0.137
x93: Intra-organization Conflict	-0.080 NS	0.059
Constant	19.344	
R	0.638*	2.994
R ² (R ²)	0.407 (0.294)	

The aggregate staff behavioral micro-system showed positive association with the attainments of behavioral goals; significantly with that of knowledge transfer ($r=0.505^{**}$), skill development ($r=0.484^{**}$) and diffusion of technologies ($r=0.326^{*}$) (Table 79). But its influences on the attainments of economic goals were negative, though not significant. Because of these positive and negative influences its association with as well as marginal contribution to performance were also not significant. Therefore, minor hypothesis of:

"Performance of agricultural extension organizations is directly and significantly influenced by the behavior of their staff." (4.3)

may not be accepted. The aggregate staff behavior failed to influence the performance of the organization significantly. On aggregation its explanatory power sharply and highly decreased from 40.70% to 2.70% due to highly inconsistent and mutually opposite direction of influences to the attainments of goals as well as performance of the organizations.

Staff Determinants of Performance

Among the staff background, quality and behavioral variables only two variables of staff behavior namely, professional commitment and anxiety-stress explained significant variation of performance at individual as well as interacting situation. At higher level of interaction the magnitude and direction of their marginal contributions may change. Therefore, in order to identify the staff determinants of performance at macro level of interaction ceteris paribus assumption was further relaxed and all staff variables were step-wise regressed with performance (Table 81). Out of 20 staff background, quality and behavioral variables only 14 variables ceteris paribus explained 79.57% performance variability of agricultural extension organizations ($R = 0.892^{**}$) of which 51.34% was contributed positively and 28.23% negatively.

Marginal contributions of eight variables were found to be significant, explaining about 62.99% of performance. Among them staffs parents occupation (Agriculture) (6.19%), rural background of staff (2.54%), professional commitment (16.84%) and anxiety-

Table 21: Marginal Contributions of Staff Micro System to Attainments of Goals and Performance of Agricultural Extension Organizations

Micro-System	Staff Micro System Variables (174 - 175)	Goals Attainments										Performance	
		Attitude Change	Knowledge Transfer	Skill Development	Diffusion of Technology	Productivity Increase	Income Increase	Level of Living Improvement					
		1.22	1.42	1.84	1.25	1.16	1.17	1.13	1.11	1.11	1.11	1.11	
314	Staff's Family Type	0.095(2.47) (0.089)	0.138(0.41) (0.148)	0.136(2.33) (0.094)	0.133(1.15) (0.145)	-	-	-	-	-	-	-	0.971(1.44) (0.042)
375	Staff's Family Size	-	0.603(0.11) (2.052)	2.492(4.54) (1.192)	-	-	-1.291(16.80) (0.547)	-	-	-	-	-	-
376	Staff's Income	-	6.787(2.48) (3.244)	4.953(2.35) (2.172)	5.718(4.15) (3.073)	-	-	-	-	-	-	-	1.128(1.95) (0.759)
377	Staff's Parent Occupation(eg)	0.091(2.55) (0.042)	0.533(4.63) (0.137)	0.442(4.00) (0.082)	0.197(1.14) (0.153)	-	-	-	-	-	-	-	0.687(1.19) (0.034)
378	Staff's Rural Background	0.214(16.20) (0.074)	0.462(4.63) (0.174)	0.263(3.99) (0.105)	0.293(2.53) (0.184)	-	-	0.113(4.12) (0.482)	-	-	-	-	0.206(2.54) (0.052)
379	Elite Representation	0.112(10.24) (0.052)	0.183(0.40) (0.164)	-0.146(1.08) (0.101)	-	-	-	-0.115(7.00) (4.028)	-	-	-	-	-0.324(0.92) (0.323)
380	Staff's Age	-1.258(14.42) (0.417)	-	-0.272(0.16) (0.857)	-	-	-	-	-	-	-	-	-0.237(15.96) (0.151)
381	Staff's Education	-0.868(11.29) (1.438)	-11.941(21.15) (14.614)	-5.206(5.47) (2.237)	-8.764(7.96) (13.878)	-	-	-1.498(5.32) (1.272)	-	-	-	-	-4.374(14.11) (1.389)
382	Staff's Personal Quality	-0.282(10.98) (4.090)	-	-0.019(11.75) (0.141)	-0.451(6.07) (0.241)	-	-	-	-	-	-	-	-0.018(0.97) (0.021)
383	Staff's Work Experience	0.237(1.28) (0.492)	-3.437(16.47) (11.142)	-1.295(11.95) (0.805)	-3.337(7.41) (11.286)	-	-	-	-	-	-	-	0.283(16.85) (0.143)
384	Staff's Work Exp.	-0.028(1.82) (0.028)	-0.226(2.23) (0.112)	-0.461(0.70) (0.072)	-0.202(4.51) (0.108)	-	-	-	-	-	-	-	-0.018(1.97) (0.010)
385	Inservice Training of Staff	0.010(0.04) (0.018)	-0.035(0.83) (0.037)	-0.033(0.47) (0.024)	-	-	-	-0.021(1.04) (0.020)	-	-	-	-	0.013(1.48) (0.004)
386	Extension Training of Staff	-0.008(4.50) (0.037)	-	-0.041(2.26) (0.074)	-	-	-	0.043(3.26) (0.039)	-	-	-	-	-
387	Staff's Organizational Tenure	0.006(10.20) (0.399)	1.818(5.71) (0.522)	0.583(1.97) (0.382)	2.895(2.78) (1.074)	-	-	-0.528(16.64) (0.211)	-	-	-	-	0.031(2.08) (0.076)

Table 81. Contd.

Micro-System	Goal Attainments									
	Attitude Change	Knowledge Transfer	Skill Development	Diffusion of Technology	Productivity Increase	Income Increase	Level of Living Improvement	Performance		
888 Staff's Professional Commitment	0.256(4.51)*** (0.041)	0.953(14.25)*** (0.178)	0.568(10.10)*** (0.160)	0.546(10.26)*** (0.174)	-	-	-	0.283(5.84)*** (0.047)		
889 Level of Motivation	0.509(3.63) (0.211)	-0.352(0.78) (0.403)	-	-	-	-	0.141(4.84)*** (0.052)	0.205(2.92) (0.160)		
890 Job Satisfaction	-0.851(0.28) (0.129)	0.632(1.44) (0.412)	0.320(1.00) (0.243)	-	-	-	-0.093(5.97)*** (0.038)	-		
891 Absence from Duty	0.188(2.27) (0.108)	-	-	-	-	-	-	0.114(2.89) (0.065)		
892 Anxiety-Stress	0.401(2.55)*** (0.172)	2.180(9.43)*** (0.512)	1.255(9.02)*** (0.287)	1.249(17.46)*** (0.312)	-0.187(8.77) (0.098)	-	-	0.257(42.82)*** (0.131)		
893 Extra-Organizational Conflict	-0.183(3.04) (0.228)	-0.801(2.17)*** (0.228)	-0.765(9.37)*** (0.167)	-0.281(2.26) (0.238)	-0.152(12.56) (0.053)	-0.348(16.28) (0.087)	-	-0.257(2.92)*** (0.041)		
Constant	379.721	58.356	4.584	104.134	28.860	87.075	41.110	74.879		
R	0.921***	0.902***	0.921***	0.825***	0.496*	0.586*	0.831***	0.872***		
R ²	0.637	0.810	0.837	0.681	0.165	0.282	0.691	0.528		

Note: Figures in the parentheses: Underneath standard Error; right side - percent contribution.
*, **, *** mean 0.05, 0.01 and 0.001 level of significance respectively

stress (12.82%) cumulatively contributed 38.39% positively and staff age (4.59%), staff education (14.11%), staffs work experience (2.98%) and intra-organizational conflict (2.92%) cumulatively contributed 24.59% negatively.

Explanatory power of staff's professional commitment ($R=0.348^*$, $b=0.091^*$) and anxiety-stress ($R=0.358^*$, $b=0.263^*$) was significant and marginal contributions were also significant. When interacted with other behavioral variables their marginal contributions increased substantially ($b=0.106$ and $b=0.452$ respectively). Marginal contribution of none of the other variables could become significant at micro-system level of interaction.

Substantial changes were observed when all variables of staff background, quality and behavior interacted at macro system level. Marginal contribution of staff professional commitment was though significant but reduced to some extent ($b=0.132$). The influence of six other variables namely staffs parents occupation, rural background of staff, staff age, staff education, staffs personal quality and intra-organizational conflict became significant. Contribution of staffs parents occupation (Agriculture) increased and became positive from -0.028 to 0.087 , and that of staffs rural background also increased and became 0.054 to 0.206 . Marginal contribution of staff age increased but became negative from 0.200 to -0.802 , and that of staff education increased from 1.431 to -4.574 . Marginal contribution of staffs personal quality changed much from 0.129

to -0.133 and that of intra-organizational conflict increased substantially from -0.089 to -0.253 .

In view of the change of magnitude and direction of marginal contributions of some of the staff variables the following hypotheses are amended.

1. When all staff variables interact, more is the staff having agriculture as their parents occupation, better is the performance of agricultural extension organization. (4.1.5)
2. When all staff variables interact, more is the staff having rural background, greater is the performance of agricultural extension organizations. (4.1.6)
3. When all staff variables interact, younger is the staff, greater is the performance of agricultural organizations. (4.2.1)
4. When all staff variables interact, higher is the level of staff education, lower is the performance of agricultural extension organizations. (4.4.2)
5. When all staff variables interact, higher is the personal qualities of staff, lower is the performance of agricultural extension organizations. (4.2.3)
6. When all staff variables interact, lower is the intra-organizational conflict, greater is the performance of agricultural extension organizations. (4.3.6)

Even at this level of interaction six variables namely staff's family size, staff's work experience, total in service training and job satisfaction did not make significant contribution to performance. The hypotheses concerning those variables as stated earlier, therefore remained unchanged. It seemed that staff with more education, personal qualities and experience, due to some difficulty had been contributing little to increase the performance of the organizations.

Staff Determinants of Goal Attainments

The role of staff of all hierarchical levels is crucial in agricultural extension organizations as it pursues to achieve intangible goals among millions of people who live in variable physical, economic, socio-psychological, political and organizational environment. The previous expositions revealed the magnitudes, variability and their inter-relationship as well as relation with goal attainments and performance at individual and micro-system level of interaction.

The magnitude and relationships were found to be variable in attaining different goals of extension organizations as well as their performance. Therefore, their factor contributions are expected to be variable in attaining different goals when they would interact at staff macro system level. Therefore all staff background, quality and behavioral variables were step-wise regressed with the attainment of each component goal separately relaxing ceteris paribus assumption further to estimate their

explanatory power as well as factor contributions to goal attainments.

The regression analysis showed that explanatory power of staff variables to the attainment of different goals was though variable but significant. Eighteen, 16, 12, 3, 8 and 12 staff variables explained 84.82%, 81.36%, 84.82%, 68.22%, 24.60%, 46.79% and 69.06% variability in the attainment of the goals of attitude change, knowledge transfer, skill development, technology diffusion, productivity and income increase and level of living improvement respectively. The magnitude and directions of contributions to the attainment of different goals were not same, often exhibited opposite influences resulting little or no contribution to performance.

Factor contributing behavior of staff background, quality and behavioral variables to the attainments of component goals revealed that rural background of staff consistently contributed positively to all component goal attainments, except productivity increase. On the other hand intra-organizational conflict had consistently contributed negatively to the attainment of all goals. Generally agricultural and rural background made positive contributions to achieve behavioral goals and negative or no contribution to that of economic goals.

All staff quality variables except organizational tenure were contributing negatively to attain behavioral goals and no or negative contribution to the economic goals. The contribution of staff behavioral variables seemed to be inconsistent with goal attainments.

Aggregate Staff Macro-System

The aggregate staff macro system showed significant associations with the attainments of the behavioral goals, significantly with that of change of attitude ($r=0.422^*$), knowledge transfer ($r=0.463^*$) and diffusion of technologies ($r=0.315^*$) (Table 82).

Its association with the attainments of economic goals were not significant, rather seemed to be negative in case of increasing clients income. It further gives the evidence of program deficiency in respect of economic goals of extension

Table 82: Influence of Aggregate Staff Macro-System on Goal Attainments and Performance of Agricultural Extension Organizations

Goal Attainments	Correlation Coefficients r
Attitude Change	0.422**
Knowledge Transfer	0.463**
Skill Development	0.295 NS
Diffusion of Technology	0.315*
Productivity Increase	0.136 NS
Income Increase	-0.108 NS
Level of Living Improvement	0.106 NS
Performance	0.475**
R * R : Linear	= 0.226 **
Quadratic	= 0.227 *

work. The on-going programs, as was narrowly focused with high priority, the programs failed to create impact on economic changes.

The aggregate staff variables however showed significant influence on the overall performance of the organizations. Its linear explanatory power as well as marginal contributions were found to be significant¹. The power to explain the variability in performance did not increase when quadratic function was used. It seemed that inspite of certain degree of inconsistency and opposite influences of individual variables on the attainments of different goals and performance, the net influence of aggregate staff variables was still significantly positive. However, its explanatory power was reduced from 79.57% to 47.60% due to aggregation.

1. The estimated linear function was as follows:

$$P = 52.078 + 0.235^{**} \times 42$$

$$R = 0.475 \quad (R^2 = 0.200)^{**}$$

(14.389)

Where: P = Performance of Agricultural Extension Organizations
x42 = Aggregate Staff Macro-System.

Summary

Professional staff of agricultural extension organizations play significant role in designing and operating the organizations. Twenty staff variables relating to their background, quality and behavior were studied to estimate their contributions to the attainment of goals as well as performance of the organizations.

On an average 47.4% professional staff had nuclear family with 56.0% having agricultural as their parent's occupation. They had a large family of 8.47 members with an annual income of Tk. 25.266 thousands. Only a few of them had rural (1.4%) and elite (15.4%) background. They were comparatively younger (32.21 yrs) with a very low level of formal education (12.68 yrs.).

They had 10.25 yrs of service with 7.21 yrs of experience in extension work and 8.30 yrs of tenure in the same organizations. They received 51.45 manday inservice training with only 9.95 manday's specialized training on extension. They possessed an average level of personal qualities (61.04). The behavioral pattern of the staff was characterized by only about one forth having professional commitment (24.3%), high level of job satisfaction (35.67) with an average level of motivation for work (19.80), considerable anxiety - stress (31.66) and engaged in some degree of intra-organizational conflict (48.11). On an average they remained 15.51 staff days outside their duty station on account of various activities.

The staff background, quality and behavioral variables were not independent to each other. Some of the behavioral variables seemed to have relations with background and quality variables. The magnitude of personal qualities had no association with any of their background, quality and behavioral variables including formal education but had positive relation with the magnitude of inservice training only. Inservice training seemed to make positive changes in personal qualities of staff. Older staff of elite background had more professional commitment, whereas older experienced staff of rural background had lower professional commitment. Level of motivation was not associated with any of their background, quality and behavior; rather increased motivation resulted more anxiety and stresses. The older and experienced staff seemed to be more satisfied with their job as compared to their younger colleagues.

Among 20 staff background, quality and behavioral variables only two namely professional commitment and anxiety-stress singly had significant explanatory power to performance differential and made significant linear and positive contribution to performance.

In interacting situation 14 variables explained 79.57% performance differential of which four namely, staff's parent's occupation (agriculture), rural background, professional commitment and anxiety-stress made significantly positive contributions. Age, education personal quality and intra-organizational conflict made significantly negative contributions

to performance. Staffs family size, inservice training, organizational tenure and job satisfaction had no influence on performance.

The influences of staff background, quality and behavioral variables were not uniform to the attainments of different goals of extension work. Generally speaking staff background, quality and behavioral variables explained more differential in the attainment of behavioral goals as compared to economic goals. Contributions of individual variables were small but their cumulative contributions to performance was quite high. In the attainment of attitude change the principal positive contributors were elite representation and organizational tenure but their contributions become in-significant when interacted with staff age, education and personal qualities which were significantly negative contributed to the attainment of attitude change. Professional commitment, anxiety and agricultural background of staff made significant positive contribution to knowledge transfer but formal education pulled down the attainment significantly. In developing skill among clients, staffs having professional commitment were contributing positively but again staffs personal qualities made negative contribution. In the attainment of technology diffusion the largest positive contribution came from professional commitment and anxiety among staff. Formal education and personal qualities of staff contributed significantly negatively. Most of the staff background, quality and behavioral variables had no influences on the attainment of the increase of clients productivity. Only

three variables namely extension training, anxiety-stress and intra-organizational conflict explained 46.78% of the attainment of the increase of clients productivity but the influence was negative. Similarly only four variables namely, staff family size, rural to influences of different staff variables to performance, the net influence of different staff variables to the attainment of goals the influence of aggregative staff variable on the performance of the organizations was significantly positive and its marginal contribution to performance was also significant. It's explanatory power did not change when quadratic function was used. By and large staff were contributing positively toward the performance of the organizations.

XI. RESOURCE DETERMINANTS OF PERFORMANCE

Introduction

In order to attain the goals of extension work the resource needs of clients need to be fulfilled. Similarly the extension organizations also need some resources, both human and capital to support their activities so as to attain the goals. Extent of fulfillment of resource need of clients and extension organizations is, therefore, expected to have some influence on the performance of extension organizations or the attainment of their goals. On a priori assumptions seven variables relating to resource need fulfillment were included in this study. Their relationships with the attainment of different goals as well as performance and factor contributions to performance at different levels of interaction and aggregation were estimated, examined and presented in this chapter.

Clients Resources

Two variables were selected relating to clients resource need namely, purchased input need and credit need fulfillments. These two variables were the manifestation of clients resource need beyond the availability of their own resources. On an average 57.56% (± 40.46) and 34.38% (± 51.69) of purchased input and credit needs of clients were fulfilled from all sources. The extent of input and credit need fulfillments showed significant variation among the primary administrative units, Upazilas or Sub-zones (Appendix-J).

Fulfillment of clients input and credit needs had significant correlation ($r=0.452^{**}$) (Table 83).

Table 83: Inter-relationships Among Variables of Clients Resource Micro System

Variables of Clients Resource Micro System	x94	x95
x94 : Clients Input Need Fulfillment	1.000	0.452**
x95 : Clients Credit Need Fulfillment		1.000

Therefore high colinearity exists between fulfillment of input and credit needs of clients as both needs are simultaneously met through disbursement of credit in kind either through extension organizations themselves or through banks and financial institutions.

The association of input and credit need fulfillment with the attainments of different goals and performance of the organizations have been presented in Table 84. The relationships indicated that extent of fulfillment of purchased input needs, though tended to contribute to the attainment of economic goals, were decreasing the attainment of behavioral goals. Because extension workers themselves were involved in distribution of inputs or controlling their distribution which overburdened them or force them to play incompatible roles and thereby lead them to sacrifice the attainment of behavioral goals. And as it was influencing behavioral and economic goals in opposite direction its explanatory power to performance variability became weak, rather remained negative. Therefore, more is the involvement of

extension workers in input distribution or control more they sacrifice their performance.

Table 84 : Relationships and Contributions of Variables of Clients Resource Micro System to Goal Attainments and Performance of Agricultural Extension Organizations

Variables of Clients Resource Micro-system	Goal Attainments							Performance		
	Attitude Change	Knowledge Transfer	Skill Development	Technology Diffusion	Productivity Increase	Income Increase	Level of Living Improvement	R ²	Linear	Quadratic
x94 : Input Need Fulfillment	-0.362*	-0.268	-0.150	-0.366*	-0.025	0.066	0.176	-0.307*	0.094	0.096
x95 : Credit Need	-0.074	-0.054	0.006	0.054	-0.072	-0.072	0.017	-0.022	0.000	0.003
Aggregate Micro System of Client Resources	-0.408*	-0.266	-0.146	-0.355*	0.021	0.061	0.172	-0.138	0.019	0.030

Clients credit need fulfillment had also no significant association with performance of agricultural extension organizations, or the attainment of any of its goals. However the direction of relation toward attainment of skill development, technology diffusion and level of living improvement, was positive. The explanatory power of fulfillment of clients credit need alone to performance differential of agricultural extension organizations both linear and quadratic and its marginal contribution to performance were not significant.

Therefore the supporting hypotheses that "more is the extent of fulfillments of credit or input needs of clients, better is the performance of agricultural extension organizations" may not be true. In other words extension is likely to perform equally

well at the present level of input and credit need fulfillment.

In an interacting situation the fulfillment of clients purchased input and credit needs had no significant power to explain performance of agricultural extension organizations (Table 85). The marginal contributions of both variables were also not significant. However purchased input need fulfillment exhibited negative influence as the extension personnel themselves had been involved in input function which was likely to influence the performance of the organizations negatively.

Table 85: Marginal Contributions of Variables of Client Resource Micro System to Performance of Agricultural Extension organizations

Variable of Clients Resources Micro System	Regression Coefficients	Standard Errors
X94: Clients Input Need Fulfillment	-0.068 NS	0.036
X95= Clients Credit Need Fulfillment	0.050 NS	0.067
Constant	28.850	
R^2	0.333 NS	3.473
(R^2)	0.111 (0.050)	

When fulfillment of both needs aggregated it showed negative association to the attainment of behavioral goals, significantly with that of changing attitude of clients and diffusing technologies (Table 84). But its association with the attainment of economic goals were positive; though the relationships were not significant. The influence on the overall performance was significant but negative and its marginal contributions were also not significant. Therefore, the minor hypothesis of :

"Performance of agricultural extension organizations is directly and significantly influenced by the extent of fulfillment of resource needs of their clients". (5.1)

may not be true. Poor explanatory power of resource need fulfillment to performance of the organizations was perhaps due to the direct involvement of the staff to handle or control procurement and distribution of inputs and credit which might have taken away their attention from the fulfillment of the professional goals of the organization

Institutional Resource

Availability or use of both human and capital resources were included in the study. In case of availability or use of capital resources both total as well as its different components were included to examine the contribution of individual components as well as use of total capital resources. The components were travel allowances, logistic support and contingency expenses. As regards salary expenses, staff salary level was taken into account in staff management process. On an average 88.54% (+10.33) manpower need of the organizations were fulfilled. A primary administrative unit, Upazila or Sub-zone on an average spent Tk.28.66, (+28.85) Tk.35.65 (+35.65) and Tk. 47.95 thousands (+5.82) for travel, logistics and contingency activities respectively. The average annual expense per client family stood as Tk.120.39 per year (+129.60). The quantities of these variables were found to have wide variation among the primary administrative units, Upazilas or Sub-zones Appendix-J).

Manpower need fulfillment and expense on travel allowances seemed to be independent of logistic support, contingency expense or expense per client family as these expenses were comparatively small. However logistic support and contingent expenses were positively correlated ($r=0.831^{**}$) and together simultaneously increased expense per client family (Table 86).

Table 86 : Inter-relationship Among Variables of Institutional Resource Micro-system.

Variables of Institutional Resource Micro System	X96	X97	X98	X99	X100
x96 : Manpower Need Fulfillment	1.000	0.017	0.059	0.083	0.184
x97 : Travel Allowances		1.000	0.585**	0.750**	-0.029
x98 : Logistic Support			1.000	0.831**	0.580**
x99 : Contingent Expenses				1.000	0.439**
x100: Expense per Client Family					1.000

Except the attainment of the goal of increasing clients level of living the extent of resource need fulfillments exhibited positive associations with the attainments of behavioral and economic goals of the organizations (Table 87).

The estimates showed that as more the manpower need was fulfilled, organizations succeeded to attain the goals of increasing technology diffusion and productivity more. The organizations tended to achieve all goals positively by spending more on travel expenses. Increased travel expenses helped achieve the goal of increasing income of the clients. Increased expenditure on travel account resulted more frequent visits of

Table 87 : Relationships and Contributions of Institutional Resource to Goal Attainments and Performance of Agricultural Extension Organization.

Variables of Institutional Resource Micro-System	Goal Attainments							Performance			
	Attitude Change	Knowledge Transfer	Skill Development	Technology Diffusion	Productivity Increase	Income Increase	Level of Living Improvement	R	R ²	Linear	Quadratic
x96 : Manpower Need	0.275	0.278	0.111	0.438*	0.419*	0.222	-0.018	0.394*	0.155*	0.183*	
x97 : Travel Allowances	0.030	0.109	0.207	0.019	0.254	0.326*	-0.169	0.154	0.204	0.205	
x98 : Logistic Support	0.252	0.155	0.092	0.313*	0.129	0.097	-0.001	0.244	0.060	0.101	
x99 : Contingent Expenses	0.267	0.351*	0.268	0.309*	0.185	0.192	-0.180	0.373*	0.139*	0.284*	
x100: Expense per Client Family	0.404*	0.399*	0.176	0.634**	0.028	0.084	0.068	0.447*	0.200**	0.202*	
Aggregate Micro System Institutional Resources	0.365*	0.428*	0.225	0.624**	0.101	0.004	0.015	0.331*	0.110*	0.138	

extension supervisors and was likely to increase magnitude of supervision which seemed to help attain the goal of increasing income of the clients.

Logistic support also exhibited positive influence on the attainments of all goals, significantly with that of technology diffusion. In the present system of budgeting contingent expenses covers working capital of the extension organization. with the increase of contingent expenses the organizations tended to achieve all goals positively, significantly the goal of knowledge transfer ($r=0.351^*$) and technology diffusion ($r=0.309^*$). Perhaps increased contingent expenses created scope of organizing more educational activities and thereby more participation of clients resulting more transfer of knowledge and hence more diffusion of technologies. Expense per client family which also included

salary and overhead expenses showed positive relation with the attainment of all goals significantly with that of change of attitude ($r=0.404*$), transfer of knowledge ($r=0.399*$) and diffusion of technologies ($r=0.634**$). As the organizations spend more per client family, the behavioral goal are attained more. The economic goals seemed to receive less priority and attention.

Three variables of resource availability and use namely manpower need fulfillment, contingent expense and expense per client family seemed to have significant influence on the overall performance of the organizations.

Individually they had significant power to explain differential performance and their marginal contributions to performance were significant¹. When quadratic functions were used explanatory powers however did not increase substantially. Therefore the hypotheses that higher is the manpower need fulfillment or more is spent on contingent activities or per client family better is the performance of agricultural extension organizations may not be rejected. The supporting hypotheses that more is spent on travel allowances or logistic better is the performance of the organizations may not

1. a) The linear function was as follows:

$$P=15.177 + 0.136 X 96* \\ (0.058)$$

$$R=0.394* \quad (\bar{R}^2=0.127) \\ (3.329)$$

Where: F=Performance of Agricultural Extension
X96=Manpower Need fulfillment

Estimates showed that for each 7.35% short of manpower one percent performance was decreased.

be true as their influences and factor contributions to performances were not significant. It appears that overall expenses per client family resulted better performance; but only manpower need fulfillment and contingent expenses made significant contributions.

Individually some of the resource variables exhibited significant associations and made significant contributions to attain some of the goals as well as performance of the organizations. When they interact their cumulative explanatory power remained significant but their marginal contributions no longer remained significant due to high colinearity (Table 87)

1 Cont.

b) The estimated quadratic function was as follows:

$$P = 22.319 + \underset{(0.057)}{0.168} X_{99} - \underset{(0.0004)}{0.00087} (X_{99})^2$$

$$P = 0.533^* (\bar{R}^2 = 0.235) \\ (3.116)$$

Where, P=Performance of Agricultural Extension Organizations
X₉₉=Contingent Expenses per Primary Administrative Unit

The estimates showed that upto certain level of increase of contingent expenses, the performance increased at a decreasing rate.

c) The estimated linear function was:

$$P = 25.945 + 0.012 X_{100} ** \\ (0.005)$$

$$R = 0.447 (\bar{R}^2 = 0.173) ** \\ (3.240)$$

Where, P=Performance of Agricultural Extension Organization
X₁₀₀=Expenses per Client Family

Table 88 : Marginal Contributions of Variables of Institutional Resource Micro System to performance of Agricultural Extension Organizations.

Institutional Resource Variables	Regression Coefficients	Standard Errors
X96 = Man power Need Fulfillment	0.101	0.054
X97 = Travel Allowances	0.015	0.050
X98 = Logistic Support	-0.050	0.030
X99 = Contingent Expenses	0.050	0.034
X100= Expenses per Client Family	0.013	0.007
Constant	16.010	
R^2	0.634*	3.000
R^2	0.404	

In an interacting situation it appears that influences of manpower availability, contingent expenses and expenses per client family were significantly reduced. Logistic support became a negative force. It appears that the organizations could not add to programmes quantitatively and qualitatively with the increased provision of logistics or otherwise misused such facilities. As a result logistic support signaled as a negative force to performance of the organizations

Resource Determinants of performance

When variables of clients and institutional resources would interact, the magnitude and direction of influence of individual variables may further change. Therefore relaxing the ceteris paribus assumption all resource variables of both clients and institution were step-wise regressed to further estimate their explanatory powers as well as marginal contributions at resource level of interaction. The estimates revealed that only four variables explained 40.19% of performance variability ($R=0.634^{**}$) (Table 89) Inclusion of other resource variables did not increase

Table 1: Marginal Contributions of Resource Variables to Attainments of Goal and Performance of Agricultural Extension Organizations

Micro System Variables (x94 - x100)	Goal Attainments					Performance	
	Attitude Change (x2)	Knowledge Transfer (x3)	Skill Development (x4)	Diffusion of Technology (x5)	Productivity Increase (x6)		Income Increase (x7)
Clients Res. Need Fulfillment							
x94: Clients Input Need Fulfillment	0.050(6.78) (0.037)			-0.174(1.69) (0.113)	0.020(0.57) (0.043)		
x95: Clients Credit Need Fulfillment				0.336 (2.87) (0.214)			
Institutional Res. Need Fulfillment							
x96: Manpower Need Fulfillment	0.063(2.27) (0.068)	0.223(4.36) (0.198)		0.442(10.69)* (0.186)	0.202*(17.15)* (0.079)		0.102(10.07)* (0.054)
x97: Travel Allowances				-0.094(0.47) (0.181)	0.052(6.07) (0.039)		
x98: Logistic Support		0.286(14.65)* (0.112)		-0.091(1.79) (0.103)			-0.050(6.31) (0.030)
x99: Contingent Expenses		0.271(3.78)** (0.097)		0.149(0.76) (0.126)			0.054(3.84) (0.005)
x100: Expense Per Client Family	0.010(16.34)* (0.005)	0.049(15.91)* (0.019)		0.457(40.23)* (0.024)			0.012(19.94)* (0.025)
Constant	79.164	2.886	8.029	-1.486	-1.288	4.120	4.427
R	0.504*	0.622*	0.4457	0.785**	0.492*	0.419NS	0.436NS
R ²	0.174	0.296	-0.022	0.464	0.160	-0.023	0.034

Note: *, ** Means 0.05, 0.01 Level of Significance respectively
Figure in the Parentheses: Underneath - Standard Errors, Right Side - Percent Contributions

the explanatory power of the regression model. Among these variables manpower need fulfillment (10.07%), contingent expenses (3.84%) and expenses per client family (19.94%) made significant contributions and their cumulative contribution was 33.85%.

Expense on logistic support contributed 6.31% negatively. perhaps use of logistic was not adequately directed to the attainments of the goals of agricultural extension organizations and the use of more of it distracted attention of staff from the performance of the organizations. It seemed that contribution of logistic support was reduced and became negative when it interacted either among the institutional or both client land institutional resources variables

Resource Determinants of Goal Attainments.

It was previously observed that resource variables and the attainments of component goals had variable associations both in magnitude and direction. Consequently their factor contributions to the attainments of different goals are also expected to be variable in an interacting situation. In order to estimate the factor contributions of resource variables to different goal attainments, all resources variables were step-wise regressed with the attainment of each of the goals separately.

At this level of interaction regression analysis showed that 3,4,7 and 3 resource variables explained only 25.40%, 38.69%, 61.62 and 24.21 variability in the attainments of the goals of attitude change, knowledge transfer, technology diffusion and

productivity increase respectively. They were not found to make any contribution to the attainments of goals of skill development, income increase and level of living improvement.

The factor contributing behavior of resource variables to different goal attainments showed that clients input and credit need had no or negative contribution to attain behavioral goals. It however, helped attain increase of clients productivity, though not significantly. Fulfillment of manpower need helped achieve behavioral and economic goals positively. Expenditure on travel and logistics had no or negative contribution to extension goal attainments. Contingent expense as well as expense per client family helped attain behavioral goals positively. Expense per client family was the principal determinants of the attainments of goal of attitude change, knowledge transfer and technology diffusion. Fulfillment of manpower need of the organizations was the principal determinants of productivity increase. None of the variables contributed significantly to attain the goal of increasing clients income or level of living.

Aggregate Resource System

The aggregate resource system showed significant associations with the attainments of behavioral goals, significantly with that of attitude change, knowledge transfer and technology diffusion

Table 90 : Influence of Aggregate Resource Macro-system on Goal Attainments and Performance of Agricultural Extension Organizations

Attainments of Goals	Correlation Coefficient (r)
Attitude Change	0.344*
Knowledge Transfer	0.417**
Skill Development	0.219 NS
Diffusion of Technology	0.610**
Productivity Increase	0.104 NS
Income Increase	0.009 NS
Level of Living Improvement	0.025 NS
Performance	0.327*
R*R=Linear	: 0.107*
Quadratic	: 0.137 NS

Its influence on the attainments of economic goals were positive but not significant. Fulfillment of resource needs of both extension organizations and their clients however showed significant positive association with performance. The influence was linear and its marginal contribution was significantly positive¹. Therefore the major hypothesis of:

"Performance of agricultural extension organizations is directly and significantly influenced by the extent of fulfillment of their resource need."

may not be rejected. It is observed that overall use of resources may result better performance of the organization, but it is not making substantial contribution to the attainments of economic goals due to program deficiencies and priorities.

1 The estimated linear function was:

$$P = 91.520 + 0.079 \times X_{28} \quad (0.041)$$

$$R = 0.331 \quad (\bar{R}^2 = 0.080) \\ (15.428)$$

Where, P=Performance of Agricultural Extension Organizations
X₂₉=Institutional resource need fulfillment

Summary

On average 57.56% and 34.38% purchase inputs and credit needs of the clients of agricultural extension services were met through all sources. As regard institutional resources need and use, 88.54% manpower need of agricultural extension organizations were met with an annual expense of Tk. 28.66; Tk. 35.65 and Tk. 47.95 thousands per primary administrative unit i.e. a Upazila or a Sub-zone for travel, logistic support and contingency activities respectively. The average annual expense was Tk. 120.39 per client family.

Clients input and credit need fulfillment was significantly associated as the former was usually provided on credit. There was simultaneous increase of logistics, contingent and travel expense and the former two increase of logistics, contingent and travel expense and the former two increased expense per client family significantly.

Among the resource variables explanatory power of manpower need fulfillment and expense per client family and its component as contingent expenses was linear and significant. In interaction overall expense per client family as well as its contingent component made significant contribution to performance. The factor contribution of resource variables was not uniform to the attainments of different component goals. Although four variables namely clients input need, institutional manpower need, contingent expenses and expense per client family were the significant contributors of attitude change, but their individual

contribution was not significant. In transferring knowledge expense per client and contingent expense contributed significantly and positively; while fulfillment of manpower need was the significant contributor of technology diffusion and increase of clients productivity. Resource variables either singly or in interaction had no influence in the attainment of increase of clients income and level of living.

PART D : GLOBAL MODELS OF PERFORMANCE

CHAPTER XII : PERFORMANCE DETERMINANTS

CHAPTER XIII : TEST OF MODEL OF MANAGEMENT

XII. PERFORMANCE DETERMINANTS

Introduction

The magnitude, variability, relationships and factor contributions of environmental, strategic, management, staff and resource variables to the attainment of each of the component goals as well as the performance of agricultural extension organizations were examined separately and were presented in the previous chapters. It helped to have greater insight into the different systems and processes and their components at micro and macro levels of interactions and aggregation. Through those analyses significant variables were identified for making further analysis under a total interacting situation.

In this pursuit first the variables having significant colinearity were identified and excluded. Sixty-seven discrete variables showing significant associations with performance and/or attainment of one or more goals were selected. Relaxing ceteris paribus assumption altogether all of them were step-wise regressed with performance as well as the attainments of each goal to finally identify determinants and estimate their factor contributions in a total interacting situation.

Secondly, influence and factor contributions of aggregated micro and macro systems or processes were also estimated and examined.

Individual Discrete Variables

Performance

Relaxing ceteris paribus condition farther all of those 67 variables were step-wise regressed to identify the performance

determinants and their managerial contributions under total interacting situation. The estimates showed that 21 variables explained 99.60% variability in performance of agricultural extension organizations ($R=0.998^{**}$) (Table 91). Four environmental variables, namely client literacy, productive capacity of land, draft power availability and irrigation coverage explained 18.04% variability in performance. Two strategic variables namely, technology adoptability and extension model integration explained 32.31%. Nine management process variables, namely client participation, size of client per extension agent, strategic authority, relation oriented supervisory leadership, staffs salary level, formalization, supervisor's mobility, co-ordination, managerial succession explained 30.22%. Four staff variables namely professional commitment, inservice training, staffs' rural background and staff's family income explained 8.25% and two resource variables, namely manpower need fulfillment and logistic support explained 10.75% variability in performance.

Thirteen variables contributed 47.98% positively and eight variables contributed 51.59% negatively. It has been observed that contribution of technology adoptability was positive but its contribution was absorbed by size of clients per extension agent, professionalization and organizational tenure of staff to the extent that its influence became negative as these variables displayed negative association with performance. In other words even technological advantages could not result better performance due to larger clients per extension worker, more technically

Table 91: Marginal Contributions of Organizational Variables to Performance of Agricultural Extension Organizations

No.	Organizational Variables	Regression Coeffs.	% Contributions	Standard Errors
x39:	Technological Adoptability (Scores)	-0.198 NS	32.01	0.098
x23:	Client Literacy (Percent)	0.124 **	10.70	0.013
x96:	Manpower Need Fulfillment (Percent)	0.100 **	9.73	0.014
x68:	Client Participation in Educational Activities (Man Hrs)	0.034 **	9.06	0.312
x51:	Size of Clients (00 Farm Families/EA)	-0.403 **	9.68	0.067
x12:	Productive Capacity of Land (Percent)	0.216 **	5.42	0.016
x88:	Professional Commitment (Percent)	0.132 **	5.54	0.011
x65:	Supervisory Leadership (RO) (Scores)	-0.049 NS	3.25	0.050
x57:	Staff's Salary Level (000 Tk./Yr.)	-0.685 **	2.73	0.078
x85:	Inservice Training of Staff (Mandays)	0.292 **	2.04	0.034
x18:	Draft Power Availability (Acre/Pair of Bullock)	1.336 **	1.64	0.135
x55:	Formalization (Scores)	0.516 **	1.92	0.067
x63:	Supervisors Mobility (Days/Months)	-0.223 **	0.95	0.042
x61:	Coordination (Scores)	-0.377 **	1.14	0.066
x98:	Logistic Support (000 Tk./OP. Unit)	-0.020 **	1.02	0.003
x53:	Strategic Authority (Scores)	0.173 **	0.68	0.028
x60:	Managerial Succession (Yr./Transfer)	-0.379 **	0.81	0.064
x78:	Staff's Rural Background (Percent)	0.040 **	0.25	0.010
x36:	Extention Model Integration (D)	1.703 **	0.30	0.386
x76:	Staff's family Income (000 Tk./Yr.)	0.634 **	0.42	0.163
x13:	Irrigation Coverage (Percent)	0.221 *	0.28	0.009
	Cpmstrant	-9.733		
	R	0.998 **		0.410
	R ²	0.987		

Note: *, ** Mean 0.05, 0.01 Level of Significance Respectively

educated staff and more staffs having longer tenure in the same organization. Professionalization and organizational tenure are expected to have problems of heterophily and perhaps with low empathy for which their influence on the organizations have failed to utilize services of more qualified staff.

In all, 38 variables made significant but variable contributions to performance in one or another level of interaction (Table 92). At individual level 15 variable had significant explanatory power to performance differential. The variables were productive capacity of land, client literacy, clients mass communication exposure, client-pattern relationship, technology adoptability, professionalization, size of clients per extension worker, incentive, clients participation in educational activities, quality of client participation, staff's professional commitment, anxiety-stress, fulfillment of manpower need of the organization, contingent expense and expense per client family. Among them contributions of professionalization and size of clients per extension agent were negative.

When the variables interacted at micro system or process level the contributions of only seven variables namely clients mass communication exposure, technology adoptability, professionalization, size of clients per extension agent, quality of client participation, staff professional commitment, and anxiety-stress remained significant. The influences of other variables were absorbed when interacted with the variables of same micro system (Appendix - M).

Table 92: Change of Significant Marginal Contributions of Organizational Variables to Performance at Different Levels of Interaction (Regression Coefficients)

No.	Variables	Single Factor	Level of Interaction		
			Micro	Macro	Total
x12:	Productive Capacity of Land	0.170	-	0.217	0.216
x13:	Irrigation Coverage	-	-	0.076	0.221
x16:	Tenurial Structure (Owner Farming)	-	-	0.123	-
x18:	Draft Power Availability	-	-	2.269	1.336
x23:	Client Literacy	0.110	-	-	0.124
x25:	Clients Mass Commn. Exposure	0.084	0.122	-	-
x29:	Clients Patron Relationship	0.068	-	0.067	-
x31:	Clients Political Consciousness	-	-	0.226	-
x32:	Clients Political Participation	-	-	0.138	-
x33:	Socio-Political Influence	-	-	-0.229	-
x36:	Extension Model Integration	-	-	-	1.703
x39:	Technology Adoptability	1.406	1.282	-	-
x46:	Professionalization	-0.050	-0.043	-0.078	-
x51:	Size of Clients/EA	-0.425	-0.396	-0.776	-0.403
x53:	Strategic Authority	-	-	-	0.173
x55:	Formalization	-	-	-	0.516
x57:	Staff Salary Level	-	-	-0.726	-0.685
x58:	Incentive	0.246	-	-	-
x60:	Managerial Succession	-	-	-	-0.379
x61:	Coordination	-	-	-	-0.377
x63:	Supervisors Mobility	-	-	-0.652	-0.223
x65:	Supervisory leadership (RD)	-	-	-0.593	-
x68:	Clients Participation (EA)	0.048	-	-	0.034
x69:	Quality of Client Participation	0.275	0.216	-	-
x76:	Staffs Family Income	-	-	-	0.634
x77:	Staffs Parents Occupation (AG)	-	-	0.087	-
x78:	Staffs Rural Background	-	-	0.206	0.040
x80:	Staff Age	-	-	-0.802	-
x81:	Staff Education	-	-	-4.574	-
x82:	Staff Personal Quality	-	-	-0.133	-
x85:	Inservice Training of Staff	-	-	-	0.292
x88:	Staffs Professional Commitment	0.091	0.106	0.283	0.132
x92:	Anxiety Stress	0.263	0.452	0.557	-
x93:	Intra-Organizational Conflict	-	-	-0.253	-
x96:	Manpower Need Fulfillment	0.136	-	0.102	0.100
x98:	Logistic Support	-	-	-	-0.022
x99:	Contigent Expenses	0.035	-	0.054	-
x100:	Expense Per Client Family	0.012	-	0.012	-

When the variables of the same macro system and process interact the influence of client literacy, clients' mass communication exposure technology adoptability, incentive, clients participation in educational activities, quality of clients participation became insignificant due to colinearity with other variables. On the other hand the marginal contributions of irrigation coverage, tenurial structure, draft power availability, clients political consciousness and participation, socio-political influence on program administration, staff salary level, supervisors mobility, supervisory leadership (RO), staffs parents occupation, staff's rural background, staff age, staff education, intraorganizational conflict became significant but their contributions at individual and micro level of interaction were not significant. It seemed that their influences were multiplied when interacted with other variables of the same systems and processes.

In a total interacting situation contributions of some of the variables having significant contributions at individual, micro and macro level of interaction did not remain significant. These variables were tenurial structure, clients mass communication exposure, client-patron relationship, clients political consciousness and participation, socio-political influence, technology adoptability professionalization, staff incentive, supervisory leadership (RO), quality of client participation in educational activities, staffs parents occupation, staffs age, education and personal quality, anxiety-stress, intra-organizational conflict, contingent expense and

expense per client family. The contributions of such variables as extension model integration, strategic authority, formalization, staffs family income, logistic support and inservice training of staff became significant, though their contribution to performance were not significant at individual or at micro or macro level of interactions. Among them contributions of logistic support was negative. Further two variables namely size of clients per extension agent and staffs professional commitment had significant contribution at all levels of interaction. The former made negative and the latter made positive contributions to performance. But both made highest contributions at macro-level of interaction. The magnitude of contributions of all variables had variation due to level of interaction except in case of client patron relationship and expense per client family. Influence of both variables remained similar at all levels of interactions.

Based on the estimates of significant contributions at total interacting situation the following supporting hypotheses were further amended.

1. In a total interacting situation, more is the integration of models of extension work, better is the performance of agricultural extension organizations. (2.1.1)
2. In a total interacting situation, more is the strategic authority, better is the performance of agricultural extension organization. (3.2.4)
3. In a total interacting situation, more is the formalization, better is the performance of agricultural extension organization. (3.2.6)

4. In a total interacting situation, more is the frequency of change of managers, better is the performance of agricultural extension organization. (3.3.4)
5. In a total interacting situation, more is the magnitude of co-ordination, lower is the performance of agricultural extension organizations. (3.4.1)
6. In a total interacting situation, more is the staff's family income, better is the performance of agricultural extension organizations. (4.1.4)
7. In a total interacting situation, more is the inservice training of staff, better is the performance of agricultural organizations. (4.2.5)

Goal Attainments

In the previous chapters it has been observed that the organizational variables had variable magnitude and direction of relationships with the attainment of different goals of the organizations. Their marginal contributions also varied at different levels of interaction. Therefore, in a total interacting situation the marginal contributions of different variables are also expected to be variable in the attainment of different goals. All significant variables were therefore step-wise regressed separately to estimate their marginal contributions to the attainment of each goal in a total interacting situation.

Attitude Change : In a total interacting situation 21 variables explained 99.60% variability in the attainment of the goal of changing attitude of clients of agricultural extension services towards recommended technologies of crop production ($R=0.99^{**}$). Five environmental, one strategic, eight management process, four staff and three resource variables contributed 18.95%, 24.49%, 46.05%, 4.07% and 5.59% respectively (Table-93). Eleven variables contributed 38.63% positively and the remaining ten variables were contributing 60.52% negatively.

Significant positive contributors with their marginal contributions were incentive to staff (10.16%), clients participation in educational activities (10.61%), clients attitude toward change (9.30%), staff's anxiety-stress (2.63%), fulfillment of manpower need of the organization (2.40%), clients socio-political influence on the program administration (1.32%), staff's family income (0.84%), intra-organization conflict (0.42%), operational farm size (0.49%), contingent expenses (0.33%) and staff's personal qualities (0.18%). The positive contributions of those variables were obvious except in case of intra-organizational conflict and anxiety among staff. It seemed that an operational unit was achieving greater attitude change among its clients when anxiety-stress was high among staff. Possibly under such condition the staff were endeavoring more to accomplish the organizational goals to safeguard their personal positions and interests.

The negative contributions with their marginal contributions were technology adoptability (24.49%), size of clients per extension agent (12.21%), supervisors mobility (5.48%), clients political consciousness (5.31%), managerial succession (4.15%), level of educational activities (1.34%), rainfall (2.58%), formalization (1.60%) and severity of punishment (0.50%). On closure examination it was found that contribution of technology adoptability was significantly positive but it was absorbed by size of clients per extension worker. It seemed that with the increase of client size per extension agent even the advantages of the technologies of higher adoptability could become neutral or negative to the attainment of goal of changing clients attitude due to dispersion of efforts. Similar situation also occurred in case of contingent expenses and expense per client family. When expense on contingent activities which includes educational activities too was included in the regression model the contribution of expense per client or that of educational activities became negative to the attainment of the goal of attitude change because of colinearity. Four management process variables such as formalization, managerial succession, severity of punishment and supervisors mobility seemed to contribute negatively to the attainment of the goal of attitude change as formalization limits scope of work, managerial succession interrupt continuity of approaches and program and severity of punishment repress individual initiatives and motivation and force them to conform to the norms and values imposed by the controlling officers. The negative contribution of supervisors mobility to

Table 93: Marginal Contributions of Organizational Variables to Attainment of Goal of Changing Clients Attitude to Recommended Technologies

No.	Organizational Variables	Regression Coeffs.	% Contributions	Standard Errors
x39:	Technology Adoptability (Scores)	-0.680 NS	24.49	0.120
x58:	Incentive ('000' Tk./Yr.)	0.590 **	10.16	0.038
x68:	Clients Participation in Educational Activities (Man Hrs.)	0.060 **	10.61	0.004
x30:	Attitude Toward Changes (Scores)	2.158 **	9.30	0.110
x51:	Size of Clients/EA (No.)	-1.076 **	12.21	0.070
x63:	Supervisors Mobility (Days/Month)	-0.721 **	5.48	0.054
x31:	Clients Political Consciousness (%)	-0.123 **	5.31	0.015
x100:	Expense Per Client Family (Tk./Yr.)	-0.001 NS	2.86	0.002
x60:	Managerial Succession (Yrs./Tr.)	-0.245 *	4.15	0.084
x67:	Level of Educational Activities (Staff Days)	-0.070 **	1.34	0.005
x92:	Anxiety-Stress (Scores)	0.305 **	2.63	0.032
x10:	Rainfall (Cm/Yr.)	-0.017 *	2.58	0.006
x96:	Man Power Need Fulfillment (%)	0.166 **	2.40	0.019
x55:	Formalization (Scores)	-0.016 **	1.60	0.080
x33:	Socio-Political Influence (Scores)	0.135 **	1.32	0.019
x76:	Staffs Family Income ('000' Tk./Yr.)	1.468 **	0.84	0.203
x93:	Intra-Organizational Conflict (Scores)	0.070 **	0.42	0.012
x15:	Operational Farm Size (Acres)	0.339 **	0.44	0.065
x73:	Severity of Punishment (Scores)	-0.023 **	0.50	0.007
x99:	Contingent Expense ('000' Tk./Yr./PAU)	0.010 **	0.33	0.003
x82:	Staff Personal Quality (Scores)	0.037 *	0.18	0.017
	Constant	18.915		
	R	0.998 **		0.439
	R^2	0.989		

Note: *, ** Mean 0.05 and 0.01 Level of Significance Respectively.

attitude change attainment was probably due to lack of goal orientation or credibility of extension personnel which needs in-depth study. It further showed that clients political consciousness was contributing negatively to the attainment of their attitude change as clients being politically conscious could be more critical to the extension programs and personnel. Such critic may either be positive or negative depending on the ability of extension personnel. It seemed that extension agents could not utilize clients political consciousness positively toward their goal attainment.

Knowledge Transfer : Where all organizational variables were interacting 27 variables explained 99.80% variability in the attainment of the goal of transferring knowledge among the clients of agricultural extension services ($R=0.999^{**}$), (Table-94). Six environmental, three strategic, eleven management process, four staff and three resource variables explained 5.53%, 21.73%, 65.33%, 3.14% and 4.26% respectively. Twelve variables contributed 67.80% positively and fifteen variables contributed 32.19% negatively.

The positive contributors with their marginal contributions were amount and quality of clients participation in educational activities (12.47%, 43.48%), co-ordination (3.66%), fulfillment of manpower need of the organizations (3.06%), formalization (1.43%), client-patron relationship (1.35%), size of clients per extension agent (0.79%), level of control (0.56%), technological diversity (0.38%), strategic authority (0.22%), rainfall

Table 94: Marginal Contributions of Organizational Variables to the Attainment of the Goal of Transferring Knowledge

No.	Organizational Variables	Regression Coeffs.	% Contributions	Standard Errors
x69:	Quality of Clients Participation (Scores)	0.426 **	43.48	0.021
x68:	Client Participation in Educational Activities (Man Hrs.)	0.257 **	12.47	0.003
x46:	Professionalization (Percent)	-0.182 **	20.99	0.004
x61:	Coordination (Scores)	1.515 **	3.66	0.034
x96:	Manpower Need Fulfilment (Percent)	0.558 **	3.06	0.008
x33:	Socio-Political Influence (Scores)	-0.049 *	2.53	0.015
x18:	Draft Power Availability (Acre/Pair of Bullock)	6.948 **	1.12	0.097
x89:	Level of Motivation (Scores)	-0.958 **	1.57	0.017
x63:	Supervisors Mobility (Days/Month)	-1.042 **	1.87	0.022
x55:	Formalization (Scores)	1.221 **	1.43	0.032
x29:	Client-Patron Relationship (Scores)	0.096 **	1.35	0.005
x88:	Staffs Professional Commitment (Percent)	-0.208 **	1.33	0.006
x98:	Logistic Support ('000' Tk./Pr. Op. Unit)	-0.145 **	1.01	0.003
x51:	Size of Clients (00 Families/EA)	0.453 **	0.79	0.034
x85:	Inservice Training of Staff (Mandays)	-0.182 **	0.45	0.001
x71:	Level of Control (Scores)	0.152 **	0.56	0.019
x40:	Technological Diversity (Scores)	0.275 **	0.38	0.031
x53:	Strategic Authority (Scores)	0.373 **	0.22	0.014
x39:	Technology Adoptability (Scores)	-0.909 **	0.36	0.051
x10:	Rainfall (Cm./Yr.)	0.092 **	0.21	0.003
x73:	Severity of Punishment (Scores)	-0.088 **	0.15	0.003
x100:	Expense Per Client Family (Tk./Yr.)	0.032 **	0.19	0.001
x64:	Horizontal Communication (Scores)	-1.787 **	0.25	0.064
x21:	Product Market Difficulty (Scores)	-0.594 **	0.28	0.030
x76:	Staff Family Income (000 Tk./Yr.)	-1.155 **	0.13	0.097
x92:	Anxiety Stress (Scores)	-0.282 **	0.11	0.018
x16:	Tenurial Structure (Percent)	-0.038 **	0.04	0.005
	Constant	-59.703		
	R	0.999 **		0.177
	R ²	0.999		

(0.21%), expense per client family (0.19%). In transferring technological knowledge high positive contribution of clients participation in education activities, both qualitatively and quantitatively was obvious and of paramount importance. Extension services may adopt programs to improve environmental conditions and thereby transfer more knowledge among their clients. Although client-patron relation had positive contribution to knowledge transfer its intensity can not be increased as it is unethical to establish an exchange relationship between clients and extension agents. The positive contributions of management process variables such as magnitude of co-ordination, formalization, authority and control was though small but could go a long way to maximize both quality and quantity of educational activities. It was further observed that with the increased diversity in providing technological advice, the attainment of the goal of transferring knowledge also increased due to increased credibility of extension agents.

The negative contributors with their marginal contributions were professionalization (20.99%), socio-political influence (2.53%), draft power availability (1.12%), level of staff motivation (1.57%), supervisor's mobility (1.87%), professional commitment (1.33%), logistics (1.01%), inservice training of staff (0.45%), technology adoptability (0.36%), severity of punishment (0.15%), horizontal communication (0.25%), product market difficulty (0.28%), staff family income (0.13%), anxiety-stress (0.11%), and tenurial structure (0.04%). The negative

contributions of professionalization and its associated variables such as motivation, mobility, professional commitment, inservice training and family income seemed to be due to increased heterophily between extension personnel and their clients as well as failure of the organizations to utilize services of qualified staff. The effect of increased heterophily could be reduced by increased empathy among extension personnel. Possibly professional education failed to develop empathy among the extension personnel which is one of the key attributes of an extension agent to earn credibility and confidence among their clients. Socio-political influence on the program administration was perhaps not constructive rather destructive to the attainment of transfer of knowledge. Higher professionalization could also cause promoting higher level of technologies which in turn would cause negative contribution to technology diffusion. Logistic supports were also not directed to increase efficiency of transferring knowledge, rather used otherwise making negative contribution to attainment of this goal. Owner farming and product market difficulty were also acting as hindrance to knowledge transfer.

Skill Development: In a total interacting situation 24 organizational variables explained 99.80% variability in the attainment of the goal of developing technological skills among the clients ($R=0.999^{**}$), (Table-95). Five environmental, two strategic, ten management process, seven staff variables explained 10.85%, 41.12%, 36.79% and 11.20% of performance

Table 95: Marginal Contributions of Organizational Variables to the Attainment of the Goal of Developing Skills

No.	Organizational Variables	Regression Coeffs.	% Contributions	Standard Errors
x39:	Technology Adoptability (Scores)	3.476 **	40.38	0.109
x68:	Clients Participation in Educational Activities (Man Hrs.)	0.169 **	23.31	0.017
x78:	Rural background of Staff (Percent)	-0.091 **	4.51	0.045
x12:	Productive Capacity of Land (Percent)	0.696 **	3.66	0.045
x64:	Horizontal Communication (Scores)	-2.925 **	4.58	0.156
x18:	Draft Power Availability (Acres/ Pair of Bullock)	0.809 *	4.06	0.258
x61:	Coordination (Scores)	2.005 **	2.75	0.144
x67:	Level of Educational Activities (Man Hrs.)	-0.040 **	2.45	0.006
x83:	Staff's Work Experience (Yrs.)	-1.123 **	3.28	0.142
x82:	Staff's Personal Quality (Scores)	-0.061 NS	1.93	0.035
x15:	Operational Farm Size (Acres)	0.411 **	1.15	0.116
x45:	Performance Aspiration (Scores)	-1.654 **	0.74	0.090
x66:	Supervisory Leadership (TO) (Scores)	-0.236 NS	1.12	0.108
x25:	Clients Mass Communication Exposure (Percent)	-0.192 **	1.01	0.011
x13:	Irrigation Coverage (Percent)	0.188 **	0.97	0.010
x52:	Span of Supervision (NO)	-0.098 **	0.90	0.015
x92:	Anxiety-Stress (Scores)	0.307 **	0.62	0.036
x53:	Strategic Authority (Scores)	0.384 **	0.44	0.037
x93:	Intra-Organizational Conflict (Scores)	0.275 **	0.39	0.037
x48:	Staff Participation in Programing (Scores)	0.267 **	0.42	0.054
x55:	Formalization (Scores)	1.094 **	0.70	0.120
x81:	Staff's Education (Yrs.)	0.526 NS	0.26	0.292
x87:	Staff's Organizational Tenure (Yrs.)	0.579 **	0.21	0.105
x73:	Severity of Punishment (Scores)	0.037 *	0.12	0.011
	Constant	-86.310		
	R	0.999 **		0.457
	\bar{R}^2	0.996		

Note: *, ** Mean 0.05 and 0.01 Level of Significance Respectively

variability respectively. Forteen variables contributed 75.38% positively and ten contributed 24.58% negatively.

The positive contributors with their marginal contributions were technology adoptability (40.38%), client participation in educational activities (23.31%), productive capacity of land (3.66%), coordination (2.75%), operational farm size (1.15%), irrigation coverage (0.97%), staff's anxiety-stress (0.62%), strategic authority (0.44%), intra-organizational conflict (0.39%), staff participation in programing (0.42%), formalization (0.70%), staff education (0.26%), organizational tenure (0.21%) and severity of punishment (0.12%). The environmental conditions such as productive capacity of land, draft power availability, operational farm size and irrigation coverage promoted the attainment of skill development significantly. However, the largest positive contribution of technology adoptability and participation in educational activities was obvious. The contribution of management processes such as coordination, centralization, staff participation in programing and staff punishment though small but their cumulative contribution was substantial and also some of their contributions might have been manifested through client participation.

The negative contributors with their marginal contributions were rural background of staff (4.51%), horizontal communication (4.58%), draft power availability (4.05%) level of educational activities (2.45%), staff's work experience (3.28%), performace aspiration of staff (0.74%), clients mass

communication exposure (1.01%) and span of supervision (0.90%). Staff of rural background seemed to sacrifice skill development. Further staffs with higher education, better personal quality, and more experience were also contributing negatively perhaps due to heterophily as well as failure of the organization to utilize the services of qualified staff properly. It was also revealed that it was not the amount of educational activities organized in a unit but participation of clients that made positive contribution to performance of the organizations.

Horizontal communication and span of supervision were also contributing negatively as the staff tended to set low standard of performance informally and dispersed their efforts when they communicate more among their colleagues and have larger span of supervision. Clients having mass communication exposure seemed to be less concerned about skill development and thereby contributing negatively to the attainment of the goal of skill development.

Technology Diffusion : In a total interacting situation 27 variables explained 100% variability in the attainment of the goal of technology diffusion among the clients of agricultural extension services ($R=1.000^{**}$) Seven environmental, two strategic eleven management process and seven staff variables explained 8.34%, 0.88%, 78.43% and 12.33% of performance variability respectively. None of the resource variables had significant contribution to the attainment of the goal of technology diffusion (Table-96). Fourteen variables contributed 42.72%

Table 96: Marginal Contributions of Organizational Variables to the Attainment of the Goal of Technology Diffusion

No.	Organizational Variables	Regression Coeffs.	% Contributions	Standard Errors
x51:	Size of Clients (00 families/EA)	-3.628 **	43.36	0.107
x68:	Clients Participation in Educational Activities (Man Hrs.)	0.157 **	15.73	0.007
x55:	Formalization (Scores)	4.237 **	7.75	0.150
x78:	Rural Background of Staff (Percent)	0.164 **	6.68	0.022
x66:	Supervisory Leadership (TO) (Scores)	1.031 **	2.65	0.098
x12:	Productive Capacity of Land (Percent)	0.434 **	2.35	0.037
x17:	Subsistence Pressure (Land/Capita)	-48.072 **	4.32	1.843
x63:	Supervisors Mobility (Days/Month)	-0.966 **	2.15	0.055
x65:	Supervisory Leadership (RO) (Scores)	-0.897 **	2.16	0.073
x71:	Level of Control (Scores)	-1.597 **	2.34	0.056
x77:	Staff's Parents Occupation (Percent)	-0.121 **	2.27	0.020
x93:	Intra-Organizational Conflict (Scores)	-0.097 *	1.92	0.025
x57:	Staff's Salary Level (000 Tk./Yr.)	-1.384 **	1.06	0.120
x31:	Clients Political Consciousness (Percent)	0.482 **	1.03	0.020
x81:	Staff's Educational Level (Yrs.)	5.969 **	0.93	0.303
x89:	Level of Motivation (Scores)	-0.905 **	0.36	0.049
x64:	Horizontal Communication (Scores)	4.183 **	0.50	0.215
x39:	Technology Adoptability (Scores)	-3.397 **	0.72	0.305
x15:	Operational farm Size (Acres)	-3.063 **	0.25	0.231
x67:	Level of Educational Activities (Man Days)	-0.055 **	0.48	0.007
x85:	Inservice Training of Staff (Man Days)	0.000 NS	0.25	0.005
x25:	Clients Mass Communication Exposure (Percent)	0.160 **	0.20	0.015
x38:	Universality in Contact (Percent)	0.159 **	0.16	0.024
x88:	Staff's Professional Commitment (%)	0.216 **	0.15	0.040
x13:	Irrigation Coverag (%)	-0.118 **	0.11	0.017
x20:	Commercialization (%)	-0.079 **	0.08	0.016
x92:	Anxiety-Stress (Scores)	0.145 **	0.02	0.065
	Constant	-113.061		
	R	1.000 **		0.476
	R ²	0.999		

Note: *, ** Mean 0.05 and 0.01 Level of Significance Respectively

positively and thirteen variables contributed 57.26% negatively. Unless negative factors are controlled there seemed to have no prospect of increasing the attainment of the goal of technology diffusion.

The positive contributors with their marginal contributions were client participation (15.73%), staff's rural background (6.68%), subsistence pressure (4.32), task oriented supervisory leadership (2.65%), productive capacity of land (2.35%), clients political consciousness (1.03%), staff's educational level (0.93%), communication (0.50%), total inservice training of staff (0.20%), universality in contact (0.16%), staffs professional commitment (0.15%) and anxiety stress among the staff (0.02%). The contributions of staff inservice training and anxiety-stress were not significant.

The negative contributors with thier marginal contributions were number of clients per extension agent (43.36%), supervisors's mobility (2.15%), relation oriented supervisory leadership (2.16%), level of control (2.34%), staffs parent's occupation (2.27%), intra-organizational conflict (1.92%), staffs salary level (1.06%), level of motivation (0.36%), technology adoptability (0.72%), operational farm size (0.25%), level of educational activities (0.48%), irrigation coverage (0.11%), and commercialization of agricultural production (0.08%). The largest hindrance to achieve diffusion of technologies was therefore the size of clients per extension agents. The negative contribution of supervisors mobility indicated that thier mobility was not

goal directed. Staff's parent occupation (agriculture), salary level and motivation seemed to create heterophily with little or no empathy and therefore contributed negatively. The negative contribution of technology adoptability, level of educational activities, irrigation coverage and commercialization of agricultural production was possibly the manifestation of size of clients per extension worker.

Productivity Increase: In a total interacting situation 25 variables explained 99.80% variability in the attainment of the goal of increasing clients productivity ($R=0.999^{**}$). Seven environmental, three strategic, eight management process, five staff and two resource variables explained 8.38%, 16.02%, 26.37%, 28.77% and 19.56% variability respectively. Fourteen variables contributed 63.38% positively and 11 contributed 35.72% negatively (Table-97).

The positive contributors with their marginal contributions were manpower need fulfillment (17.52%), intra-organizational conflict (14.79%), quality of participation in educational activities (6.78%), rural background of staff (7.32%), strategic authority (2.45%), level of motivation (1.99%), irrigation coverage (3.21%), clients input need fulfillment (2.04%), tenurial structure (1.81%), staff's organizational tenure (2.00%), clients mass communication exposure (1.04%), supervisors mobility (0.84%), clients participation in educational activities (1.08%) and staff participation in programming (0.51%). The contribution of intra-organizational conflict, rural background of staff and client participation was not significant. The

Table 97: Marginal Contributions of Organizational Variables to the Attainment of the Goal of Increasing Clients Productivity

No.	Organizational Variables	Regression Coeffs.	% Contributions	Standard Errors
x96:	Manpower Need Fulfillment (%)	0.260 **	17.52	0.022
x93:	Intra Organizational Conflict (Scores)	0.022 NS	14.79	0.023
x40:	Technological Diversity (Scores)	-1.068 **	10.86	0.080
x57:	Staff's Salary Level (000 Tk./Yr.)	-0.681 *	7.24	0.194
x69:	Quality of Clients Participation (Scores)	0.643 **	6.78	0.071
x78:	Rural Background of Staff (%)	0.035 NS	7.32	0.020
x64:	Horizontal Communication (Scores)	-3.998 **	7.24	0.209
x53:	Strategic Authority (Scores)	0.541 **	2.45	0.043
x86:	Level of Motivation (Scores)	0.643 **	1.99	0.045
x38:	Universality in Contact (%)	-0.183 **	1.85	0.015
x46:	Professionalization (%)	-0.055 **	3.31	0.011
x13:	Irrigation Coverage (%)	0.104 **	3.21	0.011
x94:	Clients Input Need Fulfillment (%)	0.060 **	2.04	0.007
x16:	Tenurial Structure (%)	0.069 **	1.81	0.012
x87:	Staff's Organizational Tenure (Yrs.)	0.934 **	2.00	0.062
x88:	Staff's Professional Commitment (%)	-0.046 NS	2.67	0.026
x23:	Client Literacy (%)	-0.216 **	1.42	0.024
x25:	Clients Mass Communication Exposure (%)	0.104 **	1.04	0.013
x63:	Supervisors Mobility (Days/Month)	0.369 **	0.84	0.053
x68:	Clients Participation in Educational Activities (Man Hrs.)	0.018 NS	1.08	0.008
x48:	Staff's Participation in Programing (Scores)	0.336 **	0.51	0.051
x66:	Supervisory Leadership (TD) (Scores)	-0.710 **	0.23	0.107
x15:	Operational Farm Size (Acres)	-0.296 **	0.30	0.068
x29:	Client-Patron Relationship (%)	-0.063 **	0.50	0.015
x31:	Client Political Consciousness (%)	-0.093 **	0.10	0.023
	Constant	28.469		
	R	0.999 **		0.473
	R ²	0.990		

Note: *, ** Mean 0.05 and 0.01 Level of Significance Respectively

positive contributions of those variables were obvious except intra-organizational conflict which was earlier expected to have negative contribution. It seemed that intra-organizational conflict created pressure on employees to achieve goals to avoid critiques. Factor contributing behaviour showed that negative contribution of clients political orientation absorbed the positive influence of intra-organizational conflict and its marginal contribution became insignificant.

The negative contributors with their marginal contributions were technological diversity (10.86%), staff salary level (7.24%), communication level (7.24%), universality of contact (1.85%), professionalization (3.31%), professional commitment (2.67%), client literacy (1.42%), task oriented supervisory leadership (0.23%), operational farm size (0.50%) and clients political orientation (0.10%). The negative contribution of technological diversity and universality of contact implied that in order to achieve the goal of increased productivity of clients some degree of strategic authority both in respect of clients and technologies was essential. Professionalization, professional commitment and task oriented supervisory leadership and higher salary level contributed negatively due to heterophily in association with lack of empathy and distraction of attention from organizational goal attainments to preservation of professional rights and privileges. Whereas clients literacy, political consciousness and bigger farm size seemed to create a condition in which clients might have been concerned more with other than the problems of increasing productivity and therefore,

contributed negatively to the attainment of the goal of increasing clients productivity.

Income Increase: In a total interacting situation 16 variables explained 99.40% variability in the attainment of the goal of increasing clients income ($R=997^{**}$) (Table-98). Five environmental, two strategic, five management process, three staff and one resource variable explained 31.08%, 18.04%, 22.02%, 21.13% and 7.16% variability respectively. Eight variables contributed 28.98% positively and eight variables contributed 70.45% negatively. It implied that in general organizational variables were contributing negatively toward the attainment of the goal of increasing clients income.

The positive contributors along with marginal contributions were staff participation in programming (7.04%), expense per client family (7.16%), severity of punishment (5.25%), irrigation coverage (4.54%), level of motivation (2.27%) product market difficulty (1.21%), productive capacity of land (1.28%) and client participation in educational activities (0.23%). The positive contribution of irrigation coverage on income was obvious. The positive contribution of management processes like staff participation in programming, staff motivation, organizing educational activities and sanctions imposed on the staff for maintaining standard of performance was contributing positively toward attaining the goal of increasing clients income.

The negative contributors with their marginal contributions were operational farm size (22.98%), intra-organizational

Table 98: Marginal Contributions of Organizational Variables to the Attainment of the Goal of Increasing Clients Income

No.	Organizational Variables	Regression Coeffs.	% Contributions	Standard Errors
x15:	Operational Farm Size (Acres)	-1.343 **	22.98	0.049
x93:	Intra-Organizational Conflict (Scores)	-0.233 **	10.85	0.013
x45:	Performance Aspiration (Scores)	-1.466 **	11.26	0.078
x46:	Professionalization (%)	-4.042 **	6.78	0.005
x48:	Staff Participation in Programing (Scores)	0.441 **	7.04	0.029
x67:	Level of Educational Activities (Staff Days)	-0.026 **	8.58	0.004
x80:	Staff Age (Yrs.)	-0.770 **	8.01	0.041
x100:	Expense Per Client Family (Tk./Yr.)	0.033 **	7.16	0.002
x73:	Severity of Punishment (Scores)	0.062 **	5.25	0.005
x13:	Irrigation Coverage (%)	0.107 **	4.54	0.009
x89:	Level of Motivation (Scores)	0.263 **	2.27	0.027
x21:	Product Market Difficulty (Scores)	0.306 **	1.21	0.037
x25:	Clients Mass Communication Exposure (%)	-0.063 **	1.07	0.008
x12:	Productive Capacity of Land (%)	0.093 **	1.28	0.017
x57:	Staff's Salary Level (000 Tk./Yrs.)	-0.431 **	0.92	0.090
x68:	Client Participation in Educational Activities (Man Hrs.)	0.008 **	0.23	0.003
	Constant	90.800		
	R	0.997 **		0.447
	R ²	0.998		

Note: *, ** Mean 0.05 and 0.01 Level of Significance Respectively

conflict (10.85%), performance aspiration (11.26%), professionalization (6.78%), level of educational activities (8.58%), staff age (8.01%), clients mass communication exposure (1.07%), and staffs salary level (0.92%). The attainment of increasing clients income seemed to decline with the increased farm size and mass communication exposures. The negative contribution of intra-organizational conflict was obvious. The significant negative contribution of professionalization, higher salary, age and performance aspiration was perhaps due to increased heterophily with lack of empathy as well as failure of the organizations to utilize services of qualified staff. The negative contribution of educational activities was due to high priority on few specific technologies of selective crops which had little or even negative contribution to overall productivity and income of the clients.

Level of Living Improvement : Relatively few variables (12) explained 89.87% variability in the attainment of the goal of improving clients level of living ($R=0.948^{**}$) (Table-99). Four environmental, four management process, three staff and one resource variable explained 43.16%, 21.87%, 14.06% and 10.74% variability respectively, Nine variables contributed 71.79% positively and the remaining three contributed 18.04% negatively. It seemed that relatively few organizational variables were contributing positively toward the attainment of the goal of improving clients level of living.

Table 99: Marginal Contributions of Organizational Variables to the Attainments of the Goal of Improving Clients Level of Living

No.	Organizational Variables	Regression Coeffs.	% Contributions	Standard Errors
x13:	Irrigation Coverage (%)	0.001 NS	25.07	0.007
x17:	Subsistence Pressure (Land/Capita)	-1.984 **	12.83	0.356
x49:	Role Conflict (Scores)	0.137 NS	6.54	0.096
x87:	Staffs Organizational Tenure (Yrs.)	-0.088 NS	8.40	0.069
x94:	Clients Input Need Fulfillment (%)	0.017 **	10.74	0.006
x61:	Coordination (Scores)	-0.261 **	6.74	0.069
x85:	Inservice Training of Staff (Mad days)	0.010 **	6.84	0.002
x83:	Staff's Work Experience (Yrs.)	0.439 **	2.76	0.102
x80:	Staff Age (Yrs.)	-0.295 **	2.90	0.083
x33:	Socio-Political Influence (Scores)	0.060 **	3.52	0.018
x58:	Inter-Organizational Conflict (Scores)	0.068 *	1.74	0.030
x68:	Clients Participation in Educational Activities (Man Hrs.)	0.005 NS	1.75	0.003
	Constant	7.921		
	R	0.948 **		0.474
	R ²	0.834		

Note: *, ** Mean 0.05 and 0.01 level of Significance respectively

The positive contributors with their marginal contributions were irrigation coverage (25.07%), subsistence pressure (12.83%), role conflict (6.54%), clients input need fulfillment (10.74%), inservice training of staff (6.84%), staffs work experience (2.76%), clients socio-political influence (3.52%), intra-organizational conflict (1.74%) and clients participation in educational activities (1.75%). The largest contributors were irrigation and inputs. Positive contribution of inservice staff training, work experience was due to increased capability of staff. Role conflict would perhaps created a condition for better performance to avoid critique.

The negative contributors were staffs organizational tenure (8.40%), coordination (6.74%) and staff age (2.90%). It seemed that older and experienced staff were contributing negatively perhaps by giving priority on behavioural goals. The negative contribution of coordination within the organization was due to more priority to behavioral goals as compared to economic goals.

Micro Systems and Processes

Performance

In the previous chapters the influence of each of the aggregate micro process and system was estimated and examined. Out of 20 aggregate systems and processes only six exhibited significant power to explain performance differential among the organizations. These were economic environment, socio-psychological environment, management strategies, educational

process, staff quality and institutional resource use. Their marginal contributions were also significant. The failure of other systems and processes to exhibit significant influence on performance was attributed to inconsistency and contradictory influence of individual discrete dimensions. The magnitude and direction of influence are expected to change in an interacting situation. All aggregative micro systems and processes were step-wise regressed to estimate explanatory power to performance differential and their marginal contributions to performance as well as goal attainments.

In a total interacting situation the explanatory power of all micro systems and processes was highly significant ($R=0.930^{**}$), (Table - 100). Estimate showed that eighteen aggregate micro systems and processes and extension models explained 86.49% variability in performance. It may be mentioned here that in a total interacting situation 21 discrete variables relating to different micro systems and processes explained 99.60% variability in performance. The reduction of explanatory power from 99.60% to 86.49% was due to aggregation of discrete variables having influence on performance in opposite directions. The reduction was 12.11%. Among 18 micro systems and processes the marginal contributions of only three micro systems and processes namely economic environment (29.21%), educational processes (20.31%) and staff quality (17.63%) were contributing significantly (67.15%). Staff quality however contributed 17.63% negatively. It should also be mentioned that some of the discrete variables relating to other micro processes contributed

Table 100: Marginal Contributions of Aggregate Micro Systems and Processes to Goal Attainments and Performance of Agricultural Extension Organization

No.	Micro Process and Systems	Goal Attainments						Level of Living Improv.	Performance
		Attitude Change (x2)	Knowledge Transfer (x3)	Skill Development (x4)	Diffusion Technology (x5)	Productivity Increase (x6)	Income Increase (x7)		
Environment									
x9:Agro-Ecol. Environment	0.594(5.57) (0.391)	3.216(1.60) (2.131)	2.863(7.38) (1.364)	5.401(4.65) (1.705)	1.416(21.56) (1.392)	2.266(20.55) (0.920)	-	0.142(7.08) (0.827)	
x10:Economic Environment	-	0.806(0.08) (2.031)	0.556(7.26) (1.184)	-2.590(2.31) (1.581)	-1.332(2.77) (1.128)	-2.555(7.29) (0.979)	6.431(18.08) (1.540)	2.331(29.21) (0.784)	
x11:Socio-Psyc. Environment	-	0.855(20.37) (0.628)	0.059(0.02) (0.377)	-	-	-	1.332(5.14) (0.510)	0.243(0.68) (0.264)	
x12:Political Environment	1.064(2.65) (0.604)	1.561 (0.08) (3.162)	0.654 (0.10) (1.497)	-	-	-	-1.719(0.90) (2.069)	0.535(1.98) (1.303)	
x13:Organiz. Environment	-	4.193(0.57) (3.456)	3.856(4.13) (1.769)	4.274(2.10) (2.621)	-	-	-3.807(1.40) (2.519)		
Strategy									
x14:Approach Strategy		-28.366(0.18) (42.271)	2.997 (0.69) (23.187)	23.461(6.21) (19.256)	-27.308(5.03) (17.629)	-12.991(2.06) (13.732)	18.212(1.07) (21.200)	-5.586(0.64) (12.032)	
x15:Technological Strategy		0.719(42.43) (2.214)	2.243(44.94) (1.380)	-	-1.474(4.79) (0.935)	-	-	-0.415(0.94) (0.751)	
x16:Client	-6.503(3.39) (4.965)	4.125(2.29) (22.959)	-	10.900(0.50) (18.156)	-	-17.540(4.74) (10.191)	-	3.622(1.04) (8.662)	
x17:Management Strategy	0.239(6.14) (0.104)	0.078(9.74) (0.725)	-0.295(0.14) (0.418)	1.017(2.29) (0.483)	-0.470(4.26) (0.337)	-	-0.71(1.00) (0.509)		
Management									
x18:Planning Process	-	-14.351(0.26) (19.644)	-	-	26.701(5.76) (13.081)	13.037(2.41) (10.240)	24.681(5.59) (15.098)	7.989(1.58) (7.145)	
x19:Organizing Process	-0.345(9.91) (0.181)	-1.257(2.73) (0.881)	-0.978(2.60) (0.513)	-	-1.033(3.15) (0.625)	-0.820(1.66) (0.436)	0.702(3.03) (0.634)	-0.255(0.31) (0.340)	
x20:Staff Mgt. Process	-	-1.845(0.06) (4.818)	-2.900(4.66) (2.709)	-4.068(1.62) (7.716)	-3.411(4.07) (2.194)	-2.419(3.12) (1.794)	0.774(1.79) (2.511)	0.461(0.14) (1.304)	

Goal Attainments									
No.	Micro Process and Systems	Attitude Change (X2)	Knowledge Transfer (x3)	Skill Development (x4)	Diffusion Technology (x5)	Productivity Increase (x6)	Income Increase (x7)	Level of Living Improv. (x8)	Performance (xi)
x21:	Implementation Process	1.305(1.44) (0.921)	-1.481(0.07) (5.241)	3.014(0.39) (3.041)	3.879(0.75) (3.529)	-	-	-10.965(4.06) (3.861)	-1.896(0.79) (1.798)
x22:	Educational process	0.411(16.61) (0.139)	1.952(8.32) (0.808)	0.930(9.85) (0.547)	0.037(4.53) (0.491)	-	-	-	1.058(20.31) (0.265)
x23:	Controlling Process	-	5.400(0.42) (11.760)	5.030(0.46) (7.102)	-	10.958(3.87) (7.994)	-	2.953(6.67) (7.674)	4.939(0.77) (3.856)
Staff									
x24:	Staff Background	0.212(1.01) (0.214)	0.312 (0.37) (1.704)	-0.660 (0.08) (0.938)	-	-	-0.801(4.76) (0.661)	-1.550(4.28) (1.074)	-0.254(0.12) (0.554)
x25:	Staff Quality	0.031(0.68) (0.048)	-0.038(0.02) (0.232)	-0.082(0.77) (0.138)	-0.125(0.31) (0.175)	0.323(2.33) (0.176)	-	-0.414(5.52) (0.160)	-0.280(17.63) (0.110)
x26:	Staff Behavior		0.081(0.38) (0.653)	-0.511 (2.96) (0.390)	1.067(6.95) (0.373)	-	-	-1.506(8.98) (0.405)	-0.264(1.85) (0.196)
Resource									
x27:	Client Resources	-0.257(0.91) (0.390)	2.266(0.97) (1.905)	1.352(1.85) (0.933)	-1.616(1.07) (1.268)	1.798(2.67) (17.629)	1.418(2.70) (0.956)	0.925(4.70) (1.228)	0.593(0.17) (0.706)
x28:	Institutl.	-	0.017(0.43) (0.122)	-0.036(0.32) (0.073)	-0.004(39.00) (0.099)	-	-	-	0.014(0.48) (0.049)
x44:	Model (Purity)	-11.051(18.12) (4.055)	-	-0.117(0.11) (12.428)	16.540(0.89) (16.246)	-	-	11.571(1.21) (14.030)	-10.499(0.73) (8.212)
x45:	Model Integration	-4.709(1.82) (7.817)	29.917(0.14) (44.655)	-5.388(0.03) (27.977)	88.195(4.40) (33.635)	-	-	-	-

	Constant	70.252	-160.352	-156.991	-186.585	47.571	124.732	16.741	7.098
	R	0.826**	0.956**	0.943**	0.881**	0.776*	0.702*	0.857*	0.930**
	R ²	0.482	0.731	0.686	0.568	0.384	0.286	0.451	0.650

Note: *, ** Mean 0.05 and 0.01 Level of Significance respectively

Figures in Parentheses: Right Side - Percent Contributions and Underneath - Standard Errors

significantly in a total interacting situation but those micro systems and processes such as socio-psychological environment, organizing and controlling processes after counter balancing their influences did not make significant marginal contributions. Eleven micro systems and processes contributed 63.41% positively and eight contributed 23.01% negatively. Inclusion of any other micro systems and processes did not increase the explanatory power of the regression model.

The positive contributors were agro-ecological environment (7.05%), economic environment (29.21%), socio-psychological environment (0.68%), political environment (1.98%), client strategy (1.04%), planning process (1.58%), staff management process (0.14%), educational processes (20.31%), controlling process (0.77%), clients resource need fulfillment (0.17%) and allocation and use of institutional resources (0.48%). Individually three more micro systems and processes namely socio-psychological environment, management strategies and use of institutional resource made significant contributions to performance. But in a total interacting situation their contributions were not significant.

The negative contributors were extension approaches (0.64%), technological strategies (0.94%), organizing process (0.31%), implementation process (0.79%), staff background (0.12%), staff quality (17.63%), staff behaviour (1.85%) and model purity (0.73%) Management strategy and organizational environment made no contribution as their contributions were beyond tolerance

limit. Individually extension model integration, though exhibited positive contribution to the attainment of some of the goals eventually showed negative contribution to overall performance in a situation of total interaction.

Based on the estimates of marginal contributions of the micro systems and processes the following minor hypotheses were amended .

1. In a total interacting situation performance of agricultural extension organizations is directly and significantly influenced by the economic environment of the client system. (1.2)
2. In a total interacting situation performance of agricultural extension organizations is directly and significantly influenced by the educational processes organized by them. (3.5)
3. In a total interacting situation performance of agricultural extension organizations is inversely and significantly influenced by staff quality. (4.2)

Goal Attainments

Like discrete variables the aggregative micro systems and processes exhibited variable and often opposite direction of influences on the attainments of different goals. It is therefore expected that their contributions will also be changed in a total interacting situation. Hence all micro systems and process were step-wise regressed with the attainments of each goal separately to estimate their marginal contributions to different goal attainments.

Attitude Change: The explanatory power of the micro systems and processes to differential attainments of goal of changing

clients attitude was significant ($R=0.826^{**}$) (Table-100). Out of 20 micro systems and processes 12 explained 68.23% variability in performance. Inclusion of any other micro system and processes did not increase their explanatory power. It may be mentioned that 21 discrete variables relating to different micro systems and processes in a total interacting explained 99.60% variability in the attainment of the goal of attitude change. The aggregation of the discrete variables into micro processes and systems reduced the explanatory power by 31.37% as some of the positive and negative variations of different variables of some micro system and process were neutralized due to aggregation. Marginal contributions of only three micro systems and processes namely management strategy (6.14%), educational process (16.61%), and pure extension model (-18.12%) were significant, explaining about 40.87% variability. However, contribution of pure extension model (T & V) was negative. Though there was significant association with implementation process, institutional resource need fulfillment, organizing process and clients resource need fulfillment could not make significant marginal contributions to the attainment of the goal at attitude change in a total interacting situation. Educational process seemed to be the principal determining process of attitude change.

Knowledge Transfer : The explanatory power of micro systems and processes to differential attainment of the goal of transferring technological knowledge was significant ($R=0.956^{**}$). All micro systems and processes explained 91.31% variability (Table 100). It should be mentioned that 27 discrete

variables relating to different micro systems and processes explained 99.80% variability in the attainment of the goal of knowledge transfer. But the variables in aggregation as micro processes and systems explained about 91.31%. The reduction of explanatory power by 8.49% was perhaps due to aggregation. However marginal contribution of only educational process was significant. Though the largest positive contribution came from socio-psychological environment (20.37%) and technological strategy (42.43%), but their influences were absorbed model integration and staff behaviour. It seemed that even under favourable socio-psychological environment and most favorable technological strategy the attainment of goal of knowledge transfer is seriously impeded by the existing models of extension work and behavioural pattern of the professional staff. In terms of knowledge transfer pure model (T&V) exhibited no influence and integrated model exhibited negative influence.

Skill Development: Twenty aggregate systems and processes explained 88.92% variability in the attainment of the goal of developing skills of using new and improved technologies among clients ($R=0.943^{**}$) in which 77.15% was positively contributed by eleven variables and 11.67% negatively by remaining nine variables. Inclusion of other micro systems and processes did not increase their explanatory power (Table 100). It may be recalled that 24 discrete organizational variables in a total interacting situation explained 99.80% variability in the attainment of the goal of skill development. The explanatory power seemed to be reduced by 10.88% due to aggregation as some of discrete

variables exhibited positive and negative influences. However, marginal contribution of none of the micro systems and processes was statistically significant. The largest positive contribution came through technological strategy (44.94%) and educational process (9.85%). Examining the interacting behavior from regression model it was found that staff management process, staff behavior and integrated extension model absorbed the contributions of educational process and management strategy, controlling process and reduced the influence of technological strategies. It seemed that inspite of advantage of technology and favorable educational process attainment of the goal of skill development was seriously impeded by management strategy, staff management and control process. It seems skill development among the clients was sacrificed in favour of attaining other goals.

Technology Diffusion : Fifteen aggregate micro systems and processes variables explained 77.62% variability in the attainment of the goal of diffusing the use of new and improved technologies ($R=0.881^{**}$) (Table 100). Inclusion of any other micro system or process did not increase their explanatory power. The positive contributors with magnitude of their contributions were agro-ecological environment (4.65%), organizational environment (2.10%), approach strategy (6.21%), clients strategy (0.50%), management strategy (2.29%), implementation process (0.75%), educational process (4.53%), staff behavior (6.95%) and model of extension work (5.39%). The negative contributors were economic environment (2.31%), staff management process (1.62%), staff quality (0.31%), clients resource need fulfillment (1.07%)

and allocation and use of institutional resources (39.00%).

It may be mentioned that 27 discrete variables relating to different micro processes and systems explained 100% variability in the attainment of the technology diffusion. The explanatory power seemed to be reduced by 22.38% due to aggregation of discrete variables into different micro systems and processes as some of the positive and negative variations were neutralized through aggregation. However out of fifteen explanatory micro system and processes marginal contributions of only four namely agro-ecological environment (4.65%), management strategy (2.29%), staff behavior (6.95%) and integrated model of extension work (4.50%) were significant. In the step-wise regression analysis institutional resource need fulfillment was found to be the largest contributor but its influence was absorbed by such micro systems and processes as approach and client strategies in association with staff management process. It was revealed that positive influence of use of institutional resources was absorbed through negative influence of adopted approach, client strategy and staff management process. A rational client strategy and staff management make use of institutional resources more effective and thereby would help achieve higher of technology diffusion. It was further observed that in a total interacting situation influence of agro-ecological environment became significant and that of management strategy turn into positive when interacting with other microsystems and processes. Although socio-psychological environment, technological strategy, implementation process had significant association with but the

marginal contributions to the attainment of the goal of technological diffusion were not significant under total interacting situation,

Productivity Increase: Only 11 micro systems and processes explained 60.22% variability in the attainment of the goal of increasing the productivity of clients ($R=0.776^*$) in which five variables contributed 36.19% positively and six variables contributed 24.07% negatively (Table 100). Inclusion of other micro systems and processes did not increase their explanatory power. The positive contributors were agro-ecological environment (21.56%), planning process (5.76%), controlling process (3.87%) and clients resource need fulfilment (2.67%) and the negative contributors with their contributions were economic environment (2.77%), approach strategy (5.03%), technological strategy (4.79%), management strategy (4.26%), organizing process (3.15%), and staff management process (4.07%).

The marginal contribution of none of the micro systems and process became significant, though some of them had significant associations with the attainment of the goal of increasing clients productivity. The largest significant contributor was the agro-ecological environment but its influence was absorbed by management processes more substantially by educational processes, staff management and controlling processes. It seemed that educational process was not adequately oriented to productivity increase as management micro processes did not take account of increasing clients' total productivity in the matters of organization, programs and staff management.

However, it should be mentioned here that 25 discrete organizational variables relating to some of the micro systems and processes explained 99.80% variability in the attainment of the goal of increasing clients productivity. In a total interacting situation the explanatory power decreased from 99.80% to 60.22% when the discrete variables were aggregated into micro systems and process. The reduction was 39.58%. The reduction was substantially high as influence of discrete variables on the attainment of the goal of increasing productivity had wider variation.

Income Increase: Nine aggregate micro systems and processes explained 49.28% of variability in the attainment of the goal of increasing income ($R=0.702^*$) in which three contributed 25.66% positively and remaining six were contributing 23.63% negatively (Table 100). Inclusion of other micro systems and processes in the regression model did not increase their explanatory power. Positive contributions came from agro-ecological environment (20.55%), planning process (2.41%) and clients resource need fulfillment (2.70%) and negative contributions came from economic environment (7.29%), approach strategy (2.06%), client strategy (4.74%), organizing process (1.66%), staff management process (3.12%) and staff background (4.76%). The marginal contributions of only agro ecological environment and economic environment were significant; the latter was however negative. In spite of its significant positive association the influence of educational processes was not significant in a total interacting situation

because of its very poor orientation to increase income of the clients. In the attainment of the goal of increasing clients income the agro ecological environment of client system plays positive and dominant role. Economic conditions seemed to be unfavourable.

Further it should be mentioned that 16 discrete variables in a total interacting situation explained 99.40% of the attainment of the goal of increasing clients income. The explanatory power reduced from 99.40% to 49.29% when the variables were aggregated into micor systems and processes. The reduction was substantially high because different variables had wider variation in influencing the attainment of this goal than the attainment of any other goal.

Level of Living Improvement: Sixteen systems and processes explained 73.40% variability in the attainment of the goal of improving clients level of living ($R=0.857^*$) in which 56.03% contributed by 10 micro systems and processes positively and remaining six contributed 17.41% negatively (Talbe 100). Inclusion of other systems and processes in the regression model did not increase their explanatory power. The positive contributors with their contributions were economic environment (18.08%), socio-psychological environment (5.14%), planning processes (5.59%), organizing process (3.03%), staff management process (1.79%), controlling process (6.67%), staff background (4.28%), staff quality (5.52%), clients resource need fulfillment (4.72%) and extension model purity (1.21%). The negative contributors with their contributions were political environment

(0.90%), organizational environment (1.40%), approach strategy (1.07%), management strategy (1.00%), implementation process (4.06%) and staff behavior (8.98%). Among those micro systems and processes the marginal contributions of five namely economic environment (18.08%), socio-psychological environment (5.14%), implementation process (4.06%), staff quality (5.52%) and staff behavior (9.98%) were significant, explaining about 42.78% of which contributions of implementation process and staff behavior was negative. It implied that inspite of favorable environmental system, implementation process and the resultant staff behavior were not adequately oriented to the attainment of the goal of improving clients level of living.

Macro Systems and Processes

Performance

It was observed that some of the discrete and micro-system and process variables of environment, strategies and staff *ceteris partibus* had significant explanatory powers to performance differential of agricultural extension organizations. When they were farther aggregated as macro systems and process marginal contributions of environment and staff singly remained linear and significant and that of strategies became negative and non-linear. But management process and resource individually did not exhibit any influence on the performance.

In a total interacting situation these aggregative variables may further interact which would ultimately set levels of

performance of an organization. In order to estimate the magnitude and direction of influence of all macro systems and processes in a total interacting situation all aggregate macro systems and processes were step-wise regressed to examine their explanatory power as well as their marginal contributions to performance and the change in magnitude and direction of contributions. Integrated model of sugarcane extension service and pure model of agricultural extension service (T&V) were included in the regression model as dummy variables. It may be remembered that models as dummy variable were excluded earlier from aggregation of strategic variables.

In a total interacting situation all aggregate macro systems and processes including extension models as dummy variable explained 53.29% of variability in performance of agricultural extension organizations ($R=0.730^{**}$) (Table 101). Among them marginal contributions of environment (26.97%), staff (12.99%) and integrated extension model (6.55%) were significant, explaining about 46.51% variability. The marginal contribution of strategy (3.22%) and management (3.53%) were not significant but positive. In a total interacting situation the influence of availability and use of resources was beyond tolerance limit and was excluded from the regression model.

It may be mentioned here that in a total interacting situation 21 discrete variables explained 99.60% variability in performance. When the variables were aggregated at micro systems and process level, the aggregated micro systems and

Table 101: Marginal Contributions of Aggregate Macro Systems and Processes to Goal Attainments and Performance of Agricultural Extension Organization

No.	Macro Process and Systems	Goal Attainments						Performance	
		Attitude Change (x2)	Knowledge Transfer (x3)	Skill Development (x4)	Diffusion Technology (x5)	Productivity Increase (x6)	Income Increase (x7)		Level of Living Improv. (x8)
x39:	Environment	0.143(3.02) (0.098)	1.525(10.84) (0.436)	0.832(21.31) (0.276)	0.673(9.48) (0.376)			0.414(26.97) (0.186)	
x40:	Strategy	0.145(2.90) (0.096)	0.058(0.02) (0.434)	-	0.080(0.09) (0.374)	-0.794(8.68) (0.308)		0.223(3.22) (0.189)	
x41:	Management	-	1.190(9.70) (0.383)	0.561(15.13) (0.243)	0.294(1.36) (0.330)			0.271(3.53) (0.166)	
x42:	Staff	0.076(16.21) (0.039)	0.468(10.15) (0.170)	0.198(6.98) (0.111)	0.096(1.03) (0.146)			0.162(12.99) (0.074)	
x43:	Resource	-	0.097(1.39) (0.112)	0.077(0.98) (0.075)	0.109(37.21) (0.096)			-	
x44:	Model (D1) (Purity)	-10.196(18.10) (3.538)	-11.614(0.76) (15.293)	-12.484(4.16) (9.680)	-10.689(1.05) (13.182)			1.037(0.05) (6.569)	
x45:	Model (D2) (Integration)	4.340(2.90) (4.404)	21.500(5.28) (21.880)	-10.998(1.44) (12.980)	25.082(3.39) (18.861)	-28.263(10.16) (14.836)		19.770(6.55) (8.624)	
Constant		56.286	-273.690	-73.947	-38.587	186.958	162.044	17.191	-28.490
R		0.651**	0.826**	0.707**	0.732**	0.434*	0.382 NS	0.362 NS	0.730**
R ²		0.313	0.589	0.380	0.401	0.132	-0.059	0.036	0.421

Note: *, ** Mean 0.05 and 0.01 Level of Significance respectively

Figures in Parentheses: Right Side - Percent Contributions and Underneath - Standard Errors

processes in a total interacting situation explained 86.49% variability in performance. The explanatory power was reduced by 13.11% only. When the variables were farther aggregated at macro system and process level their explanatory power became 53.29% under similar interacting situation. The reduction was 46.31%. Therefore explanatory power progressively decreased at higher level of aggregation. It was earlier observed that not only the discrete organizational variables but also their micro systems and processes were not mutually reinforcing but counterbalancing their influences on the performance of the organizations. As a result aggregation at higher levels progressively reduced the explanatory power of the organizational variables. The system or process having more inconsistency and contradictory pull of influences on performance exhibited lower explanatory power at higher level of aggregation.

The magnitude and direction of influence of some of the macro systems and processes were appreciably changed under conditions of total interaction. Marginal contribution of environment changed from 0.556 to 0.414, that of strategy changed from -0.075 to 0.223. It seemed that though strategies were negative but it was tending to make positive contribution when interacting with other macro systems and processes. Marginal contribution of management process also increased significantly from 0.006 to 0.271 though still remained in-significant, while that of staff reduced from 0.235 to 0.162 but remained significant. It implied the contribution of staff is seriously

reduced by the interaction of adopted strategies and management process. These evidences clearly testified that in order to exploit environmental and staff potential to increase the performance of the organizations the existing strategies and management processes need to be consistent for generating positive synergy toward performance of the organizations.

In the background of these changes the following major hypotheses may be amended:

1. In a total interacting situation the performance of agricultural extension organizations is directly and significantly influenced by the environment in which they operate. (1.0)
2. In a total interacting situation the performance of agricultural extension organizations is directly and significantly influenced by their staff. (4.0)
3. In a total interacting situation performance of agricultural extension organizations is directly and significantly influenced by integration of extension models.

Goal Attainments

It was observed earlier that like discrete variables the aggregate macro systems and processes had variable magnitude and direction of influences to the attainment of different goals. It may further be changed under total interacting situation. All aggregate macro systems and processes were therefore step-wise regressed to estimate their marginal contributions to the attainment of different goals of extension work.

Attitude Change: Macro systems and processes, namely environment, strategy and staff and the models as dummy variable

explained 42.38% of the attainment of the goal of attitude change ($R=0.651^{**}$) in which marginal contribution of pure model of Training and visit was significant but negative (Table 101). Its contribution was 18.10%. The second largest contributor was staff, their quality and behavior but its influence was absorbed by strategy and integrated model of extension work. It seemed that contribution of staff to the attainment of the goal of attitude change was seriously impeded by the adopted strategies in association with integrated model of extension work. Management and resource availability or use exhibited no influence on the attainment of the goal of changing client attitude.

It should be mentioned that 21 discrete variables explained 99.60% of the attainment of the goal of attitude change in a total interacting situation. On aggregation the micro processes explained only about 68.23%. When aggregated farther into macro level their explanatory power was further reduced to 42.38% due to aggregation effect as different discrete variables as well as micro and macro systems and processes instead of mutual reinforcement counter balanced some of their influences as was in case of overall performance of the organizations.

Knowledge Transfer: All macro systems and processes including dummy variables of pure and integrated models of extension work explained 68.23% of the attainment of the goal of transferring knowledge in which marginal contributions of environment (10.84%), management (9.70%) and staff (10.15%) were significant (Table 101). Contribution of strategy, resources and

models were not significant. Among the two models pure model of Training and Visit seemed to make negative contribution when interacting with the macro systems and processes. In a total interacting situation 27 discrete variables explained 99.80% attainment of the goal of knowledge transfer. When the variables were aggregated into micro systems and process their explanatory power was reduced to 91.31%. Explanatory power was further reduced to 68.23%. Comparatively reduction was far more less than that of the attainment of attitude change. It seemed that similar to the attitude change organizational variables were not mutually reinforcing but counter balancing some of their influences but variation was far less than that of the attainment of attitude change.

Skill Development: Except strategy all other four macro systems and processes including the extension models explained 49.98% of attainment of the goal of skill development ($R=0.707^{**}$) (Table 101).- Inclusion of strategy did not increase their explanatory power significantly. Among them marginal contribution of environment (21.31%) and management process (15.16%) were significant. Though not significant, contribution of staff quality and behavior was 6.98%.

It may also be mentioned that 99.80% attainment of the goal of skill development was explained by 24 discrete organizational variables in a total interacting situations. The explanatory power was reduced to 88.92% when variables were aggregated into micro systems and processes and to 49.98% when further aggregated

as macro systems and processes as the variation among variables or their contributions were neutralized by aggregation.

Technology Diffusion: All macro systems and processes had significant associations with the attainments of the goal of technology diffusion. The influence of strategy and management was significantly negative. In a total interacting situation the macro systems and processes explained 53.58% of the attainment of the goal of technology diffusion of which pure model of Training and Visit was contributing negatively. None of them in interaction had significant marginal contribution (Table 101). The largest contributors were availability and use of resources (37.21%) and environment (9.48%) in which the extension organizations operate. But their positive and significant influences were however absorbed by the negative influences of strategy and management. On the other hand negative influence of strategy and management become positive when interacting with other macro systems and process. It has been further observed that marginal contribution of environment increased from 0.556 to 0.673 and that of staff decreased from 0.235 to 0.096 in a total interacting situation. It seemed that macro system and process counter balanced their positive and negative influences to the extent that all of their contributions to technology diffusion became insignificant.

It may be mentioned here that in a total interacting situation 27 discrete variables explained 100% variability in the attainment of technology diffusion. The explanatory power was reduced to 77.62% when the discrete variables were aggregated as

micro-systems and processes. The explanatory power was reduced to 53.58% when they were farther aggregated into macro systems and processes. The successive reduction of explanatory power implied that the discrete variables as well as micro or macro systems and processes were not mutually reinforcing but counterbalancing some of the influences on the attainment of the goal of technology diffusion. It was therefore evidently clear that the organizations failed to generate greater synergy for the attainment of the goal of technology diffusion also.

Productivity Increase: Associations between the macro systems and processes with the attainment of the goal of attaining the increase of clients productivity were not significant except in case of strategy ($\bar{R}=0.296^*$). The relationship was however negative. The relation of management process was also negative though not significant ($\bar{R}=0.131$ NS) (Table 101).

In a total interacting situation only strategy and integrated model of extension work explained 18.84% of attainment of the goal of increasing clients productivity ($R=0.434^*$) but their marginal contributions were negative. Inclusion of other macro systems and processes in the regression model could not increase their explanatory power. It seemed that strategy and model integration had no influence on the attainment of the goal of increasing clients productivity rather model of extension work (integrated model) in association with strategies were influencing significantly negatively. This was because under

integrated model production of a single crop was pursued with such priority and importance that total productivity of clients were decreasing significantly. This is why intensity of cane cultivation is progressively declining in the sugar mill zones and use of modern technologies is diffused very slowly. Further strategies regarding extension approached, technology, clients and management of the organization were mutually reinforcing rather negatively toward the attainment of the goal increasing clients productivity.

It may also be mentioned here that in a total interacting situation 25 discrete variables of the organizations had been contributing 99.80% of the attainment of this goal. The explanatory power was reduced to 60.22% when the variables were aggregated into micro systems and processes. It was further reduced to only 18.84% when they were aggregated at macro systems and process level. The reduction was spectacular. It was perhaps due to the influence of organizational variables in opposite direction which had wide variability. It implied that the extension program had little orientation to clients productivity increase and whatever magnitude of attainment of this goal was accounted was perhaps due to individual initiative of extension workers in meeting local needs and demands of the clients. In program development and implementation institutional control and direction seems to be lacking in respect of increasing clients total productivity.

Income Increase: None of the macro systems and processes had significant association with the attainment of the goal of

increasing clients income (Table 101). In a total interacting situation their explanatory power was also not significant ($R=0.382$ NS). It was previously observed that 16 discrete variables explained 99.40% of attainment of the goal of increasing clients income. The explanatory power sharply came down to 49.28% when the organizational variables were aggregated at micro system and process level. It was further decreased to only 14.59% when aggregated at macro system and process level. It implied that promotion of the goal of increasing clients income was of local initiative and was subjected to be varied widely with the variation of organizational variables. As a result when the variables were aggregated into micro and macro levels their explanatory power was sharply reduced rather became negative. In other words extension organizations were pursuing the attainment of behavioral goals sacrificing that of economic goals of extension work.

Level of Living Improvement: None of the macro systems and processes had significant association with the attainment of the goal of improving level of living improvement (Table 101). In a total interacting situation their explanatory power was also not significant ($R=0.362$ NS). It may be mentioned again that 12 discrete organizational variables explained 89.87% of the attainment of the goal of improving clients level of living. The explanatory power was further decreased to 73.44% when the variables were aggregated at micro system and process level. Explanatory power became insignificant when aggregated at macro system and process level. It seemed that attainment of the goal

of improving clients level of living was residual having wide variability under variable magnitude of different variables. As a result the explanatory power of different variables successively decreased at an increasing rate at successive higher level of aggregation.

Summary

A large number of organizational variables were interoven in determining the level of performance of agricultural extension organization, some of them were contributing positively and others negatively. Prior knowledge of their magintude and direction of contributions could help design and operation of the organizations in such a way as to maximize the level of performance as well as the attainments of component goals in a given society.

In a total interacting situation it was found that 21 discrete variables explained 98.60% performance variability among agricultural extension organizations of Bangladesh. Significantly positive contributions, in order of magnitude were made by client literacy, extent of manpowe need fulfillment of the organizations, clients participation in educational activities, productive capacity of land, professional commitment of staff, inservice training of staff, magnitude of formalization in the organization, strategic authority, staff's rural background, extension model integration, staff family income and irrigation coverage, while significant negative contributions were made by size of client families per extension agent,

relation orientation of supervisory leadership, staff salary level, draft power availability, supervisors mobility, magnitude of coordination, logistic support and managerial succession. The contribution of technology adoptability, though seemed to be significant and positive, became neutralized and even made negative by the size of clients per extension agents. The technological advantages is often compensated by larger size of clients per extension agent.

The influence and factor contributions to the attainments of different goals are also variable. Twenty-one variables contributed 99.60% to the attainment of the goal of attitude change with staff incentive, clients participation in educational activities and clients attitude toward change as principal contributors and size of clients as principal impedor. Twenty-seven organizational variables contributed 99.80% to the attainment of knowledge transfer with quantity and quality of clients participation in educational activities as principal contributor and professionalization as principal impedor. The negative contribution of professionalization was possibly due to heterophily in association with lack of empathy. The attainment of 99.80% skill development was contributed by 24 organizational variables with technology adoptability and clients participation in educational activities as principal contributors. Hundred percent of the attainment of diffusion of technologies was explained by 27 organizational variables with clients participation in educational activities and formalization in management as principal contributors and size of clients per

extension agent as principal impedor. Twenty-five organizational variables explained 99.80% attainment of the goal of increasing clients productivity with manpower need fulfillment and intra-organizational conflict as principal contributors and technological diversity as principal impedor. Sixteen organizational variables explained 99.40% attainment of the goal of increasing clients income, Staff participation in programing and expense per client family were the principal contributors. Operational farm size and intra-organizational conflict were the major impedors. Twelve variables explained 89.87% of the attainment of the goal of improving clients level of living in which irrigation coverage was the principal contributor and subsistence pressure was the principal impedor.

As some of the variables were contributing either positively or negatively the aggregate contributions of different micro as well as macro-processes and systems were examined. Out of the 20 micro processes and systems, in a total interacting situation, only two namely economic environment and educational process were contributing positively and staff quality contributed negatively. The failure of other micro-systems and processes to contribute significantly was perhaps due to inconsistency among individual discrete variables and opposite pull of influences on the attainments of different goals. Educational process was the largest and significant contributor of the attainment of the goal of attitude change and knowledge transfer. None of the micro-process could contribute significantly toward attainment of the goals of skill development and productivity increase due to

contradictory pull of influences. Agro-ecological and economic environment seemed to be the largest and significant contributor of the attainments of the goals of increasing clients income and level of living respectively.

Further aggregation of the variables at macro system and process level showed that significant and direct contributions to performance were coming from environment and staff model integration, while management process, strategy and resource use were not contributing directly and significantly. Their contributions were however positive. Some of their contribution might have been manifested through change of environmental variables. They also made variable contributions to the attainments of different goals.

XIII. TEST OF MODEL OF MANAGEMENT

Introduction

The componential discrete variables as well as systems and processes of the theoretical model of management were estimated and analysed separately in terms of their magnitude, variability, relationships and factor contributions at different levels of interactions and aggregations to performance as well as the attainments of the goals of agricultural extension organizations. The model proposed a highly tentative net-work of relationships among macro systems and processes with performance of the organizations. The proposed network has been tested to validate the underlying assumption of the model and to identify the critical path along which improvement could be made for maximizing the level of performance.

Network of Relationships

In the theoretical model of the study the magnitude and directions of relationships among the macro systems and processes could not be explicitly stated due to lack of prior knowledge about the network. It was tentatively and broadly hypothesized that :

"The influences of organizational variables, both discrete and aggregate systems and processes, on the performance of agricultural extension organizations are significantly direct, consistent and indirectional."

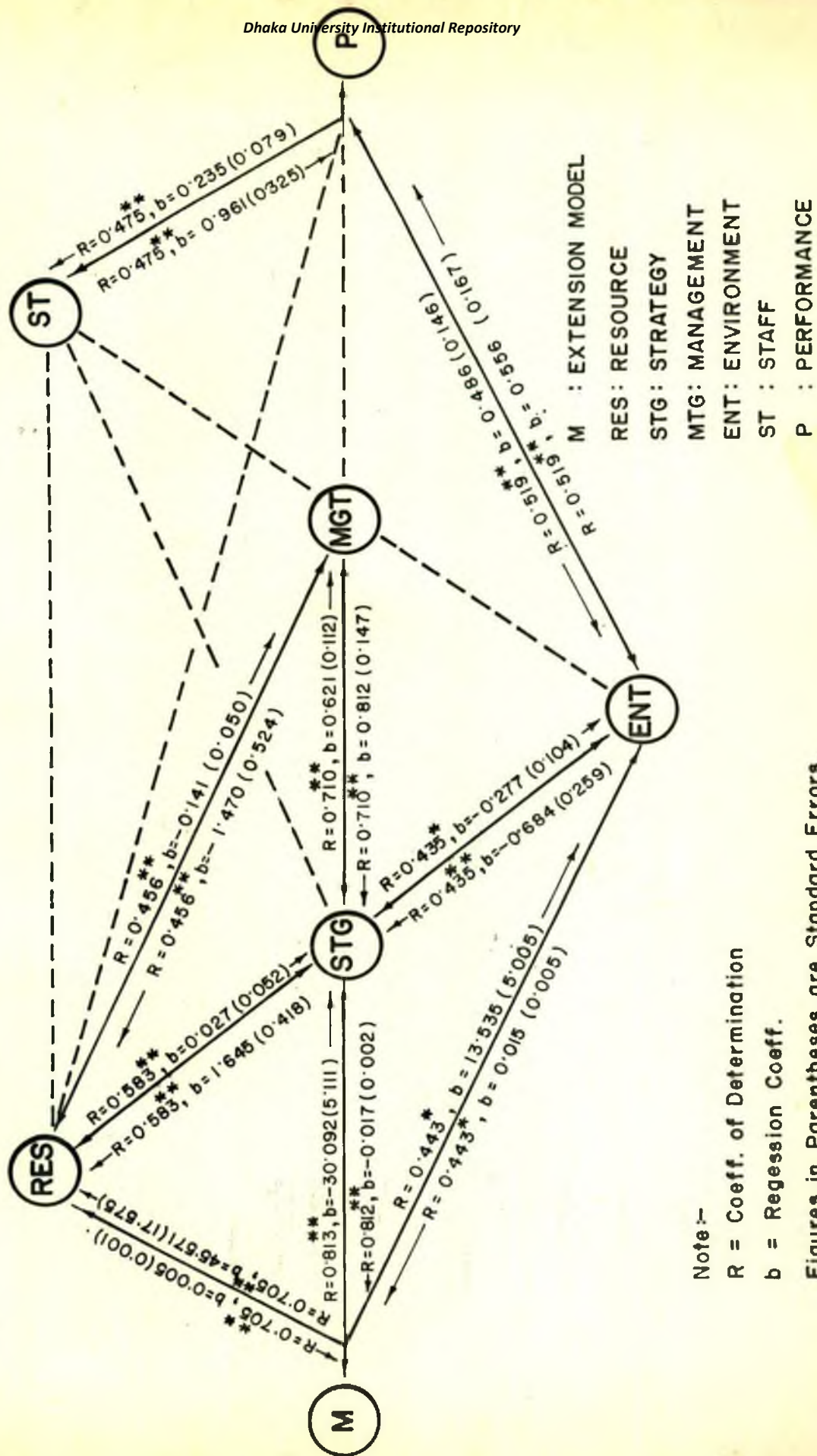
In order to establish the net-work of relationships on an empirical and analytical basis all six major components of the model viz, environment, strategy, management, staff, resource and

performance were mutually regressed. Based on their explanatory power and marginal contributions to each other the network was finally worked out (Fig 3). The bolt lines and broken lines indicate existence and non-existence of significant contributions respectively. In the process of analysis it was felt that model of extension work needs to be included in the network as model of extension work seemed to play a dominant role in the performance of agricultural extension organizations. The components of the proposed management model were then reordered. The reconstructed model of management shows that only aggregate environmental and staff macro systems were making significant contributions to performance.

The contribution of model of extension work, strategy, resource and management to performance of the organizations were not significant. They also failed to exhibit significant influence on the aggregate staff system i.e. its background, quality and behavior. But they had been influencing each other significantly. In other words strategy, management and resource (distribution and use) were neatly tied together. However some of their influences may be manifested indirectly through the environmental changes. Therefore in an empirical situation it seemed that the influence of model of extension work, strategy, management and resource were circular, but not unidirected toward performance of the organizations.

It may be recalled that organizations were performing at two-fifth of their potential level with wide variations among the

FIG. 3: TESTED MODEL OF MANAGMENT FOR AGRICULTURAL EXTENSION ORGANIZATION OF BANGLADESH



Note:-
 R = Coeff. of Determination
 b = Regression Coeff.
 Figures in Parentheses are Standard Errors.

primary administrative units, Upazillas and Subzones. This meager performance is a manifestation of the favorable environment and staff quality and behavior. The role of other components namely strategy, management and resources is highly limited due to opposite pull of influences. It seemed that the organizational variables could not logically articulated to generate positive synergy within the organizations directed toward the attainments of goals and hence their performance.

Critical Path of Influence

From the network of influences of the macro systems and processes nine alternative paths were identified. The components of each of those paths were step-wise regressed to estimate their power to explain performance differential (Table 102). It was observed that explanatory power of all paths were significant (0.05 level), explaining about 17.40% to 35.90% of performance variability. Among them the explanatory power of P₄ (Model-Resource-Management Process-Staff-Performance) was highly significant (0.001 level). Giving priority attention to this path agricultural extension organizations may increase their performance substantially. It seemed that all alternative paths were almost equally important but the path of model-resource-management-staff-performance would maximize performance more as compared to any other path. Its explanatory power could be increased more if the internal inconsistencies of management process could be removed and made more goal directed.

Table 102: Explanatory Power of Alternative Paths of Macro Systems and Processes to Performance Differential of Agricultural Extension organizations

Path No.:	Path	r	R ²
1.	Model-Resource-Staff-Performance	0.526* (14.394)	0.199
2.	Model-Strategy-Staff-Performance	0.564* (13.972)	0.245
3.	Model-Resource-Strategy-Staff Performance	0.570* (14.162)	0.225
4.	Model-Resource-Management Staff-Performance	0.641** (12.940)	0.323
5.	Model-Resource-Management Performance	0.504* (14.615)	0.174
6.	Model-Strategy-Management Performance	0.529* (14.360)	0.203
7.	Model-Strategy-Environment-Management Performance	0.665* (12.874)	0.359
8.	Model-Environment-Management Performance	0.610* (13.404)	0.306
9.	Model-Environment Performance	0.534* (14.059)	0.236

Note: Figures in the Parentheses are standard errors

Maximizing Performance

It is revealed that both micro and macro organizational systems and processes, often failed to or did not show significant influences on performance. It is also observed that models of extension work (T&V, Advisory Service and Integrated ones) strategy, resource and management had virtually no

significant influences directly on performance or indirectly through staff behavior. Why does the macro systems and processes of the organizations failed to generate positive synergy and exhibit significant influence on performance? The answer of this question is indeed vital both in academic or utilitarian point of view.

From the previous analyses of discrete variables of environment, strategy, management process, staff and resource the reasons may be attributed to:

1. Different variables both discrete and systems and processes exhibited both positive and negative influences on the performance of the organizations, and
2. Same variables, both discrete and systems and processes often have opposite directions of influences on the attainments of different goals of the organizations.

A brief recapitulation of factor contributing behavior of organizational variables may substantiate these reasons.

Factor Contributing Behavior of Organizational Dimensions

In a total interacting situation several patterns of factor contributing behavior was observed among the discrete organizational variables (Table 103) First some variables contributed positively to the attainments of all or some of the goals of extension work. Among them clients participation in educational activities had positive contribution to the attainments of all goals, though the contributions to attainments of behavioral goals were much higher than that of economic goals indicating deficiency of the educational programs in respect of increasing clients productivity, income and level of living.

Table 103: Factor Contributing Behavior of Discrete Organizational Variables to Attainments of Goals of Agricultural Extension Organizations (Significant Contribution in Percent).

No.	Discrete Organizational Variables	Goal Attainments						
		Attitude Change	Knowledge Transfer	Skill Development	Technology Diffusion	Productivity Increase	Income Increase	Level of Living Improvement
<u>Environment</u>								
x10.	Rainfall	+2.58	+0.21					
x12.	Prodv. Capacity of Land			+3.66	+2.35		+1.28	
x13.	Irrigation Coverage			+0.97	+0.11	+3.21	+4.54	+25.07
x15.	Operational Farm Size	+0.44		+1.15	-0.25	-0.30	-22.99	
x16.	Tenurial Structure		-0.04			+1.91		
x17.	Subsistence Pressure				-4.32			-12.83
x18.	Draft Power Availability		+1.12	+4.06				
x20.	Commercialization				-0.09			
x21.	Product Market Difficulty		-0.28				+1.21	
x23.	Client Literacy					-1.42		
x25.	Mass Communication Exposure			-1.01	+0.20	-1.04	-1.07	
x29.	Client-Patron Relationship		+1.35			-0.50		
x30.	Attitude Toward Change	+9.30						
x31.	Political Consciousness	-5.31			+1.03	-0.10		
x33.	Socio-Political Influence	+1.32	-2.53					+3.52
<u>Strategies</u>								
x38.	Universality in Contact				+0.16	-1.85		
x39.	Technology Adoptability	-24.49	-0.36		+40.38	-0.72		
x40.	Technology Diversity		+0.38			-10.86		
x45.	Performance Aspiration			-0.74			-11.26	
x46.	Professionalization		-20.99			-3.31	-6.78	
<u>Management</u>								
x48.	Staff Participation			+0.42		-0.51	+7.04	
x49.	Role Conflict						+6.54	
x51.	Size of Clients/EA	-12.21	+0.79		-43.36			
x52.	Span of Supervision			-0.90				
x53.	Strategic Authority		+0.22	+0.44		+2.45		
x55.	Formalization	-1.60	+1.43	+0.70	+7.75			
x57.	Staff Salary				-1.06	-7.24	-0.92	
x58.	Incentive	+10.16						+1.75
x60.	Managerial Succession	-4.15						

Table 103: Contd.

No.	Discrete Organizational Variables	Goal Attainments					
		Attitude Change	Knowledge Transfer	Skill Development	Technology Diffusion	Productivity Increase	Income Level of Living Improvement
x61.	Co-ordination		+3.66	+2.75			- 6.74
x63.	Supervisor's Mobility	-5.48	-1.87		- 2.15	+0.84	
x64.	Horizontal Communication		-0.25	-4.58	- 0.50	-7.24	
x65.	Supervisory Leadership (RO)				- 2.16		
x66.	Supervisory Leadership (TO)			-1.12	+ 2.65	-0.23	
x67.	Level of Educational Activities	- 1.34		-2.45	-0.48	-8.58	
x68.	Client Participation (Edn. Act)	+ 10.61	+12.47	+23.31	+15.73	+ 1.08	+ 0.23 +1.75
x69.	Quality of Participation		+43.48			+ 6.78	
x71.	Level of Control		+0.56		-2.34		
x73.	Severity of Punishment	- 0.50	-0.15	+ 0.12			+ 5.25
<u>Staff</u>							
x76.	Staff Family Income	+ 0.84	- 0.13				
x77.	Staff Parents Occupation				-2.27		
x78.	Rural Background			- 4.51	+6.68	+ 7.32	
x80.	Staff Age					- 8.01	-2.90
x81.	Staff Education			+0.26	+0.93		
x82.	Staff Personal Quality	+ 0.18		-1.93			
x83.	Staff Work Experience			-3.28			+2.76
x85.	Inservice Tr. of Staff	- 0.45			+0.25		+6.84
x87.	Organisational Tennure			+0.21		+2.00	-0.40
x88.	Professional Commitment	- 1.33			+0.15	-2.67	
x89.	Level of Motivation	- 1.57			-0.36	+1.99	+2.27
x92.	Anxiety-Stress	+2.63	-0.11	+0.62	+0.02		
x93.	Intra-Organizational Conflict	+0.42		+0.39	-1.92	+14.79	-10.85
<u>Resources</u>							
x94.	Clients Input Need Fulfillment					+ 2.04	+10.74
x96.	Manpower Need Fulfilment	+2.40	+3.06			+17.52	
x98.	Logistics		-1.01				
x99.	Contingent	+0.33					
x100.	Expense Per Client Family	-2.86	+0.19				+7.16

Besides productive capacity of land, irrigation coverage, clients attitude toward change, staff participation in programing, strategic authority, incentive, quality of clients participation in educational activities, rural background of staff, staffs education, fulfillment of manpower need of the organizations and clients input need had positive contributions to the attainments of either behavioral or economic goals.

Secondly some variables such as subsistence pressure, staffs performance aspiration, professionalization, staff salary level, level of educational activities, staff age had negative contributions to the attainments of some of the goals of extension work of either behavioral or economic changes. Consequently negative contribution of the level of educational activities implied that educational activities failed to meet the needs of clients as technological base was narrow, assigning priority to a few technologies which had negative influence on increasing overall productivity and income of clients and poor quantity and quality of client participation in educational activities.

Thirdly some of the variables like operational farm size, client patron relationship, technology diversity, coordination, level of control, and intra-organizational conflict had positive contributions to the attainments of behavioral goals but contributed negatively to the attainment of economic goals.

Fourthly some of the variables like supervisors mobility, rural background of staff, staff work experience, inservice training and level of motivation contributed negatively to the attainments of behavioral goals and positively to that of economic goals.

Fifthly factor contributing behavior of some variables showed inconsistency, for example clients' mass communication exposure, political consciousness, socio-political influence, size of clients per extension worker, formalization, severity of punishment, staff family income, staff personal qualities, anxiety-stress, expense per client family had both positive and negative contributions to the attainments of different behavioral and economic goals.

From the stand point of the attainment of different goals and performance, the principal contributors of performance were clients literacy, productive capacity of land, clients participation in educational activities and extent of fulfillment of the manpower need of the organizations. Principal impedorers were the number of clients per extension worker and relation oriented supervisory leadership. The principal contributors of attitude change attainment were the clients attitude toward social change, participation in educational activities, while the impedorers were highly adoptable technology and number of clients per extension agent. In attaining knowledge transfer the quantity and quality of clients participation in educational activities contributed the most, but the highest impediment came

from professionalization. Technology adoptability and clients participation in educational activities were the principal contributors for the attainment of skill development but its impeters were staff's rural background and level of horizontal communication among them. Client participation, formality in management and staffs rural background were the principal contributors of the attainment of technology diffusion whose principal impeder was also number of clients per extension worker.

In attaining clients productivity increase significant contributions came from the extent of fulfillment of manpower need of the organizations, intra-organizational conflict and quality of clients participation in educational activities, but it was impeded much by diversity in technological advice and higher salary of staff which is associated with older staff. The principal contributors in attaining clients income increase were staffs participation in programing and expense per client family, while principal impeters were clients operational farm size, intra-organizational conflict and performance aspiration of staff. Finally the attainment of improvement of clients level of living was principally contributed by irrigation coverage of arable land, fulfillments of clients purchase input need, and inservice training of staff, but impeded by subsistence pressure and older staff with longer organizational tenure. This brief exposition revealed that organizational variables had variable contributions to the attainments of different goals of extension work and directions of influence were often opposite.

Because of the pull of opposite influences some of the micro systems and processes could not influence performance of the organizations significantly (Table 104). Among the micro system, and processes agro-ecological, socio-psychological, educational and controlling micro systems and processes had positive or no influences on the attainments of some of the goals of the organizations. The remaining micro-systems and processes exhibited both positive and negative contributions to the attainments of different goals. Consequently only four aggregative micro systems could contribute significantly to the overall performance of the organizations. These were agro-ecology, economy, educational process and staff quality. The contribution of staff quality was however negative.

In view of inconsistent and opposite influences of the individual discrete and micro systems and processes variables, some of the macro systems and processes could not contribute significantly to either the attainments of the goals or the performance of the organizations (Table 105). None of the macro systems and process had been contributing to the attainment of economic goals. Rather strategy and integrated model of extension work contributed negatively (Table 105). Pure model of extension work (T&V) contributed consistently negatively. While influence of macro-systems and processes were positive though not significant in all cases.

Agricultural extension organizations may therefore maximize their performances when they would:

Table 104: Significant Factor Contributions of micro-Systems and Processes of Agricultural Extension Organizations to Goal Attainments (Percent)

No. Systems and Processes Variables	Goal Attainments						
	Attitude Change	Knowledge Transfer	Skill Development	Technology Diffusion	Productivity Increase	Income Increase	Level of Living Improvement
<u>Environment</u>	+3.02	+10.84**	+21.31**	+9.48	-	-	
x9: Agro-ecology	+5.57	+1.60	+7.38	+4.65**	+21.56	+20.55**	-
x10: Economic	-	+0.08	+7.26	-2.31	-2.77	-7.29	+18.08**
x11: Socio-Psychological	-	+20.37	+0.02	-	-	-	+5.14*
x12: Political	+2.65	+0.08	+0.18	-	-	-	-0.90
x13: Organizational	-	+0.57	+4.13	+2.10	-	-	-1.40
<u>Strategy</u>	+2.90	+0.02	-	+0.09	-8.68*	-	-
x14: Approach	-	-0.18	+0.69	+6.21	-5.03	-2.06	-1.07
x15: Technology	-	+42.43	+44.94	-	-4.79	-	-
x16: Client	-3.39	+2.29	-	+0.50	-	-4.74	-
x17: Management	+6.14*	+9.74	-0.14	+2.29*	-4.26	-	-1.00
<u>Management</u>	-	+9.70**	+15.13*	+1.36	-	-	-
x18: Planning	-	-0.26	-	-	+5.76	+2.41	+5.59
x19: Organizing	-9.91	-2.73	-2.60	-	-3.15	-1.66	+3.03
x20: Staff Management	-	-0.06	-4.66	-1.62	-4.07	-3.12	+1.79
x21: Implementaion	+1.44	-0.07	+0.39	+0.75	-	-	-4.06*
x22: Educational	+16.61**	+8.32*	+9.85	+4.53	-	-	-
x23: Controlling	-	+0.42	+0.46	-	+3.87	-	+6.67
<u>Staff</u>	+16.21	+10.15**	+6.98	+1.03	-	-	-
x24: Background	+1.01	+0.37	-0.08	-	-	-4.76	+4.28
x25: Quality	+0.68	-0.02	-0.77	-0.31	+2.33	-	-5.52**
x26: Behavior	-	+0.38	-2.96	+6.95*	-	-	-9.98**
<u>Resources</u>	-	+1.37	+0.98	+37.21	-	-	-
x27: Client Resources	-0.91	+0.79	+1.85	-1.07	+2.67	+2.70	+4.72
x28: Institutional Resources	-	+0.43	-0.32	-39.00	-	-	-
x40: Model Purity	-18.12	-0.11	-0.89	-	-	-	+1.21
x41: Model Intigration	-1.82	+0.14	-0.03	+4.50	-	-	-

Table 105: Factor Contributions of Macro Systems and Processes of Agricultural Extension Organizations to Goal Attainments (percent)

Macro Systems and Process	Goal Attainments						
	Attitude Change	Knowledge Transfer	Skill Development	Technology Diffusion	Productivity Increase	Income Increase	Level of Living Improvement
Environment	+3.02	+10.84**	+21.31**	+9.48			
Strategy	+2.90	+ 0.02		+0.09	-8.68*		
Management		+ 9.70**	+15.13*	+1.36			
Staff	+16.21	+10.15*	+ 6.98	+1.03			
Resources		+ 1.39	+ 0.98	+37.21			
Model (pure)	-18.10**	- 0.76	- 4.16	-1.05			
Model (Integrated)	+ 2.90	+ 5.28	- 1.44	+3.39	-10.16		

- (1) Minimize the magnitude of those discrete variables which have been contributing consistently negatively to the attainments of goals as well as performance,
- (2) Optimize the magnitude of those discrete variables which have been influencing positively as well as negatively to the attainments of different goals, and
- (3) Maximize the magnitude of those variables which have been contributing consistently positively.

Rationalizing Organizational Variables

In the initial scanning it was found that 67 organizational variables exhibited associations to the attainments of different goals of the organizations. Regression analysis showed that 54 variables at different levels of interaction had significant power to explain the attainments of different goals as the relationships of the remaining variables were marginal. Among these variables the magnitudes of nine variables need to be minimized as they exhibited consistently negative influences to the attainments of all goals (Table 106). Fourteen variables need to be maximized as they had consistently positive influences to the attainment of different goals. The remaining 31 variables need to be optimized as they either exhibited both positive and negative influences on the attainments of different goals or their performance were non-linear. In order to estimate the appropriate levels of those variables both linear and quadratic functions were presented in Appendix-K.

Table 106: Rationalization of Organizational Variables for Maximizing Performance

Minimization of Dimensions:	Optimization of Dimensions:	Maximizations of Dimensions:
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A. ENVIRONMENTAL VARIABLES

1. Subsistence Pressure	1. Operational Farm Size	1. Productive Capacity of Land
	2. Tenurial Structure (Owner Farming)	2. Irrigation Coverage
	3. Commercial Orientation of Ag. Production	3. Draft Power Availability
	4. Product Market Difficulty	4. Clients Attitude Toward change.
	5. Clients Literacy	
	6. Clients Mass Commn. Exposure	
	7. Client-Patron Relationship	
	8. Clients Political Consciousness	
	9. Socio-Political Influence on Program Administration	

B. STRATEGIC VARIABLES

1. Performance Aspiration	1. Universality in Contact	None
	2. Technology Adoptability	
2. Professionalization	3. Technological Diversity	

C. MANAGEMENT PROCESS VARIABLES

1. Span of Supervision	1. Size of Client per Extension Worker	1. Staff Participation (Program Planning)
2. Staff Salary	2. Formalization	2. Role Conflict

- | | | |
|--|--|---|
| 3. Supervisory Leadership (Relation Orientation) | 3. Managerial Succession | 3. Strategic Authority |
| 4. Level of Educational Activities | 4. Coordination | 4. Incentive |
| | 5. Supervisors Mobility | 5. Client Participation (in Educational Activities) |
| | 6. Horizontal Communication | 6. Quality of Client Participation |
| | 7. Supervisory Leadership (Work Orientation) | |
| | 8. Level of Control | |
| | 9. Level of Punishment | |

D. STAFF VARIABLES

- | | | |
|--|-----------------------------------|--------------------|
| 1. Staffs Parent Occupation (Agricultural) | 1. Staffs Family Income | 1. Staff Education |
| | 2. Staffs Rural Background | |
| | 3. Staff Personal Quality | |
| | 4. Staffs Work Experience | |
| | 5. Inservice Training | |
| | 6. Staffs Professional Commitment | |
| | 7. Level of Motivation | |
| | 8. Anxiety-Stress | |
| | 9. Intra-Organizational Conflict | |

E. RESOURCE VARIABLES

- | | | |
|---------------------|-------------------------------|---|
| 1. Logistic Support | 1. Expenses per Client Family | 1. Clients Input Need Fulfillment |
| | | 2. Organization's Manpower Need Fulfillment |
| | | 3. Contingent Expenses (Working Capital) |
-

The extension organization may reduce subsistence pressure in the client system by promoting the diffusions of technologies of planned family among smaller farmers. They may maximize productive capacity of land, irrigation coverage and draft power availability through organizing long term programs to help clients develop those resources. Extension may play very little or no role in optimizing operational farm size, tenurial structure, clients political consciousness but can help create an appreciation about those problems and requirements. Extension may promote cultivation of more commercial crops and educate clients about marketing technologies to help reduce marketing difficulties. They can utilize clients socio-political influences on program administration positively to achieve goals of extension work. Client-patron relationship may be optimized or removed through staff motivation, in-service training programs and create mass awareness about the terms of services.

As regard strategic variables there is no necessity of high performance aspiration. Professional staff must be realistic in setting targets of achievement. They must optimize direct contact with clients and promote diffusion of appropriate technologies and pursue a package of technologies which is diversified enough to affect both behavioral and economic changes. Instead of minimizing professionalization of the organizations, the organizations need to reorient the inservice training programs to reduce the effect of heterophility and

increase the sense of empathy among professional staff, as professional knowledge is prerequisite for effective extension work.

In order to maximize performance the agricultural extension organizations need to maximize staff participation in program planning, authority to decide upon strategic issues, staff incentive, quantity and quality of clients participation in educational activities. Although role conflict had positive influence on performance it should be carefully handled to turn into a competitive situation, rather than counter balancing each others efforts. Optimization of the number of clients per extension worker, magnitude of formality in management, frequent change of extension managers, level of coordination, supervisors mobility, communication with colleagues, work orientation of supervisory leadership, level of control and staff punishment are expected to maximize the performance of the organizations. Span of supervision should be reduced. Relation orientation of supervisory leadership should be abandoned. Findings suggest to maintain a minimum level of salary of staff with increase of incentive. This would maximize the performance. As regard educational activities it is observed that a low level of activities with high level of client participation would maximize the performance of the organizations.

As regard staff it was observed that staff having agriculture as parents occupation is not a prerequisite for good performance, but a fairly moderate number of staff having rural background with higher education and moderate level of personal

qualities is likely to maximize performance, Organizations may maximize their performance with moderate number of staff having medium level of family income, work experience, professional commitment and motivation. Inservice training, anxiety among staff and intra-organizational conflict need to be optimized for maximizing performance.

The agricultural extension organizations need to minimize logistic support but maximize the use of contingent expenses with particular reference to expense on educational activities (working capital). They must also fulfill their manpower requirements. It would therefore optimize the expense per client family. Maximising the fulfillment of purchased input needs of the clients would also help maximize the performance of the organizations.

The changes of those variables need to be taken as a package of measures which would generate the highest magnitude of positive synergy toward the attainment of the goals of the organizations and hence their performance.

PART E : SUMMARY, BIBLIOGRAPHY AND APPENDICES

CHAPTER XIV: SUMMARY AND CONCLUSION

BIBLIOGRAPHY

APPENDICES : A TO M

XIV. SUMMARY AND CONCLUSION

Introduction

Background

Agriculture, being the largest sector of the Bangladesh economy, provides immense potentiality of growth and development. Exploitation of the growth potential may create scope of reducing unemployment and improvement of poor standard of living, the twin problems of economic development of the country. In the process of agricultural development agricultural extension plays a vital role. Over the years a number of agricultural extension organizations both in public and private sectors have emerged to support a relatively large backward farming community with technological knowledge and skills, and inputs and services. In spite of a continued efforts of about three-fourth of a century success is far too low, though some explanatory progress was made in some isolated instances. Continued efforts have also been made to increase performances of the services through service specialization, change of institutional structures and functions and infusion of resources both human and capital at an increasing rate. In spite of those changes the organizations do not seem upto the expectation of their clients. The seeds of failure is rooted in the very design and operation of the organizations as there is lack of empirical knowledge about the organizational variables and their influences on performance. As a result

organizational design and operation could not be optimally articulated to generate positive synergy for maximizing their performance.

Objectives

This research has therefore been undertaken with the following objective:

1. To postulate a performance evaluation model for agricultural extension organizations and test the model in selected agricultural extension organizations,
2. To design and test the methodology of measuring the organizational variables in the field of agricultural extension services and test their validity for future use,
3. To estimate the magnitude and variability of performance among primary administrative units of different agricultural extension organizations,
4. To examine the inter-relationships among the organizational variables and identify the variables having significant influences on the performance of agricultural extension organizations,
5. To estimate factor contribution of individual discrete variables and aggregative systems and processes at different levels of interactions so as to identify significant contributors of performance of agricultural extension organizations, and

6. To construct a model of management that would maximise the level of performance of agricultural extension organizations.

Theoretical Framework

Concept of Organizational Performance

Management literature irrespective of functional areas postulates two perspectives of conceptualizing organizational performance namely, system and goal perspectives. The former presupposes that organizational performance as the total health of the organization and the latter argues that no organization exists to maintain its own health, rather health of the organization could be perceived as an input for the attainments of its goals. It is in fact a conceptual controversy which could be resolved, as at successive levels of analyses goals and system variables could be used as either dependent or independent variables. For operational convenience the goal model is gaining popularity in recent years. The goal model also faces problems of interchangibility and displacement. Controversies also exists about performance on whose view point the owners, the employees or the customers. In this respect Parsons (1956) view of society as the basis of evaluating organizational performance aiming to meet the needs of the society is more appropriate to agricultural extension organizations.

Available evidences indicated that organizational performance as a collectivity is a complex and interactive phenomenon. A vast number of influences are at work. Some of them are quantifiable, others are not. Some are internal and are subtly interwoven; still others are external. The analysis of organizational performance, either goal or system model therefore needs multivariate model which would provide scope of integrating all possible endow and exogenous variables. There are evidences of using multivariate models of performance analysis across all types of organizations irrespective of their functional areas. Empirical analysis in a total interacting situation are expected to result only a few determinants of performance some of which may be normative or universalistic and others as contingent to the situational context of a particular organization.

Proposed Performance Evaluation Model for Agricultural Extension Organizations

Goal attainment seemed to be an appropriate model of analyzing performance of agricultural extension organizations. The official goals generally expressed as targets are highly variable among organizations and often among their operational units. In order to avoid the problem of goal displacement and interchangibility the attainments of professional goals were chosen as a more stable and universal model of evaluating performance of agricultural extension organizations. The professional goals of agricultural extension organization are:

- a) Attitude Change
- b) Knowledge Transfer
- c) Skill Development
- d) Technology Diffusion
- e) Productivity Increase
- f) Income Increase
- g) Level of Living Improvement

The attainment of these professional goals are expected to be hierarchical and may be termed as component goals.

Further the levels of attainments of these component goals are not unlimited. Each has a potential level which an extension organization could attempt to achieve. The performance of agricultural extension organizations has therefore been defined as the aggregate level of the attainments as a proportion of the potential levels of professional goals. This goal model was represented as AKSTPILL model representing the first letter of each goal (Fig-I).

Proposed Model of Management

Since a large number of endow and exogenous organizational variables are interwoven to determine the level of performance of agricultural extension organizations they were ordered in a logical model of management (Fig. 2). All organizational variables were aggregated as six macro systems and processes, viz environment, strategy, management, staff, resources and performance. A network of those macro systems and processes was proposed for empirical testing (Fig. 2)

Literature showed that there was attempt to explain organizational performance in terms of some selected variables of one or other micro or macro systems and process. Such analyses are partial and inconclusive. Some authors attempted to pull different findings and postulate theoretical model as expected to be in a total interacting situation. Empirical testings of all variables and their systems and processes were not attempted in any functional area of management. The changes of magnitudes and directions of influences as well as contributions at various levels of interactions and attainments of variable goals were not identified or estimated. Research in those areas of organizational performance was found to be highly partial, inadequate and inconclusive in the field of agricultural extension organizations. The attempt was made to fill up those deficiencies in this research.

Methodology

Organizations and their Selected Dimensions

Two organizations namely Department of Agricultural Extension under Ministry of Agricultural and Directorate of Cane Development and Research of Bangladesh Sugar and Food Industries Corporation under the Ministry of Industry were selected as embedding ground of research. On apriori assumptions 100 variables were finally selected including eight performance variables. Those 92 explanatory variables were then aggregated

into 20 micro systems and processes which were farther aggregated as five macro systems and processes namely environment, strategy, management, staff and resources. Some of the variables are multivariate variables and also intangible. Twenty eight such variables were measured by developing Likert scales and their reproducibility, consistency and validity were tested. Two dummy variables namely pure and integrated models of extension work were also included. In all there were eight dependent and 119 independent variables of which 20 were aggregate systems and processes and two dummy variables.

Size and Distribution of Sample

There were three primary source of data namely farmers, service personnel and official records. A random sample of 980 farmers and 482 service personnel were drawn from six hierarchical strata of both organizations of agricultural and sugarcane extension services namely two national head quarters, 5 regions, 10 zones, 32 Upazilas or Subzones, 64 Blocks or Units and 64 Villages. Some of the respondents could not be interviewed or did not return the questionnaires due to death, transfer or migration or refusal for interview. A number of responses were rejected due to inaccurate or incomplete recording or inconsistent responses. Finally 1324 responses were taken into account for analysis. Data of some of the variables were collected from official records of relevant strata.

Collection, Tabulation, Filling and Analysis of Data

Questionnaires for different groups of respondents were pretested. The farmers were interviewed by appointed interviewers and the responses were recorded on the questionnaires. The service personnel filled the questionnaires. Supplemental data was collected from official records through prepared schedules. The filled questionnaires were edited and inconsistent and inaccurately recorded responses were excluded. Finally all valid data were tabulated, punched on diskettes, debugged and transferred to tapes for analytical purpose. SPSS program was used for computer analysis.

Analysis of variance and Chi square techniques were used to test variability of quantitative and qualitative variables respectively. Pearsons correlation was used to test associations. The data from three sources were aggregated or desegregated at the level of primary administrative units, the Upazila and Subzones, and a 32x100 matrix was derived to run step-wise regression analysis for identification of determinants of performance as well as goal attainments and estimate their marginal contributions at different levels of interactions. The discrete variables were aggregated by transforming them into standard scores and indexes were developed for different systems and processes. Step-wise regression was also run for identifying system and process determinants and estimate their marginal contributions. Based on analytical results 5 major, 20 minor and 92 supporting hypotheses were tested.

In order to establish net-work of relationships among macro systems and processes, paths of influences were established through using regression analysis. Explanatory power of alternate paths were tested through multiple regression and finally critical path was identified for maximizing performance of agricultural extension organizations.

Major Findings

Performance: Magnitude and Variability

The cumulative magnitude of performance as measured in terms of the attainments of professional goals of extension work was estimated as 38.79% of the potential level. The attainment of different professional goals of extension work had wide variations. The attainments of attitude change, knowledge transfer, skill development, technology diffusion, productivity and income increases and level of living improvement as percent of potential level were 83.51%, 30.15%, 33.67%, 42.29%, 19.22%, 20.99% and 6.86% respectively. The technologies being currently advocated had been introduced on an average of 17.27 years ago. Judging from this standpoint, the extension organizations could attain their professional goals of attitude change, knowledge transfer, skill development, technology diffusion, productivity increase, income increase and level of living improvement at the rate of 4.83%, 1.75%, 1.95%, 2.45%, 1.11%, 1.22%, 0.40% respectively.

The performance as well as attainments of component goals had significant variations among the primary administrative units of the selected organizations. Among the primary administrative units of agriculture Bogra Sadar Upazila was the best performer and Jhenaidah sadar Upazilla was the least performer, while among Subzones Millgate-A of Zeal Bangla Sugar Mills was the best performer and Baliadangi Subzone of Thakurgaon Sugar Mills was the least performer. The findings revealed that there is immense scope of increasing aggregate performance level as well as reduce differences in performance among the units giving attention to poorer performers.

Empirical Test of AKSTPILL Model

The relations among the attainments of behavioral goals seemed to be hierarchical and unidirectional. So also the attainment of the economic goals. The relationships between behavioral and economic goal attainments were not significant. Lack of significant relation between the attainment of behavioral and economic goals implied poor economic orientation of extension programs having disproportionate importance and priority to behavioral goals. There is therefore a need to rationalize the importance and priority to attainments of different component goals which would maximize the performance of the organizations.

The magnitude and direction of interrelationship among goal attainments visibly proved that

"In a balanced and well planned agricultural extension program the attainments of goals are not independent but hierarchical and unidirectional".

The proposed AKSTPILL Model of evaluation of performance of agricultural extension organizations seemed to be universally applicable.

Performance Determinants

As a single factor only 18 organizational variables had significant explanatory power to performance of agricultural extension organizations. Among the significant environmental variables productive capacity of land, product market difficulty, clients literacy and clients mass communication exposure, client-patron relationship among farmers and extension workers, and inter-organizational conflict were significantly and positively contributing to performance. The contributions of product market difficulty was negative and that of inter organizational conflict was positive but both were quadratic.

Among strategies universality in contact, technology adaptability and professionalization of the organizations had significant contributions to performance. Contribution of universality of contact was positive but quadratic. The estimate showed that for better performance the direct contact with clients should not be less than 40%. The contribution of professionalization of the organization was negative because of increased heterophily with lack of empathy.

Management process variables like size of clients per extension worker, incentive provided to staff, magnitude and quality of client participation in educational activities like meeting, demonstrations, etc. were contributing significantly to performance. The contribution of size of clients per extension agent was negative. Estimates showed that for each increase of 235 client families the organizations were losing one percent of their performance.

Among staff quality and behavior only staffs professional commitment and anxiety-stress were contributing significantly and positively. Among resource variables man power need fulfillment of the organizations and their total and contingent expenses were contributing significantly and positively.

When those variables interact with other variables of same micro systems or process some of their influences were absorbed and their factor contributions becomes insignificant except in case of technology adoptability, professionalization of the organizations, quality of client participation in educational activities, staffs professional commitment and anxiety. These variables remained dominant in determining level of performance at all levels of interactions.

At macro level of interaction influence of some new variables became significant. Draft power availability when interacted with other environmental variables contributed

significantly to performance. Similarly clients having political consciousness and participation became dominant determinants of performance in interacting with other socio economic variables of environment. Variables like staffs salary level, supervisors mobility, relation oriented supervisory leadership when interacted with other management variables became significantly negative to performance of the organizations. It seemed that in a macro level of interaction the higher salaried in other words more experienced staff were not properly utilized or perhaps were engaged in conflict thereby contributing negatively to performance. The supervisor's mobility was also not goal directed or their activities were so much of narrow focused that their overall contribution to performance became negative. Similarly supervisory leadership having relation orientation was contributing negatively.

When the variables of staff back ground quality and behavior interacted agricultural and rural back ground of staff made significant positive contribution to performance. Staff age, education and personality contributed significantly negatively. It seemed that capable, qualified and experienced staff could not be utilized positively rather their effort was directed negatively to impede performance of the organizations. At this level of interaction intra-organizational conflict as a behavioral variable was contributing significantly negatively. The factor contributing behavior of resource variables did not change in interaction.

In a total interacting situation only 19 variables had significant marginal contributions to performance of the organizations. Among them productive capacity of land, irrigation coverage, draft power availability, client literacy, extension model integration, strategic authority, formalization, clients participation in educational activities, staffs family income and rural background, professional commitment, and fulfillment of manpower needs of the organizations cumulatively contributed 45.94% to performance positively and size of clients per extension agent, staffs' salary level, managerial succession, coordination, supervisors mobility and logistic support were contributing 16.33% negatively.

In a total interacting situation influence and contribution of irrigation coverage, integration of extension models, strategic authority, formalization, managerial succession coordination and staffs family income became significant.

The influences and factor contributions to the attainments of different goals were not similar both at macro systems and process or at total interacting situation. In a total interacting situation 21 organizational variables contributed 99.60% to attainment of the goal of changing clients attitude with staffs incentive, clients participations in educational activities and clients attitude toward social changes as principal contributors and size of clients per extension worker as principal impedor. Twenty-seven organizational variables

contributed 99.80% of the attainment of the goal of transferring technological knowledge with quality of clients participation in educational activities as principal contributors and professionalization as principal impedor. The negative contribution of professionalization is assumed to be due to heterophily between professionally qualified staff and their clients in association with lack of empathy. The attainment of 99.80% of skill development was contributed by 24 organizational variables with technology adoptability and clients participation in educational activities as principal contributors. Hundred percent of the attainment of diffusion of technologies was contributed by 27 variables with clients participation in educational activities and formalization in management as principal contributors and size of clients per extension workers as principal impedor. Twenty-five variables explained 99.80% attainment of the goal of increasing clients productivity with manpower need fulfillment and intra-organizational conflict as principal contributors and technological diversity as principal impedor. Sixteen variables explained 99.40% attainment of the goal of increasing clients income. Staff participation in programming and expense per client family were principal contributors. Operational farm size and intra-organizational conflict were the major impeders. Twelve variables explained 89.87% variability in the attainment of improving clients level of living in which irrigation coverage was the principal contributor and subsistence pressure was the principal impedor.

The organizational variables were aggregated to ascertain the effectiveness of systems and processes. It was observed that out of 20 micro systems and processes only 6 were effective and were contributing significantly and positively. These were clients economic and socio-psychological environment and organizational environment in which extension organizations were operating, management strategy, educational process, staff quality, and availability and use of institutional resources. Among them the aggregate effect of organizational environment was positive and that of management strategy was negative but quadratic. It seemed that except in case of management strategies the discrete variables of those micro systems were to some extent mutually reinforcing. While other micro systems and processes were not significantly effective in increasing performance of extension organizations because of pull of contradictory influences.

Model of Maximizing Performance

The discrete variables were farther aggregated at macro level to test the theoretical model of management (Fig-3). Based on the regression analysis the direction of influence among macro systems and processes were finally worked out. The aggregate effect of environment and staff remained significant, while influence of strategies became negative but quadratic. On the other hand contribution of management on aggregation was not

significant. It was obvious that the variables of strategies and management were mutually more inconsistent than that of others. Unless those inconsistencies are removed the prospect of maximizing performance is bleak. In this endeavor some of the variables will have to be maximized, some minimized, still others will have to be optimized. Among the environmental variables the magnitude of productive capacity of land, irrigation coverage, clients literacy will have to be maximized through special extension and supporting programs. Integration of extension models need to be maximized. Among the management variables strategic authority, formalization, client participation in educational activities need to be maximized and size of clients per extension agent, managerial succession, coordination, supervisors mobility and relation orientation of supervisory leaderships should be optimized to reduce their negative influences. Intensity of higher educated staff has to be maximized for better performance. In case of resources expense on contingent activities and fulfillment of manpower needs should be maximized keeping logistic support at lower level. Most critical path was extension model-resource-management-staff-performance (Fig. 3). Improvement in this path would result maximum level of benefit in maximizing the performance of the organizations.

Conclusions

Based on the findings the following conclusion are made:

1. Agricultural extension organizations of Bangladesh were performing about two-fifth of their potential level of performance. The level of performance had significant variations among the organizations and their primary administrative units, the Upazilas and Subzones.
2. The attainments of different professional goals were not uniform. Behavioral goals such as attitude change, knowledge transfer, skill development and technology diffusion were attained more than economic goals such as productivity and income increase and level of living improvement. Attainment of different goals also had significant variation among organizations and their primary administrative units.
3. Except in few cases there was wide variations in the magnitude and intensity of organizational variables.
4. Some of the organizational variables showed positive and others had negative contributions to performance as well as attainments of different professional goals. Because of these inconsistencies the influences of some of the variables are absorbed by others.

5. Factor contributions of organizational variables to performance as well as goal attainments substantially changes at different levels of interactions.
6. In a total interacting situation 57 variables had significant contributions to either performance or attainment of one or more goals of extension work.
7. Except a few most organizational variables had linear contributions to performance as well as attainment of goals.
8. Aggregate influence of systems and process also had variable contributions to performance as well as attainments of goals of the organizations.
9. Environment and staff were making significant and direct contributions to performance as well as goal attainments. But aggregate contributions of strategy and management were not significant due to mutually inconsistent influences of discrete variables to the performance as well as the goal attainments.
10. The organizations has failed to generate synergy as the organizational variables were not mutually and positively reinforcing their influences on performance or goals attainments.

11. Organizations could maximize their influence by maximizing positive variables, minimizing the negative variables and optimizing the those variables having variable influences on goal attainments, non-linear influence and at different level of interactions.
12. Largest improvement could be made in the path of model integration - resource allocation and use - management processes and staff background, quality and behavior.

Recommendations

The Following recommendations are formulated tentatively:

1. The extension organizations should pursue attainment of all professional goals concurrently as they are mutually inter-related. This could be done by reorientation of extension programs to improve economic conditions of their clients.
2. The performance differential between organizations and their operational units should be reduced by giving more attention to poor performing operational units.
3. Develop special extension programs for the improvement of productive capacity of land, irrigation coverage, draft power improvement, clients literacy and their mass communication exposure.

4. Increase effectiveness of strategies and management processes by rationalizing the magnitudes and variation of discrete variables relating to those two system and processes giving attention to utilization of qualified and experienced staff.
5. Rationalize allocation and use of resources by orienting it to performance and attainments of goal of extension work.
6. Integrate different models of extension work to generate greater synergy in attaining different goals of extension work.

Suggested Researchable Areas

Based on the experiences of this study the following new researchable areas are identified.

1. To investigate into the cause of negative contributions of qualified and experienced professional staff.
2. Analysis of educational role of contact or supervised clients who were supposed to educate others.
3. Intensity and quality of participation of clients in decision making regarding the design and operation of extension programs to meet their needs adequately.

4. Efficiency of supportive services and its effect on the effectiveness of extension organizations
5. Factors influencing the choice of strategic and management variables which were influencing the performance of the organizations negatively.
6. Performance orientation of resource allocation and use at different hierarchical levels.
7. Horizontal and vertical communication behavior within and in between extension organizations.

Limitations

Following limitations of this study and interpretation of its finding were observed.

1. The findings of this study including testing of hypotheses may be interpreted in the prevailing socio-cultural context of Bangladesh.
2. As the study had three different data bases which were integrated into a single analytical model some discrepancies may be observed.
3. The implications or relevance of conclusions of this study may be cautiously drawn in respect of other organizations.

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Appendix A

COMPARATIVE POSITIONS OF AGRICULTURAL EXTENSION ORGANIZATIONS OF BANGLADESH

No.	Name of Organizations	Life (Ext & Mgt)	Area (Sq. Miles)	Operational (Sq. Miles)	Percent of Bangladesh (1975)	Employed	Manpower	Works	Extension Ratio	Supervisor Ratio	Expenditure (1980-81)	Total Expenditure (1980-81)	
1.	Directorate of Agri. (Ext & Mgt)	67	51090	98.27	13206	40.52	9603	58.91	21	11	4	1016.34	25.68
2.	Directorate of Agri. (Cute Prodn)	8	1563	3.00	5311	16.29	2500	15.34	5	25	20	1036.59	25.53
3.	Tobacco Dev. Board	8	8	0.15	319	0.98	210	1.29	21	3	2	31.81	0.78
4.	Cotton Dev. Board	5	34	0.07	907	2.48	202	1.24	5	6	2	187.25	4.62
5.	Agri. Dev. Estates, BADC	14	442	0.85	346	1.06	62	0.38	5	3	4	186.21	4.59
6.	Directorate of Cane Dev. & Res.	5	177	0.34	2128	6.53	1614	9.90	12	4	1	300.51	7.41
7.	Directorate of Land Water Use	19	781	1.50	855	2.63	433	2.66	9	6	2	115.02	2.84
8.	Rangpur-Dinajpur Rabb. Service	9	2453	4.72	450	1.38	168	1.03	7	6	1	6.02	0.15
9.	Integrated Rural Dev. Program	10	38704	74.47	1782	5.47	350	2.15	-	19	19	602.70	14.87
10.	Directorate of Plant Protection	25	46338	89.54	2651	8.13	428	2.63	-	20	5	45.72	1.13
11.	Directorate of Livestock	65	29073	55.94	1883	5.78	370	2.27	-	18	5	121.17	3.00
12.	Hort. Dev. Board	8	934	18.07	1112	3.41	61	0.37	-	8	1	98.51	2.44
13.	Fisheries Ext. Service	21	6879	12.85	296	0.91	85	0.52	-	4	4	33.03	0.81
14.	Forest Ext. Circle	5	9394	18.07	477	1.47	61	0.37	-	4	4	17.47	0.43
15.	Bang. Sericulture Board	4	9743	18.75	608	1.87	124	0.76	-	-	-	150.71	3.72
16.	Bang. Tea Board	4	166	0.32	78	0.24	4	0.05	-	2	2	19.74	0.49
17.	Agri. Information Service	20	51090	98.29	260	0.80	11	0.07	-	-	11	70.00	1.72
18.	Nesonite Central Committee	11	1548	2.98	24	0.07	16	0.10	-	4	4	13.81	0.34

Note 1. Source: Hassainullah, M., 1983. Agricultural Extension Organizations of Bangladesh
A System View, Research Report, Dhaka IBA

2. These Organizations Were Merged With Directorate of Agricultural (Ext. & Mgt.) as
Department of Agricultural Extension in 1983.

IN INTRODUCTION OF ORGANIZATIONS UNDER STUDY

Agricultural and Sugar~~age~~ Extension Organizations were included in this study. A brief introduction to both organizations as regards their background, structure, clientele, approaches to work and technological bases has been presented in this appendix.

(1) Department of Agricultural Extension

Back-ground

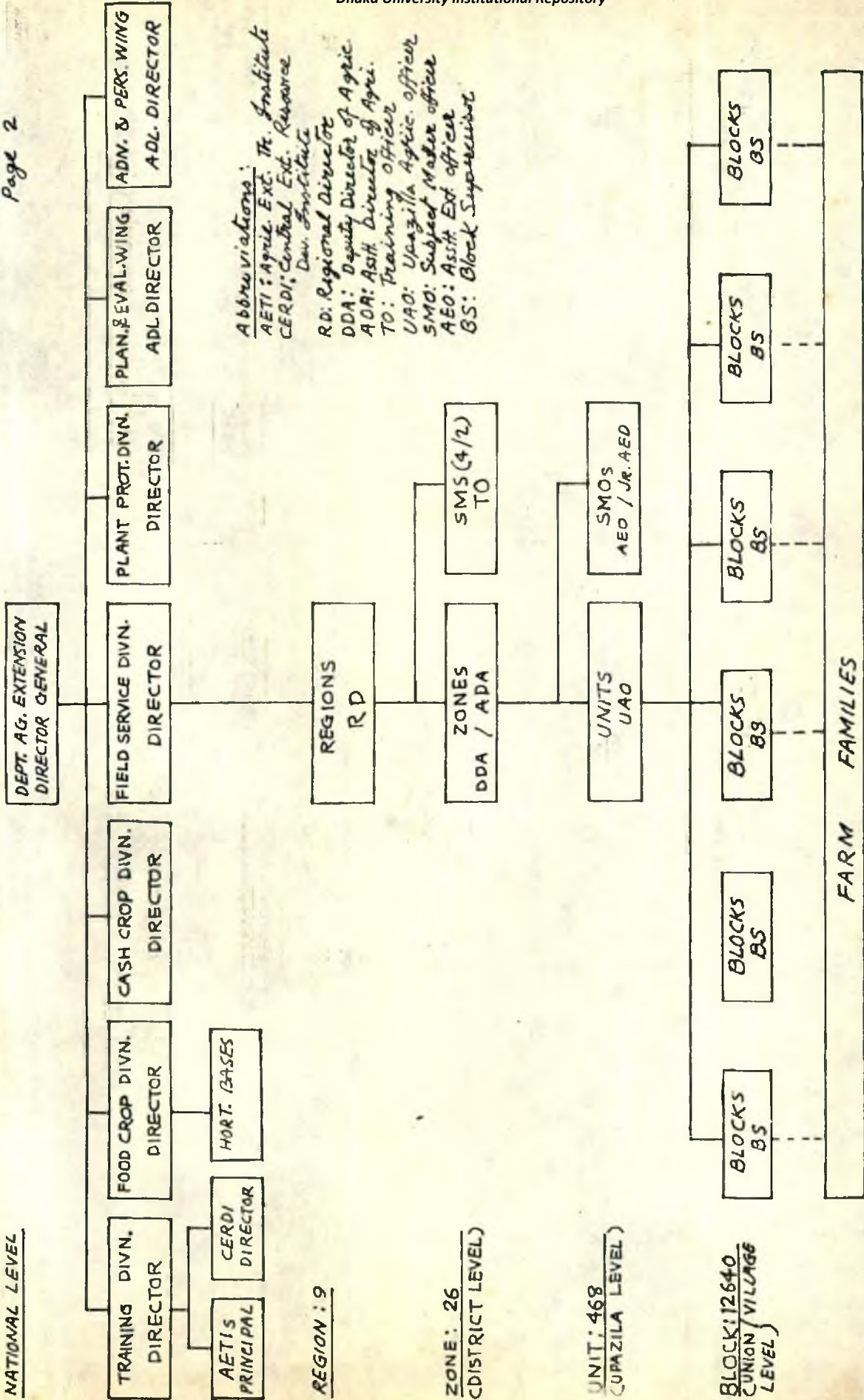
The Department of Agricultural Extension is the oldest extension organization of Bangladesh. It began at the beginning of this century as a part of the agricultural research systems and separated out as independent Directorate of Agriculture (Extension and Management) in 1970. Finally it emerged as a fullfledged independent Department in 1982 by integrating several directorates and Boards relating to different crop development programs.

Organization Structure

The organization was structured at 5 hierarchial levels, namely Block, Unit, Zone, Region and national levels (Chart-1). A Block consists of about 900 farm families and is intrusted to a Block Supervisor. A Unit is parallel to an Upazilla having about 27 Blocks on an average and is entrusted to an Upazilla Agricultural Officer under the supervision of a Deputy Director

ORGANIZATION CHART OF DEPARTMENT OF AGRICULTURE EXTENSION

Appendix-B
Chart-1
Page 2



Abbreviations:
 AETI: Agric. Ext. Tr. Institute
 CERDI: Central Ext. Resource Dev. Institute
 RD: Regional Director
 DDA: Deputy Director of Agric.
 ADA: Asst. Director of Agric.
 TO: Training officer
 UAO: Upazilla Agric. officer
 SMO: Subject Matter officer
 AEO: Asst. Ext. officer
 BS: Block Supervisor

NATIONAL LEVEL

REGION : 9

ZONE : 26
(DISTRICT LEVEL)

UNIT : 468
(UPAZILA LEVEL)

BLOCK : 12640
(UNION / VILLAGE LEVEL)

or Assistant Director of Agricultural Extension at the Zone level which is parallel to a District. The program is supervised from regional level by a Regional Director of Agricultural and there were 9 regions in the country. At the national level the Head Quarter is located at Dhaka and is organized into 5 divisions and two supporting wings. The structure of organization has been frequently changed due to change in approach and philosophy as an effort to increase the effectiveness of extension work.

Clientele

The clientele of the organization is the entire farming population of the country estimated to be about 7 million farm families. Subject to the constraints of contact and program priority primary concern remained with the head of the farm families having direct contact with the Contact Farmers. Non-farming population or even small and marginal farmers, or farming womenfolk are seldom brought under clientele system of the organization.

Approach

At the beginning the organization adopted the extension education approach using multiple educational methods. With the increasing involvement of input and credit function it switched over to Service Delivery Approach as a result the burden of input distribution increased many fold during fifties. In sixties when

input and credit function was taken over by Bangladesh Agricultural Development Corporation and Krishi Bank and subsequently commercial banks, the approach shifted to merely Advisory Service at individual level. The approach again shifted to Training and Visit model; first on a project level in 1976 and eventually on a national scale when the survey was undertaken.

Technological Base

The organization was supposed to educate the farming population on all new and improved technologies affecting all aspects of life and profession of farming population. But due to national priority primary concern remained with technologies relating to food production, more specifically grain production. Seed-fertilizer-irrigation based crop production technologies were the prime focus. However the field extension personnel, having direct contact endeavour to extend their advices in any aspect they would feel on the clients need or asked for. Local variation was wide depending on the back-ground, knowledge, interest and commitment of the individual extension workers and the interest and demand of the farmers.

(2) Directorate of Cane Development and Research

Back-ground

In late thirties two private sugar factories were established in **this** part of the subcontinent. After the

independence of the subcontinent the then government of Pakistan established an Industrial Development Corporation which began to establish new sugar factories in places where sugarcane had been growing abandonedly for making gur, a country made sweetener. Later in sixties private factories were also nationalized and the management of all sugar factories left to the then East Pakistan Industrial Development Corporation. After independence of Bangladesh the sugar industries were separated and their management was left to a newly formed Sugar Mills Corporation which was again reconstituted as Bangladesh Sugar and Food Industries Corporation in 1976 by integrating Food and Allied Industries Corporation. Uptill now the Corporation had 16 sugar factories, both established and nationalized. With the increased number of sugar factories and intensification of crop development programs supply of cane to the factory became short in late sixties when the need for cane development was felt strongly. When the Bangladesh sugar mills corporation was established, a new Directorate of Cane Development and Research was created to support the cane growers with extension service. Since then the Directorate established a sugarcane extension service under the local control of the mills management with a number of branches to deal with cane production and procurement programs. It was an integrated program of extension, inputs, credit and marketing of sugarcane.

Organizational Structure

The structure of the organization is based on Cane Development Units at the grass root level. A unit is constituted with an area having 300 acres of potential cane land with 100 acre actual cane plantation in an expected 3 years crop rotation and was entrusted to a grass root extension worker designated as Cane Development Assistant. Fifteen such unit constitute a sub-zone and the number of sub-zones varied according to size of a mill zone (Chart-2). A mill-zone is an area as identified by the mill management to be sufficient to ensure required volume of cane for capacity sugar production at expected level of cane yield per acre and rate of recovery. At the Mills level program is entrusted to an Agricultural Manager or Senior Deputy Chief Cane Development Officer under the control of the the General Manager of a Mill. Several branches are organized to look after various aspects of cane development and marketing programs including extension work namely, agronomy (field trial), extension, input and credit, cane procurement, seed inspection and mechanized cultivation with officers of different status and designation. At the corporation level the role of the Directorate of Cane Development and Research is to organize programs, mobilize resources and supervise and guide mills management for effective implementation of the programs. The Head Office is organized with three divisions and three departments headed by Chief and Additional Chiefs respectively.

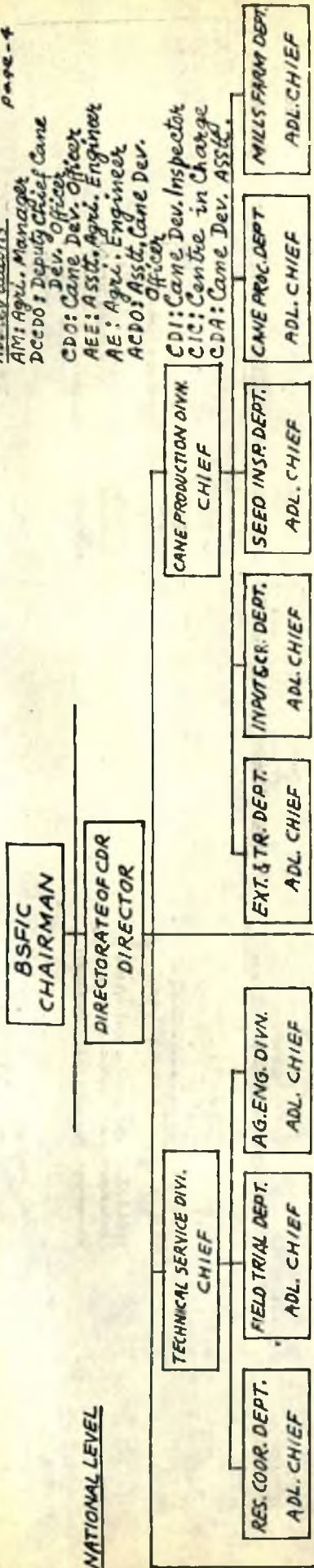
ORGANIZATION CHART OF DIRECTORATE CANE DEVELOPMENT AND RESEARCH, BSFIC

Appendix-B
Chart-2
Page-4

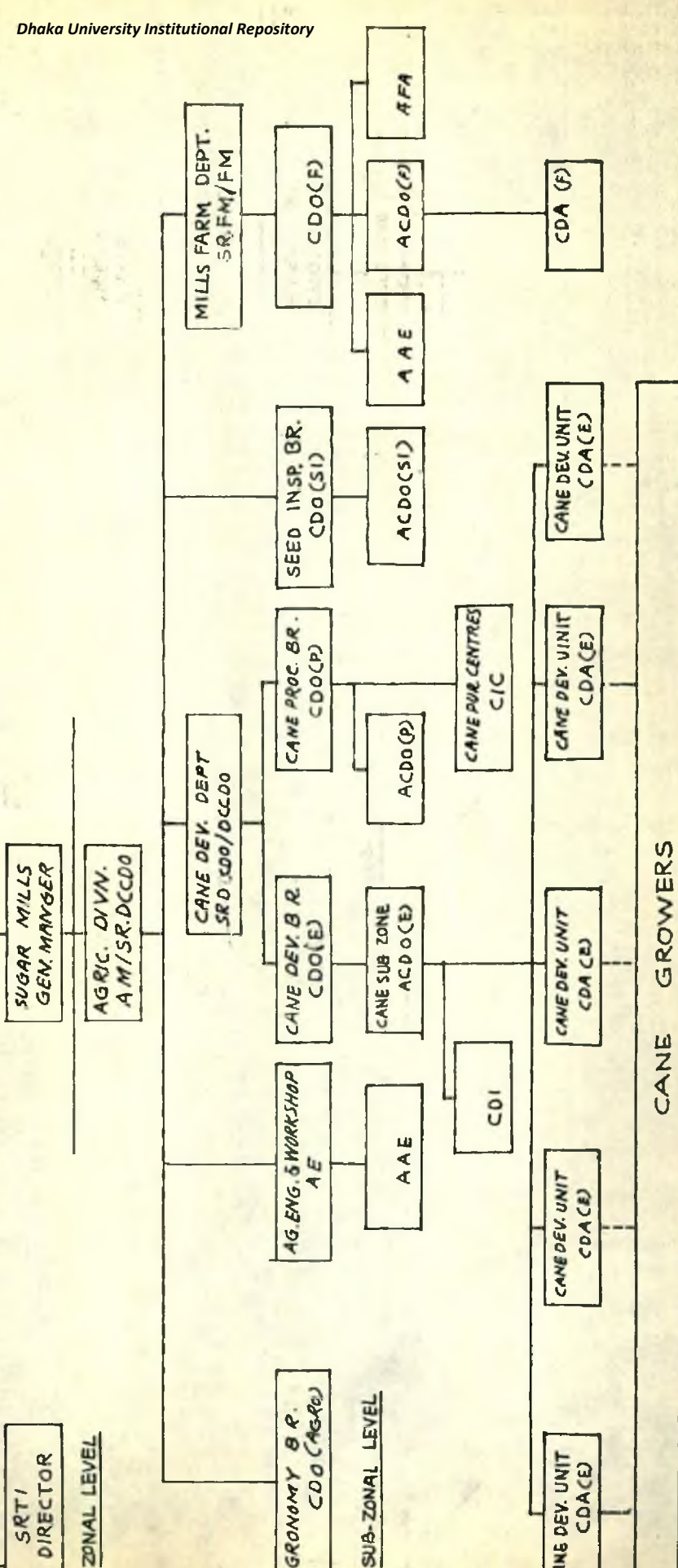
Abbreviations

- AM: Agrl. Manager
- Dcdo: Deputy Chief Cane Dev. Officer
- CDO: Cane Dev. Officer
- AE: Asst. Agrl. Engineer
- AE: Agrl. Engineer
- ACDO: Asst. Cane Dev. Officer
- CDI: Cane Dev. Inspector
- CIC: Centre in Charge
- CDA: Cane Dev. Asst.

NATIONAL LEVEL



ZONAL LEVEL



CANE GROWERS

There were two regional offices for close supervision but were abolished recently. The Director is also assisted by a group of Subject Matter Specialists.

Clientele

The organization has a clientele of about 400 thousands farm families in all mill-zones with a direct contact with about half of them as supervised cane growers who are also supported with inputs and credit. Primary concern is with the heads of the cane growing families. The marginal and small cane growers, agricultural labourers or the womenfolks of cane growing families are rarely contacted.

Approach

Since the beginning of extension work the approach was service delivery in which extension education model was imputed to diversify the educational activities from mere advice along with supply of inputs. But due to multiple functions the grass root extension workers could hardly allocate enough time to extension activities. Separation of extension function from support service function had been experimentally introduced in 3 sugar mills recently with modified training and visit approach.

Technological Base

The technological base was comparatively narrow which included new commercial cane varieties, their planting, protection and husbandry methods. With the introduction of intercropping

husbandry techniques of a host of winter crops had also been included in the technological package. The grass root extension workers of course had to advise cane growers on a wide range of technologies voluntarily or if asked for depending on individual back-ground, knowledge, initiative and commitment to the welfare of the cane growers.

TECHNICAL SPECIFICATIONS OF THE TECHNOLOGICAL PACKAGES

A. Transplanted Aman Paddy Cultivation

1. Recommended Varieties:

IRRI: BR3, BR4, BR5, BR10 (Pragati), **BR 11 (Mukti)** IR5,
IR20

Local: Early: DA31, Rajashail, Kartiksail, Agurpak.

Medium: Latisail, Patuai-23, Paijam

Late: Da-29, Naigersail, Tilak Kachari, Badsha
Vogue, Lal Vogue.

2. Ideal Seed Bed:

Length: 33 ft

Breadth: 4 ft.

Height: 6 inch

Drain: 1 1/2 ft in between beds

4 beds per 0.05 Acre of land

Mannurial dose (1) 203 maund Compost/Cowdung
for 4 beds:

(2) 1/2 Srs. TSP

(3) 1/4 Srs. MP

(4) if become yellow apply 1/4 Srs. Urea

3. Optimum Spacing (Under Optimum Condition):

IRRI : Line to line : 8-19 Inches
Plant to Plant 6-8 "

Local : Line to line : 6-8 "
Plant to Plant 4-6 "

4. Optimum Seedling Age:

IRRI : 3-4 weeks

Local : 4-5 weeks

5. Balanced Manuring per acre:

Fertilizers	IRRI	Local
Urea	2 md. 5 srs.	1 md
TSP	1 " 20 "	1 "
M.P.	33 "	22 srs.

If DAP is used in Place of ISP

Urea	1 md. 20 srs.	25 srs.
DAP	1 " 20 srs.	1 md.
M.P.	33 "	22 srs.

6. Split Fertilization of Urea Per Acre:

Application	IRRI	Local	Methods
Frst(Basic)	25 srs.	12 Srs.	Broadcast before last ploughing
1st split	30 "	14 "	15-20 day after transplantation
Second split	30 "	14 "	15-20 days after 1st split

In case of DAP no urea at Basal dose.

7. Trace Element Application:

Zinc Sulphat @ 5-10 seers/acre at pudling or top dressing or at sight of deficiency symptom

Jipsum @ 1-1.5 monds/acre at the time of final pudling or Amorium Sulphat @ 1-0 md/acre as top dressing.

8. Pest Control:

Nogos - Vepona @ 1/2 lb

Savin 85 Sp @ 1.5 lbs.
or Nogos @ 1/4 lb

Malathion 57 EC(MLT) @ 12 Ouz.

Or Saving 85 @1.5 lb.

Malathion 50 EC @120.0

Basudin 10 G 3 times
@ 12.5 lb. 15.0 lb. and 17.5 lbs.

Carbieron/Biadrin 3 times
@ 10 Oz. 11 Oz. 12 Oz.

9. Harvesting : Immediately after ripening

B. Sugarcane Production:1. Recommended Varieties

Viz: CO-1158, C175, I-1/53, I-2/54, I-9/57

Characteristics: (1) Relatively hard (2) Non-flowering except Co-1158, (3) early or timely maturing (4) relatively higher sugar.

2. Early Plantation: Mid-October to Mid-December3. Trench Method of Planting:

Specification of a Trench: Breadth 12" and depth 8-9", 3 feet apart

4. Seed Treatment: Chemicals per acre

(a) Areton-6 @ 4 Oz. per 10 gallon of water

(b) Agalol @ 8oz. per 10 gallon of water, complete dipping of setts

5. Soil Treatment:

(a) Heptachlor 4 lbs.

(b) Dieldrin

To be applied or sprayed at the bottom of Trench before planting.

6. Balanced Fertilization:

TSM:	Urea	3	mds.	per	acre
	TSP	3	"	"	"
	MP	3	"	"	"
RJSM:	Urea	3	"	"	"
	TSP	3	"	"	"
	MP	2	"	"	"
KSM	Urea	3	"	"	"
	TSP	3	"	"	"
	MP	2	"	"	"
ZBSM	Urea	3	"	"	"
	TSP	2	"	"	"
	MP	2	"	"	"

50% Urea and all others to be applied at trench prior to planting.

7. Top dressing of Urea

50% of Urea inside the trench or in side furrows at a depth of 4" covered with soil.

8. Destruction of Diseased Plants:

Major diseases: Smut, Red Rot, Stunting Mosaic, with planting disease free plants.

Central Measures: Set treatment (Chemical & Hot Water) and destruction of diseased plants.

9. Mechanical Pest Control:

Major Pests: Root Borer, Shoot Borer, Pyrilla, Thrips
Wolly Aphis, White Grubs, Termites.

Mechanical Control:-

- a) Eggs mass destruction.
- b) Destruction of inflected plants with larvae
- c) Catching and killing of adult moths by hand and light trap.

No. Writing	3	4
4. Particulars of crop production and use during 1983	5. Particulars of production and use of animal and other products during 1983	6. Particulars of production and use of animal and other products during 1983
Season and Area of Cultivation (acres)	Area/No. of plantation (Acres/No.)	Area/No. of plantation (Acres/No.)
Cultivation (acres)	Production (Mds/No.)	Production (Mds/No.)
Total (acres)	Total (Mds/No.)	Total (Mds/No.)
Price (Tk.)	Price/Unit (Tk.)	Price/Unit (Tk.)
Total value (Tk.)	Total value (Tk.)	Total value (Tk.)
Consumption (Mds/No.)	Consumption (Mds/No.)	Consumption (Mds/No.)
Total (Mds/No.)	Total (Mds/No.)	Total (Mds/No.)
Others (Mds/No.)	Others (Mds/No.)	Others (Mds/No.)
Total (Mds/No.)	Total (Mds/No.)	Total (Mds/No.)
Others (Mds/No.)	Others (Mds/No.)	Others (Mds/No.)
Total (Mds/No.)	Total (Mds/No.)	Total (Mds/No.)
Others (Mds/No.)	Others (Mds/No.)	Others (Mds/No.)
Total (Mds/No.)	Total (Mds/No.)	Total (Mds/No.)
Others (Mds/No.)	Others (Mds/No.)	Others (Mds/No.)
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Total (Mds/No.)	Total (Mds/No.)	Total (Mds/No.)
Others (Mds/No.)	Others (Mds/No.)	Others (Mds/No.)
Total (Mds/No.)	Total (Mds/No.)	Total (Mds/No.)

No. writing	7. Income from non-farm sources during 1983	5f	No writing	10. Did you require to borrow money during 1983?	6
Column Code	Source Business Service College Industries Sew labour Others (Name)	Amount/year (Tk.)	Column Code	Yes _____ No _____	
				If answer is yes, what was the total amount of credit you needed? Amount (Tk.): _____	
				How much total loan you could obtain from different sources:	
				Source	Amount (Tk.)
				Total (Tk.):	
	8. Particulars of recurring expenditures during 1983			11. Are you a regular listener, reader or viewer of radio, newspaper or television (either of own or others)?	Yes _____ No _____
	Family Expenses	Amount (Tk.)		12. Are you regular member of a club, association society, committee or council?	Yes _____ No _____
	Cultivation	Amount (Tk.)		Are/were you President/Secretary of such organization?	Yes _____ No _____
	Expenses	Amount (Tk.)		13. Are you a registered member of any political party?	Yes _____ No _____
	Seeds	Amount (Tk.)		Are you a voter?	Yes _____ No _____
	Fertilizers	Amount (Tk.)		Could you cast your vote during the last presidential election (Justice Sector)?	Yes _____ No _____
	Fuels	Amount (Tk.)		14. Are you member of any cooperative society?	Yes _____ No _____
	Farm labourers	Amount (Tk.)		15. Are you personally acquainted with Block Supervisor or ODA of your area?	Yes _____ No _____
	Acquiring of equipments	Amount (Tk.)		If yes what is his name?	_____
	Cattle treatment	Amount (Tk.)			
	Agriculture tax	Amount (Tk.)			
	Cattle feed	Amount (Tk.)			
	Land lease in	Amount (Tk.)			
	Release of leased land	Amount (Tk.)			
	Repayment of agric. credit	Amount (Tk.)			
	Block with work	Amount (Tk.)			
	Land litigation	Amount (Tk.)			
	Marketing	Amount (Tk.)			
	Others (name)	Amount (Tk.)			
	9. Long term investments during 1983	Amount (Tk.)			
	Area of Investment	Amount (Tk.)			
	Farm Equipments	Amount (Tk.)			
	Land purchase	Amount (Tk.)			
	Cattle purchase	Amount (Tk.)			
	Land development	Amount (Tk.)			
	Others (Name)	Amount (Tk.)			

Annex 9

No Writing Column Code	7	No Writing Column Code	8
	<p>16. (Educational Activities) (a) How many times did the BS/CDA visited your farm/cane fields during 1983? On an average how much time did he spend with you during a visit? Number _____ Mrs./Min _____</p>		<p>f) To educate farmers/cane growers the Block Supervisor TMO/SNO or CDA/Cse Development officer often organize educational tours for them. How many times did you participate in such tours during 1983? Number _____ On an average how much time could you spend on such a tour? Hours _____</p>
	<p>(b) During 1983 how many times could you yourself meet BS/CDA in his office or residence for taking technical advice? Number _____ On an average how much time could you get to discuss for each call? Mrs./Min _____</p>		<p>g) Often seminar/workshop for one or more days are organized by BS/TMO/SNO or CDA/ACSO/CDO. How many such seminars/workshops could you attend during 1983? Number _____ On an average how much time could you spend for a seminars/workshop? Hours _____</p>
	<p>(c) Sometimes BS/CDA arrange group/small meetings to discuss about use of new methods of cultivation. During 1983 how many such meetings could you attend? Number _____ On an average how much time could you spend in such a meeting? Mrs./Min _____</p>		<p>h) The BS/TMO/SNO or CDA/ACSO/CDO organize chashi bally/ Field Days spend a full day through meeting/demonstrations and discussions in one place. How many Field Days could you attend during 1983? Number _____ On an average how much time could you spend in such a field day? Hours _____</p>
	<p>(d) Sometimes BS/TMO/SNO or CDA/ACSO/CDO show how to supply a new technique in a meeting hold in the field. How many such meetings could you attend during 1983? Number _____ On an average how much time could you spend in such a meeting. Mrs./Min _____</p>		<p>i) The BS/TMO/SNO or CDA/ACSO/CDO arrange short course training for farmers/cane growers. Did you attend such training during 1983? Yes _____ No _____ If yes, how many day/hours could you attend? days/hours _____</p>
	<p>(e) Sometimes the BS/TMO/SNO or CDA/ACSO/CDO organize meeting in the field to show people what is the result of applying/ following a new technique of cultivation. How many such meetings could you attend during 1983. Number _____ On an average how much time could you spend for such a meeting? Mrs./Min _____</p>		<p>j) Often conference of selected farmers/cane growers are organized by BS/TMO/SNO or CDA/ACSO/CDO at TMO/Wallis campus. How many such conferences could you attend 1983. Number _____ On an average how much time could you spend for attending a conference? Mrs./Min _____</p>

<p>17. (Feasibility of participation) How frequently do you get opportunity to do the following when you meet agricultural/sugarcane extension personnel/when they contact with you or you attend any kind of meetings training or discussion? (Put tick mark in appropriate boxes)</p>	<p>No writing Column Code</p>	<p>10</p>
<p>Work</p> <p>Frequency of scope to do</p> <p>Never Seldom Some Frequently</p>		
<p>Asking to know new things</p>		
<p>Asking questions</p>		
<p>Depending explanation</p>		
<p>Expressing own experience</p>		
<p>Correcting mistakes</p>		
<p>Commenting on presentation</p>		
<p>Requesting practical demonstration</p>		
<p>Self practicing</p>		
<p>Presenting own problem</p>		
<p>Post event personal discussion</p>		
<p>18. Do you have exchange relationship with agricultural/sugarcane extension personnel? Exchange relationship means providing some personal service (cash/kind) in exchange of extension service the provide you.</p>		<p>Yes _____ No _____</p>

<p>k) Often mass meetings are organized by the BS/IAO/SIB or CDA/ICDI after giving wide local publicity. How many mass meetings could you attend during last year 1983? (Put tick mark in appropriate boxes)</p>	<p>No writing Column Code</p>	<p>9</p>
<p>On an average how much time could you spend for attending a meeting?</p> <p>Number</p> <p>Hours/Minutes</p>		
<p>l) During 1983 how many times did you visit agricultural or sugar mills stalls in an exhibition? (Put tick mark in appropriate boxes)</p>		
<p>How much time could you spend each time on an average?</p> <p>Number</p> <p>Hours/Minutes</p>		
<p>m) To recognize and offer award to best farmers/cane growers often Agriculture Department/Sugar Mills observe a success day. How many such success days could you attend during 1983? (Put tick mark in appropriate boxes)</p>		
<p>On an average how much time could you spend for attending a success day?</p> <p>Number</p> <p>Hours/Minutes</p>		
<p>n) Often film shows are organized in agriculture/cane cultivation. How many time did you enjoy such film show during 1983? (Put tick mark in appropriate boxes)</p>		
<p>How much time could you spend for a show on an average?</p> <p>Number</p> <p>Hours/Minutes</p>		
<p>o) Agricultural/sugarcane programmes are broadcast through radio. How many times did you hear such programs in a month? (Put tick mark in appropriate boxes)</p>		
<p>On an average how much time did you hear the program each time?</p> <p>Number</p> <p>Hours/Minutes</p>		
<p>p) Do you read publications concerning agriculture/sugarcane regularly? (Put tick mark in appropriate boxes)</p>		
<p>If yes, what would be the total reading hours in month?</p> <p>Hours</p>		

Appendix-D

11	No writing	12
<p>17. (Technological Diversity). In giving advice through personal contacts, meetings, etc. how much of each of the following is covered by agriculture/sugarcane extension working? (Put tick mark in appropriate box).</p>	<p>No writing</p>	<p>e) Do you fear to follow a new thing when some one advise you do so? (N) _____ Yes (1) _____ No (3) _____ No opinion (2)</p>
<p>Areas of advice</p> <p>Extent of coverage</p> <p>No / Some / all</p> <p>Aspect/Aspect aspect</p>	<p>No writing</p>	<p>f) Do you try to correct any farmer if he is mistaking? (P) _____ Yes (3) _____ No (1) _____ No opinion (2)</p>
<p>Crop production</p>	<p>No writing</p>	<p>g) Do you accept anything readily when your children or family member advise you to do so? (P) _____ Yes (3) _____ No (1) _____ No opinion (2)</p>
<p>Miscel. fish, forest production</p>	<p>No writing</p>	<p>h) Are you prepared to pay a person if his advice help increase your production? (P) _____ Yes (3) _____ No (1) _____ No opinion (2)</p>
<p>Marketing of agricultural productions</p>	<p>No writing</p>	<p>i) Are you interested to improve your cattle through artificial insemination? (P) _____ Yes (3) _____ No (1) _____ No opinion (2)</p>
<p>Development and maintenance of agricultural resources</p>	<p>No writing</p>	<p>j) Do you believe that application of new methods of cultivation will ultimately be harmful though it increased production immediately? (N) _____ Yes (1) _____ No (3) _____ No opinion (2)</p>
<p>Farm management</p>	<p>No writing</p>	<p>2) The purpose of Agricultural/Sugarcane extension service is to help farmers develop skill in agriculture or sugarcane production. Suggest anything that you like to make the service more effective in helping the farmers.</p>
<p>Home management and development</p>	<p>No writing</p>	<p>_____</p>
<p>Ranch development</p>	<p>No writing</p>	<p>_____</p>
<p>Development of local leadership</p>	<p>No writing</p>	<p>_____</p>
<p>Social development</p>	<p>No writing</p>	<p>_____</p>
<p>Social welfare & public relation</p>	<p>No writing</p>	<p>_____</p>
<p>General education</p>	<p>No writing</p>	<p>_____</p>
<p>20. Attitude toward change</p> <p>(a) Do you believe that no farmer can prosper/develop unless traditional way of doing things are given up? (P) _____ Yes (3) _____ No (1) _____ No opinion (2)</p>	<p>No writing</p>	<p>_____</p>
<p>(b) Do you think that acceptance of any new methods of cultivation by every farmer should be enforced by law? (N) _____ Yes (1) _____ No (3) _____ No opinion (2)</p>	<p>No writing</p>	<p>_____</p>
<p>(c) Do you feel shary to give up forefathers way of doing things? (N) _____ Yes (1) _____ No (3) _____ No opinion (2)</p>	<p>No writing</p>	<p>_____</p>
<p>(d) Will you consider it a misuse of money, if some one spend for experimenting new things? (N) _____ Yes (1) _____ No (3) _____ No opinion (2)</p>	<p>No writing</p>	<p>_____</p>

PART II: FARMERS OTHER THAN CONTACT/SUPERVISED ONLY	PART III: ONLY SELECTED FARMERS
13	14
<p>No Writing Column</p> <p>1. Are you acquainted with contact farmers or supervised cane growers of your locality? Yes _____ No _____ If yes, name two contact/supervised farmers 1. _____ 2. _____</p> <p>2. During last 3 months how many times could you discuss about agriculture/supervised cultivation with contact farmers/supervised cane growers of your locality. _____ number</p> <p>3. Would you consider it better to learn from contact farmers/supervised cane growers as compared to agricultural/supercane extension workers (BS/CDA)? Yes _____ No _____ What are the reasons for your yes or no? 1. _____ 2. _____ 3. _____</p> <p>4. Are the contact farmers/supervised cane growers willing to educate the fellow farmers? Yes _____ No _____ What are the reasons for yes/no 1. _____ 2. _____ 3. _____</p> <p>5. Is it feasible for contact farmers/supervised cane growers to educate others after attending their own farming and family work? Yes _____ No _____</p> <p>6. Do you have confidence in the ability of contact farmers/supervised cane growers to educate other farmers? Yes _____ No _____</p> <p>7. Do you have exchange relation with the contact farmers/supervised farmers of your locality. Exchange relation means providing goods and services for getting a favour of technical advice. Yes _____ No _____</p>	<p>No Writing Column</p> <p>1. What is the area of your transplanted Aman Paddy in this year (1982-83)? _____ Acres</p> <p>Recommended practice I: Cultivation of recommended varieties.</p> <p>1. (a) (Stages of Adoption) Are you aware that some T. Aman varieties recommended by Department of Agriculture give higher yield of paddy per acre? Yes _____ No _____ If yes, which of the following was your primary source of information? (Put tick mark on one) 1. Upazilla Agricultural office/Block Supervisor 2. Contact farmer 3. Model farmers/Pump managers 4. Neighbours/Friends 5. Fertilizer/Seed dealers 6. Radio/Television 7. Others (name): _____</p> <p>(b) After being aware did you become interested to know more about it? Yes _____ No _____</p> <p>(c) If you become interested, did you try to evaluate the comparative profitability of cultivating these varieties? Yes _____ No _____</p> <p>(d) If you become aware, did you try in small scale in your own land? Yes _____ No _____</p> <p>(e) Do you cultivate those varieties in some of your land? Yes _____ No _____ If yes, which of the following was your principal adviser? (Put tick mark on one only) 1. Upazilla Agriculture officer/Block Supervisors 2. Contact farmers 3. Model farmers/Pump managers 4. Neighbours/Friends 5. Fertilizer/Seed dealers 6. Radio/Television 7. Other (name): _____</p>

No Writing Column Code	15	No Writing Column Code	16
	<p>If you cultivate the recommended varieties, from how many years ago are you cultivating them?</p> <p>Years _____</p>	<p>5. (Skill)</p> <p>(a) Are your HYV fields attractive? (S)</p> <p>Yes _____ No _____</p>	<p>(b) Are you getting satisfactory yield of your HYV T. Aman? (S)</p> <p>Yes _____ No _____</p> <p>If no what you think were the reasons of poor yield?</p> <p>_____</p> <p>_____</p>
	<p>4. (a) Out of your total area of T. Aman land how much land is suitable for cultivating HYVs (suitable land are medium/high/low land)?</p> <p>Acres _____</p>		
	<p>(b) How much of suitable land could you cultivate with HYVs this year (1982-83)?</p> <p>Acres _____</p> <p>What were the reasons for not cultivating recommended varieties in all suitable land?</p> <p>1. _____</p> <p>2. _____</p> <p>3. _____</p>		
	<p>5. (d) (Technological Knowledge) Do you know the names of recommended varieties? (S)</p> <p>Yes _____ No _____</p> <p>If yes, name three recommended varieties.</p> <p>1. _____</p> <p>2. _____</p> <p>3. _____</p>		
	<p>(b) Do you know the characteristics of HYVs of T. Aman varieties? (S)</p> <p>Yes _____ No _____</p> <p>If yes, name three important characteristics of HYVs.</p> <p>1. _____</p> <p>2. _____</p> <p>3. _____</p>		
		<p>6. (Attitude Toward Technology)</p> <p>(a) Many think cultivation of HYVs T. Aman is the only way for better livelihood of farmers. Do you agree with them? (P)</p> <p>Yes (2) _____ No (1) _____ No opinion (2)</p>	
		<p>(b) Due to trouble and difficulty some farmers are giving up HYV T. Aman cultivation. Do you support their action? (N)</p> <p>Yes (1) _____ No (3) _____ No opinion (2)</p>	
		<p>(c) Should every farmer cultivate HYV, although its rise is not testeful as compared to local varieties? (P)</p> <p>Yes (2) _____ No (1) _____ No opinion (2)</p>	
		<p>7. (Technology Adaptability)</p> <p>(Technology Adaptability is your opinion is cultivation of HYVs? (Put tick mark in appropriate column)</p> <p>No (1) Some (2) Fully (3)</p>	
		<p>a) Consistent with local condition and cropping system (P)</p> <p>b) In consistent with local values/crystins (N)</p> <p>c) Easier to cultivate (P)</p> <p>d) Trialable in small area (P)</p> <p>e) Result is divisible (P)</p> <p>f) Labour intensive (N)</p> <p>g) Capital intensive (N)</p> <p>h) Results are visible (P)</p> <p>i) Communicable to others (P)</p> <p>j) Profitable (P)</p>	
			<p>Note: N= Negative Statement P= Positive Statement</p>

No. Writing Column Code	Technology 2 : Model seed bed preparation (Stages of Adoption)	No. Writing Column Code	18
	<p>7. (a) Are you aware that best seedlings are raised from model seed bed for T. Aman?</p> <p>Yes _____ No _____</p> <p>If answer is yes, who was the primary source of your information. (Put tick mark on any one).</p> <p>1. Upazilla Agriculture Officer/Block Supervisor _____</p> <p>2. Contact Farmers _____</p> <p>3. Model Farmers/Pup Managers _____</p> <p>4. Neighbours/Relatives _____</p> <p>5. Fertilizer/Seed Dealers _____</p> <p>6. Radio/Television _____</p> <p>7. Others (Name): _____</p>		<p>8. If answer of Q.7 is yes, from how many years are you following model seed bed preparation for raising T. Aman seedlings? _____ Years</p> <p>(a) What was the area of your model seed bed this year for T. Aman? _____ acres</p> <p>(b) If you do not follow model seed bed what were the reasons? _____</p> <p>(Knowledge)</p> <p>9. (a) Do you know the length, breadth and height of a model seed bed? (5)</p> <p>Yes _____ No _____</p> <p>If yes, what is the length, breadth and height of a model seedbed? Length _____ Breadth _____ Height _____</p> <p>(b) Do you know what is the rate of different fertilizers recommended for a model seed bed? (5)</p> <p>Name of fertilizers _____ amount (Gr.) _____</p> <p>_____</p> <p>_____</p> <p>_____</p>
	<p>(b) After being aware did you become interested to know more about it? Yes _____ No _____</p> <p>(c) If you become interested did you evaluate the benefit of model seed bed preparation? Yes _____ No _____</p> <p>(d) Do you sow seeds by making model seed bed? Yes _____ No _____</p> <p>If yes, who was your principal advisor in making model seed bed preparation?</p> <p>1. Upazilla Agricultural Officer/Block Supervisor _____</p> <p>2. Contact Farmers _____</p> <p>3. Model Farmers _____</p> <p>4. Neighbours/Friends _____</p> <p>5. Fertilizer/Seed Dealers _____</p> <p>6. Radio/Television _____</p> <p>7. Others (Name): _____</p>		<p>10. (Skill)</p> <p>(a) What was the length, breadth and height of the seed bed you prepared? (10)</p> <p>Length _____ Breadth _____ Height _____</p> <p>In such a bed what fertilizers did you apply in what amount?</p> <p>Name of fertilizers _____ amount (Gr.) _____</p> <p>_____</p> <p>_____</p>

No Writing	19	No Writing Column Code	20
	<p>11. (Attitude Towards Technology)</p> <p>(a) Do you believe that there is no need for model seed bed for raising good seedlings? (N)</p> <p>Yes (1) _____ No (1) _____ No opinion (2) _____</p> <p>(b) Do you think that all farmers should raise seedlings in model seed beds? (P)</p> <p>Yes (3) _____ No (1) _____ No opinion (2) _____</p> <p>(c) Why farmers are not coming forward to take model seed beds by spending additional money and labour. Do you support them? (N)</p> <p>Yes (1) _____ No (3) _____ No opinion (2) _____</p> <p>(Technology Adaptability)</p> <p>12. In your opinion is raising seedlings in model seed bed? (Put tick mark in appropriate column)</p> <p>Mo(1) To size(2) Fully(3)</p> <p>Extent</p> <p>a) Consistent with land and method of cultivation and gives good seedlings (P) _____</p> <p>b) Inconsistent to social values and customs (N) _____</p> <p>c) Easier to prepare (P) _____</p> <p>d) Feasible in a small scale (P) _____</p> <p>e) Gives partially good seedlings when not done properly (P) _____</p> <p>f) Labour intensive (N) _____</p> <p>g) Capital intensive (N) _____</p> <p>h) Gives visible result (P) _____</p> <p>i) Can be made understandable (P) _____</p> <p>j) Profitable (N) _____</p>		<p>If answer is yes, who was the primary source of your information for optimum spacing? (Put tick mark against one).</p> <p>1. Upazilla Agricultural Officers/Block Supervisors _____</p> <p>2. Contact Farmers _____</p> <p>3. Model Farmers/Pump Managers _____</p> <p>4. Neighbours/Friends _____</p> <p>5. Fertilizer/Seed Dealers _____</p> <p>7. Others (Name): _____</p> <p>(b) Did you become interested after hearing about optimum spacing? _____ Yes _____ No _____</p> <p>(c) Did you evaluate about benefits of optimum spacing after hearing about it? _____ Yes _____ No _____</p> <p>(d) Did you try it in small scale after hearing about it? _____ Yes _____ No _____</p> <p>(e) Do you follow optimum spacing every year in some 1. own plots. _____ Yes _____ No _____</p> <p>If yes, who was the principal advisor for optimum spacing? (Put tick mark against one)</p> <p>1. Upazilla Agriculture Officer/Block Supervisor _____</p> <p>2. Contact farmers _____</p> <p>3. Model Farmers/Pump Managers _____</p> <p>4. Neighbours/Friends _____</p> <p>5. Fertilizer/Seed Dealers _____</p> <p>6. Radio/Television _____</p> <p>7. Others (Name): _____</p> <p>14. If you follow, from how many years do you follow optimum spacing? _____ Years _____</p>

<p>No Writing Column Code</p>	<p>21 15. (a) This year how much of T. Aman could you transplant in optimum time (15th August - Sept. 15) _____ Acres (b) How much of T. Aman could you transplant in optimum spacing? _____ Acres If you could not transplant all T. Aman in optimum spacing what were the reasons? _____ _____</p>	<p>22 18. (a) Do you believe that line transplantation with optimum spacing gives higher yield of T. Aman? (P) Yes (3) _____ No (1) _____ No opinion (2) _____ (b) Some people are transplanting haphazardly to avoid extra effort. Do you support them? (N) Yes (1) _____ No (3) _____ No opinion (2) _____ (c) Are you in same opinion that one should transplant in line and optimum spacing, although it would cost or require additional labour? (P) Yes (3) _____ No (1) _____ No opinion (2) _____</p>
<p>No Writing Column Code</p>	<p>16. (Knowledge) (a) Do you know the optimum spacing for T. Aman recommended by Department of Agricultural Extension? (S) If answer is yes, what is the optimum spacing, if transplanted in optimum time? Line to Line _____ Plant to Plant _____ Local _____ (b) Do you know what are the difficulties faced by plants, if not transplanted in optimum spacing? (S) Yes _____ No _____ If answer is yes, tell atleast 3 such difficulties _____ _____</p>	<p>19. In your opinion is optimum spacing in line? (Put tick mark in appropriate column) % (1) _____ % (2) _____ % (3) _____ Extent a) Consistent with land and cultivation Method and give good result (P) _____ b) Inconsistent with local values and customs (N) _____ c) Easier to do (P) _____ d) Feasible in small scale (P) _____ e) Produce desirable results (P) _____ f) Capital intensive (N) _____ g) Labour intensive (N) _____ h) Giving visible result (P) _____ i) Communicable to others (P) _____ j) Profitable (P) _____</p>
<p>No Writing Column Code</p>	<p>17. (Skill) (a) Did you ever make straight lines by using ropes? (S) Yes _____ No _____ (b) What were the line to line and plant to plant distance in your T. Aman plots? (S) Line to line _____ Plant to plant _____ (c) What were the line to line and plant to plant distance in your T. Aman plots? (S) Line to line _____ Plant to plant _____</p>	<p>20. (Adaption Stages) (a) Did you hear that transplanting seedlings of optimum age gives higher yield of T. Aman? Yes _____ No _____ Technology IV: Optimum aged seedling.</p>

24	<p>23(a) (Knowledge) (a) Do you know the reasons of poor yield per acre if over aged seedlings are transplanted? (5)</p> <p>Yes _____ No _____</p> <p>If answer is yes, tell what were the principal reasons?</p> <p>_____</p> <p>_____</p>	No Writing Column Code
25	<p>(b) Do you know what steps a farmer need to take, if he intend to transplant seedlings of optimum age in all fields? (5)</p> <p>Yes _____ No _____</p> <p>If answer is yes, what are the steps?</p> <p>_____</p> <p>_____</p>	No Writing Column Code
26	<p>24(a) (Skill) (a) This year how many seed beds did you prepare at what interval? (5)</p> <p>No _____ Area of land _____ Interval (days) _____</p> <p>1st _____</p> <p>2nd _____</p> <p>3rd _____</p> <p>4th _____</p>	No Writing Column Code
27	<p>(b) How much land could you transplant this year with the seedlings of following age? (5)</p> <p>Local: 3-4 weeks _____ Acres</p> <p>Local: 4-5 weeks _____ Acres</p>	No Writing Column Code
28	<p>25 (Attitude toward Technology) (a) Do you believe seedlings of any age would give good yield, if properly cultivated? (4)</p> <p>Yes (1) _____ No (3) _____ No Opinion (2) _____</p> <p>(b) Should a farmer continue transplanting when some seedlings becomes over aged due to stopping of transplanting? (4)</p> <p>Yes (1) _____ No (3) _____ No Opinion (2) _____</p> <p>(c) Some people feed cattle if seedlings become over-aged. Would you support that? (4)</p> <p>Yes (3) _____ No (1) _____ No Opinion (2) _____</p>	No Writing Column Code
29	<p>If yes, who was your primary source of information for optimum spacing?</p> <p>1. Upazilla Agricultural Office/Block Supervisor _____</p> <p>2. Contact Farmers _____</p> <p>3. Model Farmers/Shop Managers _____</p> <p>4. Neighbours/Friends _____</p> <p>5. Fertilizer/Seed dealers _____</p> <p>6. Radio/Television _____</p> <p>7. Others (Name): _____</p>	No Writing Column Code
30	<p>b) Did you become interested about optimum age of seedling when you heard about it?</p> <p>Yes _____ No _____</p>	No Writing Column Code
31	<p>c) Did you evaluate the benefits of optimum age of seedlings after you heard about it?</p> <p>Yes _____ No _____</p>	No Writing Column Code
32	<p>d) After being aware did you try optimum age of seedling in small scale in planting T. Aman.</p> <p>Yes _____ No _____</p>	No Writing Column Code
33	<p>e) Are you planting in optimum age of seedlings in some lots of T. Aman.</p> <p>Yes _____ No _____</p> <p>If answer is yes who was your Principal ADVISOR? (Put tick mark in one)</p> <p>1. Upazilla Agric. Offices _____</p> <p>2. Contact farmers _____</p> <p>3. Model Farmers _____</p> <p>4. Neighbours/Friends _____</p> <p>5. Fertilizer/Seed dealers _____</p> <p>6. Radio/Television _____</p> <p>7. Others (Name) _____</p>	No Writing Column Code
34	<p>If answer is yes who was your principal advisor? (Put tick in one)</p> <p>1. Upazilla Agric. Offices _____</p> <p>2. Contact farmers _____</p> <p>3. Model Farmers _____</p> <p>4. Neighbours/Friends _____</p> <p>5. Fertilizer/Seed dealers _____</p> <p>6. Radio/Television _____</p> <p>7. Others (Name) _____</p>	No Writing Column Code
35	<p>21. If you do, from how many year are you following optimum age of seedlings?</p> <p>_____ years</p>	No Writing Column Code
36	<p>22. How much area of T. Aman did you plant with seedling of optimum age this year (1992-93)</p> <p>_____ Acres</p> <p>If you did not do, what were the reasons?</p> <p>_____</p> <p>_____</p>	No Writing Column Code

No writing
Column Code

b) Did you become interested to know more, when you heard about balanced fertilizer ?
 Yes _____ No _____

c) After being aware did you evaluate the benefits of balanced fertilization of T. Aman. ?
 Yes _____ No _____

d) After being aware, did you apply balance fertilizers on a trial basis to see its result ?
 Yes _____ No _____

e) Do you apply balance fertilizer in T. Aman
 Yes _____ No _____

If answer is yes, who was your principal adviser for balance fertilizer ? (Put tick mark on only one.)

1. Upasilla Agricultural Officer/Block Supervisor _____
2. Contact Farmers _____
3. Model Farmers/Pump Managers _____
4. Neighbours/Friends _____
5. Fertilizer/Seed Sellers _____
6. Radio/Television _____
7. Others (Name): _____

28. If you apply balance fertilizer, from how many year are you applying it ?
 _____ Years

29. (a) This year how much T. Aman did you apply balanced fertilizers ?
 _____ Acres

If you did not apply balanced fertilizer, what were the reasons

No writing
Column Code

25. Technology Adoptability: Is your opinion is transplanting seedlings of optimum size? (Put tick mark in appropriate column.)

To See
 (1) Extent (2) Full (3)

1) Consistent to land and methods of cultivation with good result (P)	_____
2) Inconsistent to local values and customs (N)	_____
3) Easier to transplant (P)	_____
4) Viable in small scale (P)	_____
5) Gives divisible results (P)	_____
6) Capital intensive (N)	_____
7) Labour intensive (N)	_____
8) Gives visible results (P)	_____
9) Communicable to others (P)	_____
10) Profitable (P)	_____

Technology V : Balanced Fertilization:

27 (Adoption stages) (a) Did you hear before that yield of T. Aman increases with balanced fertilization?
 Yes _____ No _____

If answer is yes, who was the primary source of your information for balanced fertilization?
 (Put tick mark against only one)

1. Upasilla Agricultural officer/Block supervisor _____
2. Contact Farmers _____
3. Model Farmers/Pump Managers _____
4. Neighbours/Friends _____
5. Fertilizer Seed Dealers _____
6. Radio/Television _____
7. Others (Name) _____

Appendix-D

No. drilling	Column Code	No. (1) Extent(2) Fully(3)
27		
<p>(a) (Knowledge) (1) do you know what fertilizers are to be applied at what rate for balanced fertilization? Yes _____ No _____</p> <p>(b) If answer is yes, name the fertilizers and their rate of application per acre for IRR1 and local varieties. Amount per Acre (ods/srs)(5)</p> <p>IRR1 Local</p> <p>_____</p> <p>_____</p> <p>_____</p>		
28		
<p>(a) (Skill) (a) How much of T.Mean area did you use balanced fertilizers This year? Acres _____</p> <p>(b) What fertilizers did you apply at what rate? Name of Fertilizers(5) amount per acre (ods/srs)(5)</p> <p>_____</p> <p>_____</p>		
29		
<p>(a) (Attitude toward technology) (a) Do you believe that application of balanced fertilizers increases yield of T.Mean whether the land is fertile or not? (P) Yes (3) _____ No (1) _____ No opinion (2) _____</p> <p>(b) Some farmers apply with more than what is recommended with a hope to increase yield. Do you support them? (N) Yes (1) _____ No (3) _____ No opinion (2) _____</p> <p>(c) If you are unable to say all required fertilizers, would you apply all types of fertilizers in small but proportionate quantity? (P) Yes (3) _____ No (1) _____ No opinion (2) _____</p>		
30		
<p>(a) (Technology Acceptability) In your opinion is application of balanced fertilizer? (P) (a) tick any (a) appropriate column</p> <p>_____</p> <p>(b) Consistent with land and cultivation methods and gives desired yield (P) _____</p> <p>(c) Inconsistent to local values and customs (N) _____</p> <p>(d) Easier to apply (P) _____</p> <p>(e) Trialable in small scale (P) _____</p> <p>(f) Result are divisible (P) _____</p> <p>(g) Capital intensive (N) _____</p> <p>(h) Show visible results (N) _____</p> <p>(i) Communicable to others (P) _____</p> <p>(j) Profitable (P) _____</p> <p>Technology (5): Top Dressing of Urea: _____</p> <p>isolation stages (N) (1) you hear before that use of _____</p> <p>ureas as top dressing give better yield of T.Mean? Yes _____ No _____</p> <p>If yes, who was your primary source of information? _____</p> <p>1. Upazilla Agricultural Officer/Bioch. Supervisor _____</p> <p>2. Contact farmers _____</p> <p>3. Field Farmers Group managers _____</p> <p>4. Neighbours/Friends _____</p> <p>5. Fertilizer/Seed Dealers _____</p> <p>6. Radio/television _____</p> <p>7. Others (Name) : _____</p>		

No. Writing Column	Code
38)	(Skill)(a) If you applied top dressing this year, what was the depth of 30 water in the crop field when you applied to dressing ? (5) _____ ft./inch
	b) If the depth of water of some plots exceed 2 inches how did you apply top dressing of Urea ? (5) _____
39)	(Attitude Toward Technology)
	a) Do you believe that split application of Urea several times gives much better yield of T.Aman as compared to applying all before transplanting ? (P) Yes(3) _____ No(1) _____ No Opinion (2) _____
	b) Some farmers apply entire amount of Urea at the time of final padding. Do you support them ? (P) Yes(1) _____ No (3) _____ No Opinion (2) _____
	c) If you have smaller quantity of Urea than what is recommended for T.Aman, would you still apply it in several installments ? (P) Yes(3) _____ No(1) _____ No Opinion (2) _____
40)	Do your opinion in/does top dressing of Urea ? (technology Adeptability) (Pat tick mark in appropriate column)
	Mo(1) _____ To Some(2) Fully(3) _____ Extent _____
	a) Consistent to soil and cultivation method and give good result (P) _____
	b) Inconsistent to local values and customs (N) _____
	c) Easier to apply(P) _____
	d) Trilable in small scale (P) _____
	e) Capital Intensive(N) _____
	f) Labour Intensive(N) _____
	h) Gives visible results _____
	i) Communicable to others (P) _____
	j) Profitable (P) _____

29	(b) Did you become interested when you heard about it? _____ Yes _____ No
	(c) Did you evaluate benefits of top dressing of Urea, when you heard about it? _____ Yes _____ No
	(d) Did you try in small scale to see the results of top dressing in your own land? _____ Yes _____ No
	(e) Is you applying top dressing of Urea in T.Aman _____ Yes _____ No
	If yes, who was your principal advisor? (Pat tick mark on one only)
	1. District Agricultural Officer/Block supervisor _____
	2. Contact farmers _____
	3. Neighbours/Friends _____
	4. Model/Contact Farmers _____
	5. Fertilizer/Seed Dealers _____
	6. Radio/Television _____
	7. Others (name): _____
35.	If you apply top dressing of Urea, from how many years are you doing it? _____ Years
36	(a) This year how many acres of T.Aman did you apply top dressing of Urea? _____ Acres
	(b) If you did not apply top dressing what were the reasons? _____
37	(Knowledge) Do you know the amount and time of applying top dressing of Urea in T.Aman? (10)
	If yes specify the time and amount for 1981 and local varieties
	Yes _____ No _____
	Installation Time Amount(1981) Amount(local) _____

No. Writing Column Code	31	No. Writing Column Code	32
	<p>Technology VIII: Use of Trace Element</p> <p>41 (a) Did you hear before that In spite of using of balanced Fertilizer use of Zinc and Sulphur also make difference in yield of T. Aman?</p> <p>Yes _____ No _____</p> <p>If yes, who was the primary source of your information. (Put tick mark before only one).</p> <p>1. Upazilla Agricultural Officer/Block Supervisor _____</p> <p>2. Contact farmers _____</p> <p>3. Model Farmers/Team managers _____</p> <p>4. Neighbours/Relatives _____</p> <p>5. Fertilizer/Seed Sellers _____</p> <p>6. Radio/Television _____</p> <p>7. Others (Name): _____</p>		<p>42 If you use Zinc and Sulphur, from how many years are you using these? _____ Years</p>
	<p>(b) When you heard about it, did you become interested to know more about it?</p> <p>Yes _____ No _____</p>		<p>43 (a) How much area of T. Aman did you apply Zinc and Sulphur this year. _____ Acres</p> <p>(b) If you did not do that were the reasons? _____</p>
	<p>(c) Did you evaluate benefit of using zinc and sulphur?</p> <p>Yes _____ No _____</p>		<p>44 (Knowledge) (a) Do you know the symptoms of Zinc and Sulphur deficiency in T. Aman? Yes _____</p> <p>If yes tell the major systems of their deficiency. _____</p>
	<p>(d) Did you try in small scale to see the benefits before starting to use regularly?</p> <p>Yes _____ No _____</p>		<p>(b) To see the Zinc and sulphur deficiency do you know what fertilizers are to be applied at what amount in T. Aman. (\$) Yes _____ No _____</p> <p>If yes, name the fertilizers and the rate of application Name of Fertilizers _____ amount/acre (kds/srs.) _____</p>
	<p>(e) Are you applying Zinc and Sulphur in you T. Aman fields?</p> <p>Yes _____ No _____</p> <p>If yes, who was your principal advisor regarding the use of Zinc and Sulphur? (Put tick mark before only one)</p> <p>1. Thana Agricultural Officer/Block Supervisor _____</p> <p>2. Contact farmers _____</p> <p>3. Model Farmers/Team managers _____</p> <p>4. Neighbours/Friends _____</p> <p>5. Fertilizer/Seed Sellers _____</p> <p>6. Radio/Television _____</p> <p>7. Others (Name): _____</p>		<p>45 (Skill) (a) Can you recognize the symptom of Zinc and Sulphur deficiency in T. Aman? (S) Yes _____ No _____</p> <p>(b) If you applied Zinc and Sulphur this year what was the Total amount? (S) _____ Mounds/Srs.</p>

<p>17</p> <p>No. writing Column Code</p>	<p>39</p> <p>46. (a) Do you believe that deficiency of Zinc and sulphur can decrease yield of T. Aman substantially? (P) Yes (Y) _____ No (N) _____ No opinion (2) _____</p> <p>(b) Instead of wasting to see deficiency symptoms of Zinc and Sulphur would you apply Zinc and Sulphur along with other fertilizers? (P) Yes (Y) _____ No (N) _____ No Opinion (2) _____</p> <p>(c) Considering the expense for these new fertilizers some farmers are hesitating to use these fertilizers. Do you support them? (N) Yes (Y) _____ No (N) _____ No opinion (2) _____</p> <p>47. (Technology Adaptability) In your opinion is the use of Zinc and Sulphur? (Put tick mark in appropriate column) No (N) _____ To Some (2) _____ Fully (3) _____ Extent</p> <p>(a) Constant to soil and cultivation methods and gives desired result (P) _____</p> <p>(b) Inconsistent to local values and customs (N) _____</p> <p>(c) Easier to apply (P) _____</p> <p>(d) Feasible in small scale (P) _____</p> <p>(e) Gives divisible result (P) _____</p> <p>(f) Capital intensive (N) _____</p> <p>(g) Labour intensive (N) _____</p> <p>(h) Communicable to others (P) _____</p> <p>(i) Gives visible result (P) _____</p> <p>(j) Profitable (P) _____</p> <p>Technology VIII: Pest Control:</p> <p>48 (Stages of Adoption) (a) Did you hear before that pest control can increase yield of T. Aman substantially? Yes _____ No _____</p>
<p>No Writing Column Code</p>	<p>34</p> <p>If yes, who was your primary source of information? 1. Upazilla Agricultural Officer/Block Supervisor _____ 2. Contact Farmers _____ 3. Model Farmers/Group Managers _____ 4. Neighbours/Friends _____ 5. Fertilizer/Seed Dealers _____ 6. Radio/Television _____ 7. Others (Name): _____</p> <p>(b) Did you become interested to know more about pest control, when you heard about it? Yes _____ No _____</p> <p>(c) Did you evaluate the benefits of using insecticides when you heard about it? Yes _____ No _____</p> <p>(d) Did you try in small scale before starting to use insecticides? Yes _____ No _____</p> <p>(e) Are you using insecticides to control pest infestation? Yes _____ No _____</p> <p>If yes who is your principal advisor for pest control measures/use of insecticides? 1. Upazilla Agricultural Officer/Block Supervisor _____ 2. Contact Farmers _____ 3. Model Farmers/Group Managers _____ 4. Neighbours/Friends _____ 5. Fertilizer/Seed Dealers _____ 6. Radio/Television _____ 7. Others (Name): _____</p> <p>49. If you use insecticides from how many years ago are using insecticides for pest control _____ years</p>

No Writing Column	35	36
	<p>30(a) How many acres of T. Anon was affected by pest this year? _____ Acres</p> <p>(b) This year, in how many acres of T. Anon did you use insecticide? _____ Acre</p> <p>(c) If you did not do, what were the reasons? _____ _____ _____</p>	<p>54. (Technology Acceptability) In your opinion is/does use of insecticides in T. Anon? (Put tick mark in appropriate column)</p> <p>No (1) Extent (2) Fully (3)</p> <p>To Some</p>
	<p>31 (Knowledge) Do you know what are the major pests of T. Anon and what insecticides are to be used at what rate? (10)</p> <p>None of pests Name of Insecticides Sccs/Acre</p> <p>_____ _____ _____</p> <p>_____ _____ _____</p>	<p>(a) Consistent to soil and climate and effective in pest control (P) _____</p> <p>(b) Inconsistent to local values and customs (N) _____</p> <p>(c) Easy to use (P) _____</p> <p>(d) Trickle in soil scale (P) _____</p> <p>(e) Produce divisible result (P) _____</p> <p>(f) Capital intensive (N) _____</p> <p>(g) Labour intensive (N) _____</p> <p>(h) Communicable to others (P) _____</p> <p>(i) Profitable (P) _____</p>
	<p>32. (Skill) (a) Can you identify the harmful insects of T. Anon? (3)</p> <p>Yes _____ No _____</p> <p>(b) How much insecticide did you use this year for T. Anon? (3)</p> <p>_____ Sr/Lb/oz.</p> <p>(c) How much damage could be prevented due to application of insecticides (4)</p> <p>_____ Little Some Fully</p>	<p>Technology IX: Harvest in Time</p> <p>55 (Stages of Adoption) (a) Did you know before that timely harvest reduce loss of grains substantially? Yes _____ No _____</p> <p>If yes, who was your principal source of information regarding timely harvest?</p> <p>_____</p> <p>1. Upazilla Agricultural Officer/Block Supervisor 2. Contact Farmers 3. Model Farmers/Pump Managers 4. Neighbours and Friends 5. Fertilizer/Seed Dealers 6. Radio/Television 7. Others (Name): _____</p>
	<p>33 (Attitude Toward Technology) (a) Do you believe that use of insecticides prevents pest attack and saves your T. Anon? (P)</p> <p>Yes (3) No (1) No Opinion (2)</p> <p>(b) Some farmers consider pest attack an unfortunate and remain contented. Do you support them? (H)</p> <p>Yes (1) No (3) No Opinion (2)</p> <p>(c) These days pest infestation increased so much that without prior arrangement of insecticides, T. Anon cultivation becomes useless. Do you agree with the statement? (P)</p> <p>Yes (3) No (1) No Opinion (2)</p>	<p>(b) When you heard about timely harvest, did you become interested about it? Yes _____ No _____</p> <p>(c) When you heard about it did you evaluate the benefits of timely harvest of T. Anon Yes _____ No _____</p>

Appendix-9

No Writing Column Code	17	18
	<p>(c) When you heard about it, did you try in small scale to see the benefit of transgenic harvest?</p> <p>Yes _____ No _____</p> <p>(d) Are you harvesting T. Aan transgenic?</p> <p>Yes _____ No _____</p> <p>If yes, who was your principal adviser? (Put tick mark in one only)</p> <p>1. Upazilla Agricultural Officer/Block Supervisor _____</p> <p>2. Contact Farmers _____</p> <p>3. Model Farmers/UP Managers _____</p> <p>4. Neighbours/Friends _____</p> <p>5. Fertilizer/Seed Dealers _____</p> <p>6. Radio/Television _____</p> <p>7. Others (Name): _____</p> <p>56. If you harvest T. Aan transgenic, from how many years ago are you doing it? _____ Years</p> <p>57(a) This year how much area of T. Aan transgenic you harvest, threshed and stored transgenic? _____ Acres</p> <p>(b) If you could not do so what were the reasons. _____</p>	<p>(b) Do you know the amount of grain lost due to delayed harvest, staking and threshing? (5)</p> <p>Yes _____ No _____</p> <p>If yes, what is the amount of loss? _____ Percent</p> <p>59 (Skill) (a) What is the area of your T. Aan whose grain becomes spoiled due to delayed harvest? (5)</p> <p>_____ Acres</p> <p>(b) What is the extent of losses due to rat and birds' attack on the stacks of paddy in the home stead? (5)</p> <p>None _____ Small quantity _____ To a great extent _____</p> <p>60 (Attitude Toward Technology) (a) Do you believe that substantial loss of grains occurs due to delayed harvest and threshing and storage? (4)</p> <p>Yes (1) _____ No (1) _____ No opinion (2) _____</p> <p>(b) Some farmers keep their ripen crop on the fields for getting the straws naturally dried. Do you support them? (4)</p> <p>Yes (1) _____ No (1) _____ No opinion (2) _____</p> <p>(c) Do you think that T. Aan should be harvested although plants remain still raw? (4)</p> <p>Yes (1) _____ No (1) _____ No opinion (2) _____</p>
	<p>58 (knowledge) (a) Do you know the condition of plants becomes appropriate for harvest of T. Aan? (5)</p> <p>Yes _____ No _____</p> <p>If yes what is the optimum condition of plants/time of harvest? _____</p>	

40

PART IV: CANE GRASSES ONLY

No Writing Column Code

1. What is your total area of cane plantation this year (1982-83)?

Acres

Technology - 2: Recommended Varieties

2. (Adoption Stages) (a) Did you hear before that mills recommended cane varieties give higher yield per acre?

Yes _____ No _____

If yes, who was your primary source of information? (tick mark before only one)

1. COO/ACSO/CDA
2. Supervised Cane Growers
3. Model Farmers/Co-operative Managers
4. Neighbours/Friends
5. Fertilizer/Seed Cane Dealers
6. Radio/Television
7. Others (Name):

(b) When you heard about it, did you become interested to know more about it?

Yes _____ No _____

(c) When you heard about it did you evaluate its benefits?

Yes _____ No _____

(d) When you heard about it, did you cultivate it on a trial basis?

Yes _____ No _____

(e) Are you cultivating the mills recommended varieties?

Yes _____ No _____

39

No Writing Column Code

54. (Technology Adoptability) In your opinion, does timely harvest of T. Man? (Put tick mark in appropriate column)

	To some extent (1)	To some extent (2)	Fully (3)
(a) Consistent with soil condition, cultivation procedures and prevent losses (P)			
(b) Inconsistent to local values and customs (N)			
(c) Easier to follow (P)			
(d) Trialable in a small scale (P)			
(e) Little ahead harvest gives partial benefits (P)			
(f) Capital intensive (N)			
(g) Labour intensive (N)			
(h) Results easily visible (P)			
(i) Communicable to others (P)			
(j) Profitable (P)			

62. (Product Market Difficulty) How much difficulty did you face in various aspects of marketing paddy? (Put tick mark in appropriate boxes)

Aspects of marketing	No difficulty (1)	Little difficulty (2)	Substantial difficulty (3)	Very much difficulty (4)
Timely harvest				
Storing				
Preparation for market				
Transportation				
Fair price				
Ensured selling				
Price stability				
Buyers behaviour				

No Writing Column	41	42
<p>If yes, who was your principal advisor for cultivating mills recommended cane varieties?</p> <ol style="list-style-type: none"> 1. GSO/ICDA/ICM 2. Supervised Cane Growers 3. Model Farmers/Cooperative Managers 4. Neighbours/Friends 5. Fertilizer/Seed Sellers 6. Radio/Television 7. Others (Name): 	<p>5. (Skill) (a) Did you get desirable yield of cane by cultivating mills recommended varieties? (S)</p> <p>Yes No</p> <p>What was the yield of cane you get from the Mills recommended varieties?</p> <p>Mds/Acres</p>	<p>(b) Do you find cane of other varieties in the field of mills recommended varieties? (S)</p> <p>Yes No</p>
<p>3. If you cultivate mills recommended varieties, for how many years are you cultivating them?</p> <p>..... Years</p>	<p>6. (Attitude toward technology) (a) Do you believe that increased cane production per acre is possible by cultivating mills recommended varieties only? (P)</p> <p>Yes (1) No (1) No opinion (2)</p>	<p>(c) Would you support action from the government for cultivation of Mills recommended varieties? (N)</p> <p>Yes (1) No (3) No opinion (2)</p>
<p>(b) If you did not cultivate mills recommended varieties what were the reasons</p> <p>.....</p> <p>.....</p>	<p>7. (Technology adaptability) (a) In your opinion is/does cultivation of mills recommended cane varieties? (Put tick mark in appropriate column)</p> <p>Yes (1) No (3) No opinion (2)</p>	<p>7. (Technology adaptability) (a) In your opinion is/does cultivation of mills recommended cane varieties? (Put tick mark in appropriate column)</p> <p>To Some No (1) Extent (2) Fully (3)</p>
<p>4. (Knowledge) (a) Do you know the names of mills recommended cane varieties? (S)</p> <p>Yes No</p> <p>If yes, please tell the name of three varieties.</p> <p>.....</p> <p>.....</p>	<p>(b) Do you know the characteristics of mills recommended cane varieties? (S)</p> <p>Yes No</p> <p>If yes, please tell three important characters.</p> <p>.....</p> <p>.....</p>	<p>a) Consistent to the land/cropping system and give desired yield/acre? (P)</p> <p>b) Inconsistent to local values and customs (N)</p> <p>c) Easier to cultivate (P)</p> <p>d) Suitable in small scale (P)</p> <p>e) Produce divisible results (P)</p> <p>f) Capital intensive (N)</p> <p>g) Labour intensive (N)</p> <p>h) Produce visible result (P)</p> <p>i) Marketable to others (P)</p> <p>j) Profitable (P)</p>

No Writing Column Code	43	No Writing Column Code	44
	<p>Technology - II: Early Plantation 8. (Adoption Stages) (a) Did you hear before that early plantation produces high yield of cane/acre? Yes No</p> <p>If yes, who was your primary source of information regarding early plantation? Put tick mark before one only.</p> <p>1. COM/ACB/CMA 2. Supervised Cane Growers 3. Model Farmers/Cooperative Managers 4. Neighbors/Friends 5. Fertilizer/Seed Dealers 6. Radio/Television 7. Others (Name):</p>		<p>9. If you plant early from how many years ago you planting cane early? years.</p>
	<p>(b) When you heard about it did you become interested to know more about it? Yes No</p>		<p>10. (a) What was the area of your early cane plantation last year? Acres.</p> <p>(b) If you did not do what were the reasons?</p>
	<p>(c) When you heard, did you evaluate the benefits of early plantation? Yes No</p>		<p>11. (Knowledge) (a) Do you know when is the time for early plantation? (5) Yes No</p> <p>If yes, tell the specific time for early plantation.</p>
	<p>(d) When you heard about it did you try it in a small scale before starting to follow early planting? Yes No</p>		<p>(b) Do you know what are the main reasons of higher yield, if cane is planted early? (5) Yes No</p> <p>If yes, tell the reasons.</p>
	<p>(e) Are you now planting cane early? Yes No</p> <p>If yes, who is your principal advisor for early plantation? Put tick mark before only one.</p> <p>1. COM/ACB/CMA 2. Supervised Cane Growers 3. Model Farmers/Cooperative Managers 4. Friends and Neighbors 5. Fertilizer/Seed Dealers 6. Radio/Television 7. Others (Name):</p>		<p>12. (Skill) (a) Last year (1982-83) what was your area of early cane plantation? (5) Acres.</p> <p>(b) What was the area of agricultural intercrops (like planted in between cane rows) last year? (5) Acres.</p>
			<p>13. (a) Do you believe that no increased yield is possible without early plantation of cane? (2) Yes (1) No (1) No Opinion (2)</p> <p>(b) Some farmers think late planting after harvest of winter crops can also produce really high yield of cane. Do you agree with them? (1) Yes (1) No (1) No Opinion (2)</p>

No Writing Column Code	15	16
	<p>(e) Some farmers traditionally plant cane late after harvesting winter crops. Would you support that? (N)</p> <p>Yes (1) _____ No (2) _____ No opinion (3) _____</p> <p>14. (Technology adaptability) In your opinion is/does early plantation of cane (not tiller) work in appropriate areas?</p> <p>To Some Extent (1) _____ Fully (2) _____</p> <p>a) Consistent to soil/climate/cropping system with desired high yield (P) _____</p> <p>b) Inconsistent to local values and customs (N) _____</p> <p>c) Easier to plant cane early (P) _____</p> <p>d) Feasible in small scale (P) _____</p> <p>e) Produce divisible result (P) _____</p> <p>f) Capital intensive (N) _____</p> <p>g) Labor intensive (N) _____</p> <p>h) Produce visible result (P) _____</p> <p>i) Communicable to others (P) _____</p> <p>j) Profitable (P) _____</p> <p>Technology III: Trench Method of Plantation</p> <p>15. (Adoption Stages) (a) Did you hear before that trench method of cane plantation increases cane yield substantially as compared to furrow method.</p> <p>Yes _____ No _____</p> <p>If answer is yes, who was the primary source of information about trench method of planting.</p> <ol style="list-style-type: none"> 1. COO/ACM/CMA _____ 2. Supervised Cane Grower _____ 3. Model Farmer/Cooperative Manager _____ 4. Neighbors/Friends _____ 5. Fertilizer/Seed Sellers _____ 6. Radio/Television _____ 7. Other (Name): _____ 	<p>(b) When you heard about it, did you become interested to know more about it?</p> <p>Yes _____ No _____</p> <p>(c) When you heard about it, did you evaluate the benefits of trench methods of cane plantation?</p> <p>Yes _____ No _____</p> <p>(d) When you heard about it did you try trench method in a small area before you begin to plant cane in trenches?</p> <p>Yes _____ No _____</p> <p>(e) Are you planting cane in trench now?</p> <p>Yes _____ No _____</p> <p>If yes, who was your principal advisor for trench method of plantation?</p> <ol style="list-style-type: none"> 1. COO/ACM/CMA _____ 2. Supervised Cane Grower _____ 3. Model Farmer/Cooperative Manager _____ 4. Neighbors/Friends _____ 5. Fertilizer/Seed Sellers _____ 6. Radio/Television _____ 7. Others (Name): _____ <p>16. If you plant cane in trenches from how many years are you planting in trenches?</p> <p>_____ Years</p> <p>17. (a) Last year (1992-93) how much area of your cane plantation did you follow trench method?</p> <p>_____ Acres</p> <p>(b) If you did not follow trench method what were the reasons?</p> <p>_____</p>

No Writing Column	47	21. (Technology Acceptability) In your opinion is/does planting cane in trenches? (Put tick mark in appropriate column)	No (1)	To some Extent (2)	Fully (3)
	<p>18. (Knowledge) (a) Do you know what are the breadth and depth of an ideal trench? (5)</p> <p>YES _____ No _____</p> <p>If yes, what are the breadth and depth? Breadth _____ depth _____</p> <p>(b) Do you know what is the distance between two trenches? (5)</p> <p>YES _____ No _____</p> <p>If yes, what is the optimum distance? _____</p>	<p>a) consistent to soil/climate/cropping system with desired yield (P) _____</p> <p>b) inconsistent to local values and customs (N) _____</p> <p>c) easier to plant (P) _____</p> <p>d) feasible in small scale (P) _____</p> <p>e) produce divisible result (P) _____</p> <p>f) capital intensive (N) _____</p> <p>g) labour intensive (N) _____</p> <p>h) give visible result (P) _____</p> <p>i) communicable to others _____</p> <p>j) profitable (P) _____</p> <p>Technology - IV: Sett Treatment</p>			
	<p>19. (Skill) (a) If you planted cane in trench last year what was the breadth and depth of your trenches? (5)</p> <p>Breadth _____ Depth _____</p> <p>(b) Here the breadth and depth of all trenches same in all plots? (5)</p> <p>YES _____ No _____</p> <p>what was the distance between two trenches? _____</p>	<p>22. (Adoption stages) (a) Did you hear before that setts should be treated before planting to prevent disease attack and increased yield?</p> <p>Yes _____ No _____</p> <p>If yes, who was your primary source of information?</p> <ol style="list-style-type: none"> 1. GSO/ADO/CDA _____ 2. Supervised Cane Growers _____ 3. Model Farmers/Cooperative Managers _____ 4. Neighbours/Friends _____ 5. Fertilizer/Insecticides Dealers _____ 6. Radio/Television _____ 7. Others (Name): _____ 			
	<p>20. (a) Do you believe that planting cane in trenches of optimum distance apart produces more cane than planted in narrow furrows? (P)</p> <p>Yes (5) _____ No (1) _____ No opinion (2) _____</p> <p>(b) If you get all required support would you plant all cane in ideal trenches? (P)</p> <p>Yes (5) _____ No (1) _____ No opinion (2) _____</p> <p>(c) Some cane growers think both trench and furrow give same yield/acre, if cared properly. Do you agree with that? (P)</p> <p>Yes (1) _____ No (5) _____ No opinion (2) _____</p>	<p>(b) when you heard about it, did you become interested to know more about sett treatment? Yes _____ No _____</p> <p>(c) when you heard about it, did you evaluate benefit of sett treatment? Yes _____ No _____</p>			

Appendix-3

No Writing Column Code	19	No Writing Column Code	50
	<p>(d) When you heard about it, did you try in small scale before you begin the use? Yes No</p> <p>(e) Are you using sett treatment now? Yes No</p> <p>If yes who was your principal advisor? (Put tick mark before one only)</p> <p>1. COM/AD/ICIA 2. Supervised Core Growers 3. Model Farmers/Cooperative Manager 4. Neighbour/Friends 5. Fertilizer/Insecticide Dealers 6. Radio/Television 7. Other (Name) :</p>	<p>26. (Skill) (a) If you treated setts last year please fill amount of 50 Chemicals, water with quantity of Suddot (10)</p> <p>Amount of Chemicals Amount of water Quantity of Setts</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>Did you use chemical/water/sett with guess or with accurate measurement? Guess Measurement</p>	
	<p>22. If you follow sett treatment from how many years are you treating setts before planting? Years</p> <p>23. (a) Last year how many acres did you plant after treating the setts? Acres</p> <p>(b) If you did not treat setts what were the reasons? </p>	<p>27. (Attitude Toward Technology) (a) Do you believe that sett treatment prevents disease attack and increase yield of case? (1)</p> <p>Yes (1) No (1) No Opinion (2)</p> <p>(b) Some think sett treatment is of no benefit when disease attacks. Do you agree with them? (2)</p> <p>Yes (1) No (3) No opinion (2)</p> <p>(c) Would you support the action not to allow any body to plant cane without sett treatment? (2)</p> <p>Yes (1) No (3) No Opinion (2)</p>	
	<p>25. (Knowledge) (a) Do you know what chemicals are used in what dose to treat setts? (5)</p> <p>Yes No</p> <p>If yes, what are the chemicals and their standard doses of application?</p> <p>Name of Chemical Dose/Acre</p> <p>.....</p> <p>.....</p> <p>(b) Do you know what are the beneficial effects of sett treatments in addition to preventing disease? (5)</p> <p>If yes, what are the beneficial effects? </p>	<p>28. (Technology acceptability) In your opinion is/does sett treatment?</p> <p>No (1) Extent (2) Fully (3)</p> <p>To Some</p> <p>a) Consistent to soil/climate/method of cultivation with desired effect (P)</p> <p>b) Inconsistent to local values and customs (N)</p> <p>c) Easier to use (P)</p> <p>d) Available in small scale (P)</p> <p>e) Produce divisible result (P)</p> <p>f) Capital Intensive (N)</p> <p>g) Labour Intensive (N)</p> <p>h) Produce visible results</p> <p>i) Communicable with others (P)</p> <p>j) Profitable (P)</p>	

No Writing Column Code	Technology - V: Soil Treatment	No Writing Column Code	30. If you treat soil before planting from how many years ago are you doing it? Years
	<p>23. (Adaptation Stages)</p> <p>(a) Did you hear before that soil treatment before planting cane prevent attack of white ant and soil born insects and increase yield of cane.</p> <p>Yes _____ No _____</p> <p>If yes, who was your primary source of information? (Put tick mark on the only)</p> <p>1. CDO/ADO/CDA _____</p> <p>2. Supervised Cane Growers _____</p> <p>3. Model Farmers/Cooperative Managers _____</p> <p>4. Neighbours/Friends _____</p> <p>5. Fertilizers/Insecticides Dealers _____</p> <p>6. Radio/Television _____</p> <p>7. Others (Name): _____</p>		<p>31(a) List near how much area of cane did you treat soil before planting? Acres</p>
	<p>(b) When you heard about it, did you become interested to know more about it?</p> <p>Yes _____ No _____</p>		<p>(b) If you did not do, what were the reasons? (5)</p> <p>-----</p> <p>-----</p>
	<p>(c) When you heard about it, did you try to evaluate the benefits of soil treatment?</p> <p>Yes _____ No _____</p>		<p>31(c) (wedge) (a) Do you know what insecticides are used for soil treatment? (5)</p> <p>Yes _____ No _____</p> <p>If yes, tell specifically the names of chemicals and their dose if application per acre.</p> <p>Name of Insecticides _____ Amount/Acre _____</p> <p>-----</p> <p>-----</p>
	<p>(d) When you heard about it did you try it in small scale before starting to use?</p> <p>Yes _____ No _____</p>		<p>(b) Do you know the methods of soil treatment?</p> <p>Yes _____ No _____</p> <p>If yes, which one of the following method is appropriate?</p> <p>-----</p> <p>1. Spreading chemicals at the time of final ploughing</p> <p>2. Spreading at the bottom of furrow/trench</p> <p>3. Spreading at the bottom of furrow/trench</p>
	<p>(e) Are you treating soil now before planting cane?</p> <p>Yes _____ No _____</p>		<p>31(d)(i)(a) If you used soil treatment did you spray at the bottom of furrow/trench?</p> <p>Yes _____ No _____</p>
	<p>If yes, who was your principal adviser for soil treatment? (Put tick mark on one only)</p> <p>1. CDO/ADO/CDA _____</p> <p>2. Supervised Cane Growers _____</p> <p>3. Model Farmers/Cooperative Managers _____</p> <p>4. Neighbours/Friends _____</p> <p>5. Fertilizers/Insecticides Dealers _____</p> <p>6. Radio/Television _____</p> <p>7. Others (Name): _____</p>		<p>(b) In spite of soil treatment did you observe attack of white ant?</p> <p>Yes _____ No _____</p>

No writing Column	<p>33. (Attitude toward technology) (a) Do you believe that prevention of attack of ant and other soil borne insects is possible by soil treatment? (Y) Yes(3) No(1) No opinion(2)</p> <p>(b) Some cane growers do not plant cane without soil treatment. Do you support them? (P) Yes(3) No(1) No opinion(2)</p> <p>(c) Do you think soil treatment becomes useless, if white ant begin to attack? (N) Yes(1) No(3) No opinion (2)</p>	<p>No writing Column</p> <p>IF yes, who was your primary source of information for balanced manuring of cane? (Put tick mark before one only)</p> <p>1. GOV/AGRO/CCA 2. Supervised Cane Growers 3. Model Farmers/Cooperative Managers 4. Neighbours/Relatives 5. Fertilizer/Insecticides Dealers 6. Radio/Television 7. Others (Name):</p>	34																																								
No writing Column	<p>34. (Technology Acceptability) In your opinion is/does soil treatment (Put tick mark in appropriate column)</p> <table border="0"> <tr> <td>a) Consistent to soil/climate with desired result(P)</td> <td>No(1)</td> <td>Some Extent(2)</td> <td>Fully(3)</td> </tr> <tr> <td>b) Inconsistent to values and customs(N)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>c) Easier to apply (P)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>d) Profitable in small scale (P)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>e) Produce desirable result(P)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>f) Capital intensive(N)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>g) Labour intensive(N)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>h) Produce visible result(P)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>i) Communicable to others(P)</td> <td></td> <td></td> <td></td> </tr> <tr> <td>j) Profitable</td> <td></td> <td></td> <td></td> </tr> </table> <p>Technology - VI: Balanced Manuring of Cane</p> <p>35. (Adoption Status)(a) Did you hear before that balance manuring produces higher yield of cane?</p> <p>Yes _____ No _____</p>	a) Consistent to soil/climate with desired result(P)	No(1)	Some Extent(2)	Fully(3)	b) Inconsistent to values and customs(N)				c) Easier to apply (P)				d) Profitable in small scale (P)				e) Produce desirable result(P)				f) Capital intensive(N)				g) Labour intensive(N)				h) Produce visible result(P)				i) Communicable to others(P)				j) Profitable				<p>(b) When you heard about balanced manuring of cane did, you become interested to know more about it? Yes _____ No _____</p> <p>(c) When you heard about it, did you evaluate the benefit of balanced manuring of cane? Yes _____ No _____</p> <p>(d) When you heard about it did you try it in a small scale before starting its use? Yes _____ No _____</p> <p>(e) Are you applying balanced manures in Cane now? Yes _____ No _____</p> <p>If yes, who is your principal adviser? (Put tick mark before one only)</p> <p>1. GOV/AGRO/CCA 2. Supervised Cane Growers 3. Model Farmers/Cooperative Managers 4. Neighbours/Friends 5. Fertilizer/Insecticides Dealers 6. Radio/Television 7. Others (Name):</p>	35
a) Consistent to soil/climate with desired result(P)	No(1)	Some Extent(2)	Fully(3)																																								
b) Inconsistent to values and customs(N)																																											
c) Easier to apply (P)																																											
d) Profitable in small scale (P)																																											
e) Produce desirable result(P)																																											
f) Capital intensive(N)																																											
g) Labour intensive(N)																																											
h) Produce visible result(P)																																											
i) Communicable to others(P)																																											
j) Profitable																																											

Appendix 7

No writing Column Code	55	No writing Column Code	56
	<p>26. If you use balance manure in cane from how many years are you applying it?</p> <p>..... Years</p>		<p>40. Attitude toward technological Do you believe that balance manuring ensure higher yield of cane? (P)</p> <p>..... Yes (1) No (1) No opinion (2)</p>
	<p>27. (a) Last year how many acres of your cane plantation did you apply balanced manuring?</p> <p>..... Acres</p> <p>(b) If you did not, do what were the reasons?</p> <p>.....</p> <p>.....</p>		<p>(a) Some farmers think that proper care can give higher yield of cane without balanced manuring. Do you agree with them? (N)</p> <p>..... Yes (1) No (1) No opinion (2)</p> <p>(c) If mills would provide you all fertilizers would you apply balanced manures even by making cash/credit purchase from market? (P)</p> <p>..... Yes (1) No (1) No opinion (2)</p>
	<p>28. (Knowledge) (a) Do you know the name of fertilizers and manures and their rate of application per acre for balance manuring of cane? (5)</p> <p>..... Yes No</p> <p>(b) If yes, name the fertilizers/manures and their amount per acre? (5)</p> <p>Name of fertilizers/manures amount/acre</p> <p>.....</p> <p>.....</p> <p>.....</p>		<p>41. (Technology acceptability) In your opinion is/does balance manuring? (Put tick mark an appropriate column)</p> <p>..... No (1) Extent (2) Fully (3)</p> <p>In Some</p> <p>a) Insistent to soil/fillmate/cropping system with desired result (P) b) Inconsistent to local values and customs (N) c) Easier to apply (P) d) Feasible in small scale (P) e) Produce divisible result (P) f) Capital intensive (N) g) Labour intensive (N) h) Give visible results i) Communicable to others (P) j) Profitable (P)</p>
	<p>29. (Skill) Last year (1962-63) in how many acres of cane did you apply fertilizers?</p> <p>..... Acres</p> <p>What were the fertilizers and their total amount you applied? (10)</p> <p>Name of Fertilizers Amount (Total)</p> <p>.....</p> <p>.....</p> <p>.....</p>		<p>Technology VIII: Top Dressing of Urea</p> <p>42. (Reaction Stage) (a) Did you hear before that application of urea as top dressing gives much higher yield of cane?</p> <p>..... Yes No</p>

Appendix-9

No Writing Colman Code	57: If yes, who was your primary source of information for top dressing of Urea? (Put tick mark before one only)	No Writing Colman Code	43: If you use Urea as top dressing from how many years are you applying it? _____ Years
	<ol style="list-style-type: none"> 1. CDO/ACD/Cik 2. Supervised Farmers 3. Model Farmers/Pump Managers 4. Neighbours/Friends 5. Fertiliser/Seed Dealers 6. Radio/Television 7. Others (Name): _____ 		44: Last year (1982-83) in how many acres of cane plantation did you apply Urea as top dressing? _____ Acres
	(b) When you heard, did you become interested to know about top dressing of Urea? _____ Yes _____ No		(b) If you did not do, what were the reasons? _____
	(c) When you heard did you evaluate the benefits of top dressing of Urea in Cane? _____ Yes _____ No		45: (Knowledge) (a) Do you know how much of Urea should be applied in Cane at what time? (S)
	(d) When you heard, did you try in small scale before starting top dressing of Urea in Cane? _____ Yes _____ No		Time _____ Amount/Acre _____
	(e) Are you applying Urea as top dressing in Cane? _____ Yes _____ No		(b) Do you know what are the reasons of using Urea as top dressing? _____ Yes _____ No
	If yes, who is your principal advisor of top dressing of Urea? <ol style="list-style-type: none"> 1. CDO/ACD/Cik 2. Supervised Cane Growers 3. Model Farmers/Co-operative Manager 4. Neighbours/Friends 5. Fertiliser Seed Dealers 6. Radio/Television 7. Others (Name): _____ 		If yes, state the reasons of top dressing? _____
			46: (Skill) (a) Last year (1982-83) in how many acres of Cane did you apply Urea as top dressing (S) _____ Acres
			(b) In which of the following ways did you apply top dressing? <ol style="list-style-type: none"> 1. Broadcasting Urea evenly in the field 2. Broadcasting inside trench/furrow 3. Inside trench/furrow and then covered with soil.

Appendix-9

<p>No Writing Column Code</p>	<p>If yes who was your primary source of information for mechanical pest control? (Put tick mark before only one)</p> <p>1. CBO/ACBO/COA 2. Supervised Cane Growers 3. Model Farmers/Cooperative Managers 4. Neighbours/Friends 5. Fertilizer/Insecticide Dealers 6. Radio/television 7. Others (Name):</p>	<p>No Writing Column Code</p>	<p>57. If you follow mechanical pest control form how many years ago are you following mechanical pest control?</p> <p>Yes _____ No _____</p>
<p>No Writing Column Code</p>	<p>(b) When you heard about it, did you become interested to know more about mechanical pest control in sugarcane? Yes _____ No _____</p> <p>(c) When you know about it, did you evaluate the benefits of mechanical pest control? Yes _____ No _____</p> <p>(d) When you heard about it did you try in small scale before starting mechanical pest control? Yes _____ No _____</p> <p>(e) Are you following mechanical pest control in sugarcane? Yes _____ No _____</p> <p>If yes, who is your principal advisor? (Put tick mark before only one)</p> <p>1. CBO/ACBO/COA 2. Supervised Cane Growers 3. Model Farmers/Cooperative Managers 4. Neighbours/Friends 5. Fertilizer/Insecticide Dealers 6. Radio/television 7. Others (Name):</p>	<p>No Writing Column Code</p>	<p>58. (a) Last year in how many acres of cane plantation did you follow mechanical pest control? Acres _____</p> <p>(b) If you did not do what were the reasons? _____ _____ _____</p>
<p>No Writing Column Code</p>	<p>(a) Do you know the methods of mechanical pest control? (5) Yes _____ No _____</p> <p>If yes, what are the methods? _____ _____ _____</p> <p>(b) Do you know which insects can be controlled by mechanical methods? (5) Yes _____ No _____</p> <p>If yes name the insects _____ _____ _____</p>	<p>No Writing Column Code</p>	<p>59. (Knowledge) (a) Do you know the methods of mechanical pest control? (5) Yes _____ No _____</p> <p>If yes, what are the methods? _____ _____ _____</p> <p>(b) Do you know which insects can be controlled by mechanical methods? (5) Yes _____ No _____</p> <p>If yes name the insects _____ _____ _____</p>
<p>No Writing Column Code</p>	<p>(a) Cane you identify the insects by observing condition/nature of attack? (5) Yes _____ No _____</p> <p>(b) Do you frequently observe the field to ascertain whether pest attack started? Yes _____ No _____</p> <p>(c) As compared to other cane growers what was the extent of pest infestation in your cane field? (5) LESS _____ Same _____ More _____</p>	<p>No Writing Column Code</p>	<p>60 (Skill) (a) Cane you identify the insects by observing condition/nature of attack? (5) Yes _____ No _____</p> <p>(b) Do you frequently observe the field to ascertain whether pest attack started? Yes _____ No _____</p> <p>(c) As compared to other cane growers what was the extent of pest infestation in your cane field? (5) LESS _____ Same _____ More _____</p>

Appendix-D

No. Writing Column	65 61. Attitude Toward Technology: (a) Do you believe that cutting out infested plants does not harm the crop or reduce the yield? (P) Yes (3) No (1) No opinion (2) (b) Some cane growers think that cutting out infested plants not only destroy the plants but also fail to prevent pest infestation. Do you subscribe their thinking? (N) Yes (1) No (3) No opinion (2) (c) Would you support compulsory measures to follow mechanical pest control by every cane grower? (N) Yes (1) No (3) No opinion (2) 62. Technology Acceptability: In your opinion is/does mechanical pest control: (a) Fully (3) Is some No (1) Extent (2) Fully (3)	No Writing Column	66 63. (Product Market Difficulty) How much difficulty do you face in various aspects of marketing of sugarcane? (Put tick mark in appropriate boxes)
			<p>Aspects of Marketing</p> <p>Extent of difficulty</p> <p>No diff. Little Substantial culty (1) diff (2) difficulty diff culty (4)</p> <p>Timely harvest</p> <p>Storing</p> <p>Preparation for market</p> <p>Transportation</p> <p>Ensured sale</p> <p>Price stability</p> <p>Buyer's behavior</p>

Appendix 3

Confidential

**INSTITUTES OF BUSINESS ADMINISTRATION
UNIVERSITY OF DAKA, DAKA.**

**Performance Determinates of Extension Organizations
of Bangladesh**

QUESTIONNAIRE FOR SERVICE PERSONNEL

Introduction of Research Study: A number of extension organizations are working in Bangladesh. They are endeavoring to become successful in realizing their goals. In order to make them effective it is necessary to know what forces influence or control their performance. The aim of this research is to identify the forces that influence their performance in the context of Bangladesh and to find out ways to make them effective in meeting the needs of the farmers. Keeping these objectives in view this questionnaire was prepared to collect information from about 500 extension personnel of all cadres of Agriculture and Sugarcane Extension Services. The first and second parts of the questionnaire are for all personnel and the other are for particular group of personnel.

The utility of this research would depend on expressing and providing correct opinion and information. The information provided in this questionnaire is personal and confidential. The confidentiality and use of furnished information will only be used for research purpose. With this promise each respondent is requested to enhance the importance and usefulness of the study by furnishing correct opinion and information. **Accuracy of each response is highly desirable for completeness of the study.**

No Writing This Side

Column Code

Respondent (Code):

Organization: Agriculture/Sugarcane

Office: National/Regional/Institutional
(Unit) or Subzone/Block or unit.

Designation:

No Writing Column	17. Amount of Incentive received (1983)	No Writing Column	20. What are or were the occupation of your parents or guardians (Put tick mark?)
	<p>In Account of: Amount (Tk.)</p> <p>Cash Reward</p> <p>Material Reward (Value)</p> <p>Advance Payment (Amount)</p> <p>Production Incentive</p> <p>Others (if any):</p> <p>Total:</p>		<p>a) Agricultural</p> <p>b) Service</p> <p>c) Business</p> <p>d) Law</p> <p>e) Medicine</p> <p>f) Teaching</p> <p>g) Others (Name):</p>
	<p>23. How many days did you spend in 1983 outside your working jurisdiction on various accounts?</p> <p>In Account of: Period (days)</p> <p>Casual Leave</p> <p>Earned Leave</p> <p>Medical Leave</p> <p>Recreation Leave</p> <p>Seminar/Workshop</p> <p>Training (Local)</p> <p>Training (Foreign)</p> <p>Educational Tour (Local)</p> <p>Educational Tour (Foreign)</p> <p>Suspension</p> <p>Others (Name):</p> <p>Total:</p>		<p>21. Where did you spend your boyhood (upto 12 years of age)? Put tick mark.</p> <p>a) City b) Town c) Village</p> <p>22. Is or was any one of your near relatives (Parents/Brothers, Uncles, father-in-laws): Put tick mark</p> <p>a) Influential Politician</p> <p>b) Assembly Member</p> <p>c) Minister</p> <p>d) High Officials</p> <p>e) Influential Religious Leader</p> <p>f) None of the above</p> <p>23. Are/were you regularly associated with cultural activities?</p> <p>Yes No</p> <p>24. Are you an active member of professional association or societies?</p> <p>Yes No</p> <p>If yes, name the associations/societies.</p>
	<p>19. How many days were you on tour in 1983 and the distance you travelled?</p> <p>Month Travelled Distance (Miles)</p> <p>January</p> <p>February</p> <p>March</p> <p>April</p> <p>May</p> <p>June</p> <p>July</p> <p>August</p> <p>September</p> <p>October</p> <p>November</p> <p>December</p> <p>Total:</p>		

Appendix B

No. Writing Column Code	8. (Factual Authority) In making decisions regarding each of the following aspects for each power you have by dint of your position. (put tick mark in appropriate boxes)	No. Writing Column Code	9. (Management Participativeness) How democratic is the top management of your organization in deciding upon each of the following aspects of decision making? Encircle appropriate number.
	<p>Extent of Power</p> <p>No Power / Power / Power / Power</p> <p>Power to prepare / to its dis /</p> <p>Power to propose / to discuss / decide</p> <p>(1) / (2) / (3) / (4) / (5)</p> <p>Matters of Decision</p> <p>Client selection</p> <p>Fixing priority</p> <p>Fixing target</p> <p>Selecting Aids</p> <p>Work procedure</p> <p>Distribution of work</p> <p>Operational time</p> <p>Educational need</p> <p>Recognition of work</p> <p>Performance appraisal</p>		<p>1 2 3 4 5 6 7</p> <p>Democratic</p> <p>Decisions are made on the basis of discussion in a team or representative committee</p> <p>a) Generation of improved cultivation technologies 1 2 3 4 5 6 7</p> <p>b) Adopting new programmes 1 2 3 4 5 6 7</p> <p>c) Long term investment 1 2 3 4 5 6 7</p> <p>d) Change of procedures in vogue 1 2 3 4 5 6 7</p> <p>e) Change of organizational structures 1 2 3 4 5 6 7</p> <p>f) Preparation of annual development programmes 1 2 3 4 5 6 7</p> <p>g) Employment policy formulation 1 2 3 4 5 6 6</p> <p>h) Creating work facilities 1 2 3 4 5 6 7</p>
	<p>Extent of truthness</p> <p>Not / Not / True / True / to / every /</p> <p>all / True / Same / each /</p> <p>found / Different / true /</p> <p>11/4 12/3 1 3/2 1 4/1</p> <p>One can decide about his work without any bodies servility (N)</p> <p>Work procedure is left to the individuals (N)</p> <p>One can work at his will (N)</p> <p>Every body can fix up his own work method (N)</p> <p>Violation of work procedure is constantly noticed (P)</p> <p>People feel no freedom of work (P)</p> <p>There is rule to deal with every situation (P)</p> <p>Every body has definite work to do (P)</p> <p>Through proper channel is always emphasized (P)</p> <p>Written record of every body's work is maintained (P)</p> <p>Allowed work is strictly followed (P)</p> <p>There is always some one to find a solution of a problem (P)</p>		<p>9. (Management creativeness) Encircle the right number of each of the following statement.</p> <p>a) How frequently the senior officers of your organization impose decision as a means of resolving the difference of opinion among superiors and sub-ordinates regarding matters of personnel and organizational management?</p> <p>Never 1 2 3 4 5 6 7 Usually done</p> <p>b) How frequently the senior officers of your organization resist the compliance of violating the orders as a means of resolving the resistance of sub-ordinates in operationalizing change of organizational structures?</p> <p>Never 1 2 3 4 5 6 7 Usually done</p>

No Writing Column Code	10. (a) How frequently the senior officers of your organization explain the proposed change with detail logic to all concerned as a basis of resolving differences of opinion and resistance and securing organizational structure usually gives	11. (b) In your organization how true is each of the following statements regarding yourself? (Put tick mark in appropriate box against each statement)
---	Usually 1 2 3 4 5 6 7 Never gives	Extent of truth Not True True 14/1 13/2 12/3 11/4
---	d) How frequently the senior officers of your organization use specialists and consultants in formulating proposal for change after consulting the problems of management? Usually 1 2 3 4 5 6 7 Never done	Statement I get enough time to complete assigned task (A) The way I am to do work should be done differently (P) I can do my duty in spite of existence of groups & sub-groups (W) I have to work in a situation of conflicting policy & decision (P) I am assigned without provision of adequate manpower (P) I am assigned with such work what I can accept (W) I receive conflicting directives from more than one bosses (P) Often responsibility comes with out adequate resource and equipments (P) I often need to violate rules for effective performance (P) I remain often busy with unnecessary work (P)
---	e) How frequently the senior officers of your organization use arbitration in resolving the conflicts among groups and sub-groups and co-operation and co-ordination? Usually 1 2 3 4 5 6 7 Never done	
---	10. (f) (Flexibility) In your opinion how frequently each of the following aspects of your organization is changed? (Put tick mark in appropriate box against each aspect)	
---	Frequency of change Never (S) Scale (Frequency) (do) (times) (often) (frequently) (1) (2) (3) (4) (5)	
---	Organizational Matters	
---	Organizational structure	
---	Job titles	
---	Job descriptions	
---	Working base	
---	Allocation of responsibility	
---	Work procedure	
---	Employment policy	
---	Management policies	
---	Work program	
---	Frequency of Contact Never (S) Scale (Frequency) (do) (times) (often) (frequently) (1) (2) (3) (4) (5)	
---	Communication Media Face to face discussion Telephonic discussion Formal meetings Correspondence Social gatherings	

No. Writing Code	13. (Program Managers) In your opinion how much importance is assigned to each of the following aspects in preparing programs of your organization. (Put tick mark in appropriate box against each aspect).	13
	<p>Aspects</p> <p>Selection technology for solving problems</p> <p>Setting targets</p> <p>Identifying tasks to be performed</p> <p>Assigning responsibilities to individuals</p> <p>Allocation of resources and equipments</p> <p>Establishing account ability</p> <p>Setting procedure of supervision and reporting</p>	<p>Scope of participation</p> <p>No Little Some Much Very</p> <p>(0) (1) (2) (3) (4) (5)</p>
	<p>Aspects</p> <p>Analysis of socio-economic conditions of farmers</p> <p>Identification of practical problems</p> <p>Setting priority of problems</p> <p>Identifying alternative solutions</p> <p>Evaluating alternative solutions</p> <p>Selecting technology for solving</p> <p>Setting targets</p> <p>Identifying tasks to be performed</p> <p>Assigning responsibilities to individuals</p> <p>Allocation of resources and equipments</p> <p>Establishing accountability</p> <p>Setting procedure of supervision and reporting</p>	<p>Degree of Importance</p> <p>No Little Some (Satisfies) Very</p> <p>(0) (1) (2) (3) (4) (5)</p>
	<p>Aspects</p> <p>Extensive socio-economic conditions farmers</p> <p>Identification of practical problems</p> <p>Setting priority of problems</p> <p>Identifying alternative solutions</p> <p>Evaluating alternative solutions</p>	<p>Scope of participation</p> <p>No Little Some (of) Much</p> <p>(0) (1) (2) (3) (4) (5)</p>
	<p>14. (Staff participation in planning) How much scope do you get to participate in each of the following aspects of preparing short & long term programs of your organization. (Please put tick mark in appropriate box against each of the aspect).</p> <p>Aspects</p> <p>Relation organization</p> <p>Peer acquaintance friendship</p> <p>Family relation</p> <p>Inhabitant of same locality</p> <p>Student of same institution</p> <p>Same profession</p> <p>Personal locality</p> <p>Personal service/offering presents, etc. (Task orientation)</p> <p>Capability</p> <p>Initiative</p> <p>Discipline/timeliness</p> <p>Determination to work</p> <p>Target achievement</p> <p>Working overtime</p>	<p>Extent of Influence</p> <p>No Little Some Much Very</p> <p>(0) (1) (2) (3) (4) (5)</p>

<p>No Writing Column Code</p>	<p>16) Anxiety Stress) How anxious are you about each of the following job related problems in your organization? (Please put tick mark in appropriate box against each problem).</p> <p>Extent of Anxiety () (1) (2) (3) (4) (5) Very Little Slightly More Quite a bit Very much</p> <p>Problems</p> <p>Failure to achieve target Misuse of resources Loss of seniority Fear of inconsistency of assets and liabilities Loss of scope for professional advancement Loss of positional status Loss of prestige claim in the organization Loss of personal image in public Interference of superior sub-ordinate relation Interference of inter personal relation</p>	<p>17) (Motivation) Which of the following sacrifices you are ready to make for the interest of your organization. Put tick mark under Yes or No.</p> <p>Sacrifices</p> <p>Yes No</p> <p>a) Working outside normal office hours b) Working beyond assigned responsibility c) Helping colleagues keeping out work pending d) Overlooking personal problem for official work e) Sacrificing personal comfort for official work f) Ignoring social activities for official work g) Working overtime without compensation h) Work even spending personal money</p> <p>22. Make general comment about the management of your Organization.</p>
<p>No Writing Column Code</p>	<p>18) Inter-organizational Conflict) Each organization has several branches. In management different situation may arise among the branches. Five branches with situations are mentioned below. In your opinion how frequently your branch faces each of those situation. Put 1-5 (1-Never, 2-Seldom, 3-Sometimes, 4-Often, 5-Always) for each situation of each branch.</p> <p>Situations</p> <p>Interference in your work Embarrassing by overstatement in personal group contact Embarrassing by distorting information Obstructing flow of information Expression of contradictory philosophy of work Creating situation of suspicion and distrust</p>	<p>PART III: (ONLY HEADS OF OFFICES)</p> <p>1. How many staff and officers are directly responsible to you for work?</p> <p>a) Technical b) Administrative/Secretarial</p> <p>2. (Severity of Punishment) Which of the following action did you take against the many personnel due to failure of accomplishing desired work or behavior?</p> <p>Actions Number</p> <p>Rebuke severely Show cause notice Warning Temporary suspension Salary withheld Withheld of annual increment Financial penalty Deduction</p>

No	Writing Column	Code
19	4. (c) How much influence the work of each of the following organizations exert upon the work of your organization (1=No influence, 2=Little influence, 3=Some influence, 4=some influence, 5=Very much influence). Put appropriate number against each organization.	
	1) Civil Administration 2) Local Government 3) Rural Development Board 4) Input Supply Agencies 5) Banks 6) Cooperative Societies	
	* (d)	
	(e) How much consistent is the objective of your organization with the objectives of each of the following organization (1=Not at all, 2=Little, 3=Some, 4=a great extent, 5=Almost same) Put appropriate number against each organization.	
	1) Civil Administration 2) Local Government 3) Rural Development Board 4) Input Supply Agencies 5) Banks 6) Cooperative Societies	
	5. (Inter-organizational Conflict) (a) How much each of the following organization interfere in the work of your organization? (1=No, 2=Little, 3=Some, 4=some, 5=Very much). Put appropriate number against each organization.	
	1) Civil Administration 2) Local Government 3) Rural Development Board 4) Input Supply Agencies 5) Banks 6) Cooperative Societies	
	(b) How frequently the members of your organization make over statement about the faults of your organization in personal contact and writings (1=Never, 2= seldom, 3=Sometimes, 4=often, 5=Always). Put appropriate number against each organization.	
	1) Civil Administration 2) Local Government 3) Rural Development Board 4) Input Supply Agencies 5) Banks 6) Cooperative Societies	
	(c) How frequently do each of the following organization embarrass your organization by giving distorted information (1=Never, 2=seldom, 3=Sometimes, 4=often, 5=Always). Put appropriate number against each organization.	
	1) Civil Administration 2) Local Government 3) Rural Development Board 4) Input Supply Agencies 5) Banks 6) Cooperative Societies	
	* (f) The success of your organization would depend how much on the success of the following organizations? (1=No, 2=Little, 3=Some, 4=some, 5=very much) Put appropriate number against each of the following organizations.	
	1) Civil Adm. 2) Local Govt. 3) Rural Dev. Board 4) Input Supply Agency 5) Banks 6) Coop. Societies	

No	Writing Column	Code
18	3. (Socio-political Influence) How much influence is exerted by socio-political influential personalities and administrators in accomplishing each of the following work. Put tick mark in appropriate box against each aspect.	
	Aspects	Degree of influence
	Client selection	No, Little, Much
	Target setting	Little, Much
	Program evaluation	(1) (2) (3) (4) (5)
	Staff appointment	
	Financing	
	Board and parliament	
	Staff development	
	4. (Inter-organizational Relationship) (a) In your opinion how frequently do your organization contact each of the following organization? (1=No contact, 2=Few times in year, 3=once or two in a month, 4=once or two in a week, 5=Every day). Put correct number against each organization.	
	1) Civil Administration 2) Local Government 3) Rural Development Board 4) Input Supply Agencies 5) Banks 6) Co-operative Societies	
	(b) What is the basis of contact between your organization and each of the following organizations? (1=No contact, 2=rule/regulation, 3=Government directive, 4=Agreement, 5=Local need/Problem). Put appropriate number against each organization.	
	1) Civil Administration 2) Local Government 3) Rural Development Board 4) Input Supply Agencies 5) Banks 6) Cooperative Societies	

20)	No. Writing Code Column	7. (Personal Quality of staff: Please evaluate the personal qualities of each of the respondents, specifying their code numbers (List enclosed) in a 5-point scale 1-5 (1=very low, 2=low, 3=average, 4=above average, 5=very high).
<p>*d) 5. How comparable the values of the members of your organization with that of the members of each of the following organizations (1-not at all, 2-little, 3-to some extent, 4-much, 5-very much). Put appropriate number against each organization.</p> <p>----- 1) Civil Administration ----- 4) Input supply agency ----- 2) Local Government ----- 5) Banks ----- 3) Rural Development Board ----- 6) Cooperative Society</p> <p>f) How different is the philosophy and work procedure of your organization with that of each of the following organization? (1-not at all, 2-little, 3-to some extent, 4-much, 5-very much) Put appropriate number against each organization.</p> <p>----- 1) Civil Administration ----- 4) Input supply agency ----- 2) Local Government ----- 5) Banks ----- 3) Rural Development Board ----- 6) Cooperative Societies</p> <p>9. What was the budget and actual expenses of your operational unit during 1982-83. (Tk.)</p> <p>Head of Accounts Budget Actual ----- ----- ----- ----- ----- ----- ----- ----- -----</p>		
<p>* d) How frequently each of the following organizations obstruct exchange of information with your organization (1-Never, 2-Seldom, 3-Sometimes, 4-Often, 5-Always). Put appropriate number against each organization</p> <p>----- 1) Civil Adm. ----- 4) Input supply Agency ----- 2) Local Govt. ----- 5) Banks ----- 3) Rural Dev. Board ----- 6) Coop. Societies</p>		
21)	No. Writing Code Column	7. (Personal Quality of staff: Please evaluate the personal qualities of each of the respondents, specifying their code numbers (List enclosed) in a 5-point scale 1-5 (1=very low, 2=low, 3=average, 4=above average, 5=very high).
		Personal Qualities
		Code No
		Initiative
		Intelligence
		Clear thinking
		Personality
		Forthrightness
		Skill
		Perseverance
		Originality
		Rectitude
		Discipline
		Self confidence
		Cooperativeness
		Sincerity
		Cautiousness
		Self sacrifice
		Patience
		Expanding Mind
		Speaking ability
		Writing ability
		Neatness
		Local

PART IV: THANA/UPAZILLA/SUBZONE EXTENSION OFFICERS (THANADAO/MAJIDAO/OSKI)	22	23
No Writing Column	Code	Code
1. (a) Educational activities) How many farm and home visits did you make this year (1983) as Thana/Upazilla/Subzone Extension officer either alone or along with other officers and field extension workers?	Number	Number
Excluding travel time what is the amount of time you could spend for each visit?	Hours/Minutes	Hours/Minutes
(b) After farmer visit your office for technical advice, how many farmers visit your office during last one year (1983) for giving technical advice.	Number	Number
How much time on an average could you spend to a visiting farmer for giving advice?	Hours/Minutes	Hours/Minutes
(c) After application of new technologies is practically demonstrated in the field, you as a Thana/Upazilla/Subzone Extension officers along or with other officers and field staff how many such Method demonstrations could conduct during last year (1983)?	Number	Number
How many farmers on an average could attend such a Method demonstration?	Number	Number
Excluding travel time on an average how much time could you spend for each Method Demonstration?	Number	Number
(d) After result demonstrations are organised to show the benefits of using a new practice, how many result demonstrations could you alone as Thana/Upazilla/Subzone Extension officer or along with other officers or field staff, conduct during last year (1983)?	Number	Number
On an average how many farmers could attend a Results Demonstration meeting?	Number	Number
On an average how much time could you spend for a Result Demonstration meeting excluding travel time?	Hours/Minutes	Hours/Minutes
(e) Small Meetings are conducted to create awareness among farmers about application of new and improved techniques, how many such small Meetings did you conduct alone or along with other officers and field staff during 1983?	Hours/Minutes	Hours/Minutes
On an average how many farmers could attend a Small Meeting?	Number	Number
(f) Mass Meetings are organised with wide publicity to create general awareness about problems and new technologies, during last year (1983) how many such Mass Meetings were organised in your Upazilla/Subzone?	Number	Number
On an average how many farmers could attend a Mass Meeting?	Number	Number
Excluding travel time how much time required to conduct a Mass Meeting?	Number	Number
(g) Often Field Days are organised combining meetings, demonstrations and discussions, during last one year (1983) how many Field Days were organised in your Upazilla/Subzone?	Number	Number
On an average how many farmers could attend a Field Day?	Number	Number
Excluding travel time how much time is required to conduct a Field Day?	Hours	Hours

No Writing Code	24	25
	<p>(D) During 1983 was there any general/agricultural exhibition in your Upazilla/subzone?</p> <p>Yes _____ No _____</p> <p>If yes, did you participate to present technological information?</p> <p>Yes _____ No _____</p> <p>If yes how many days continued the exhibition?</p> <p>Number _____</p> <p>On an average how many visitors visited your stall every day?</p> <p>Number _____</p> <p>(E) How many Seminar/Workshop did you conduct for the farmers in your Upazilla/Subzone in 1983?</p> <p>Number _____</p> <p>How many farmers on an average could attend a Seminar/Workshop?</p> <p>Number _____</p> <p>How many days a Seminar/Workshop continued?</p> <p>Hours/Days _____</p> <p>(F) In this Upazilla/Subzone did you organise Educational Tour for the farmers in 1983?</p> <p>Yes _____ No _____</p> <p>If yes, how many farmers were in each group?</p> <p>Number _____</p> <p>Excluding travel time how much time was spent on an average for each group?</p> <p>Hours _____</p> <p>(G) Did you organise Farmer training in your Upazilla/Subzone during 1983?</p> <p>Yes _____ No _____</p> <p>If yes, how many groups were trained?</p> <p>Number _____</p>	<p>How many farmers were in a group?</p> <p>Number _____</p> <p>What was the duration of a course?</p> <p>Days _____</p> <p>(H) During 1983 did you show any film on agricultural/extension?</p> <p>Yes _____ No _____</p> <p>If yes, how many times such film was displayed?</p> <p>Number _____</p> <p>What was the average duration of a projection?</p> <p>Hours/Minutes _____</p> <p>(I) In your Upazilla/Subzone how many farmers are regular subscribers of KrishiBhata?</p> <p>Number _____</p> <p>(J) Do you or extension workers under you use Audio-visuals aid regularly?</p> <p>Yes _____ No _____</p>

PART V: UPAZILLA/SUB-TOWN OFFICERS OTHER THAN DMO/CSO	No. Writing Column Code	On an average how many farmers could attend a Result Demonstration Meeting?	27
<p>1. (a) Educational Activities) How many fars and how visits did you, make alone or along with Block Supervisor(s)/Cane Development Assistant(s) during last year (1983)?</p> <p>----- Number</p> <p>Excluding travel time on an average how much time could you spend for a single fars or how visit?</p> <p>----- Hours/Minutes</p>		<p>Excluding travel time how much time could you spend for a single Result Demonstration Meeting?</p> <p>----- Number</p> <p>Excluding travel time how much time could you spend on an average for a single Small Meeting?</p> <p>----- Hours/Minutes</p>	
<p>(b) Sometimes farmers come to your office for technical advice, how many farmers did visit your office during last year (1983) for technical advice?</p> <p>----- Number</p> <p>On an average how much time could you spend for giving advice to single office callers?</p> <p>----- Hours/Minutes</p>		<p>(b) Small Meetings are often organized for creating general awareness, how many Small Meetings did you alone or along with Block Supervisor(s)/Cane Development Asstt.(s) organize during last year (1983)?</p> <p>----- Number</p> <p>How many farmers could attend such meeting on an average?</p> <p>----- Number</p> <p>Excluding travel time how much time could spend on an average for a single Small Meeting?</p> <p>----- Hours/Minutes</p>	
PART VI: ONLY FOR BLOCK SUPERVISORS/CANE DEVELOPMENT ASSISTANTS			
<p>(c) Sometimes application of technologies are practically demonstrated in Small Meetings organized in the field, how many such Method Demonstration Meetings did you alone or along with Block Supervisor(s)/Cane Development Asstt.(s) organize during last year (1983)?</p> <p>----- Number</p> <p>On an average how many farmers could attend such a method demonstration meeting?</p> <p>----- Number</p> <p>Excluding travel time on an average how much time could you spend for a single Method Demonstration Meeting?</p> <p>----- Hours/Minutes.</p>		<p>1. Name of the Block/Cane Development Unit</p> <p>-----</p> <p>2. (Educational Activities) (a) How many fars/home visits did you alone (not with any officer) make during last-year (1983)?</p> <p>----- Number</p> <p>Excluding travel time on an average how much time could you spend for each visit and give technical advice to the farmers?</p> <p>----- Hours/Minutes</p>	
<p>(d) Sometimes the advantages/benefits of using a technology is practically demonstrated in meetings in the field, how many such Result Demonstration Meetings did you alone or along with Block Supervisor(s)/Cane Development Assistant(s) organize during last year (1983)?</p> <p>----- Number</p>		<p>(b) Often farmers meet you or visit your office (if any) for technical advice, how many farmers did meet you or visit your office for technical advice during last year (1983)?</p> <p>----- Number</p> <p>On an average how much time could you spend for each visitors for giving technical advice?</p> <p>----- Hours/Minutes</p>	

Appendix-3

No Writing Column Code	28: (c) Often small meetings are organised in the field to demonstrate the application of new technique. How many such Method Demonstration Meetings could you alone (not with any officers) organize during last year (1983)? Number In an average how many farmers could attend such a Method Demonstration? Number Excluding travel time how much time could you spend to organize such a Method Demonstration? Hours/Minutes	No Writing Column Code	3. In 1982-83 was there any committee concerning agriculturalists, either temporarily or permanent in your block or cane development unit? Yes _____ No _____ If yes, please write their name, status and number of members of different categories. Name of the Committees _____ No of members _____ Officers/Tech. Staff/Para/Total _____
No Writing Column Code	(d) Advantage/benefits of a new practice is practically demonstrated in small meetings in the field. How many such Result Demonstration Meetings could you alone (not with any officer) conduct during last year (1983)? Number In an average how many farmers could attend such a Result Demonstration meeting? Number Excluding travel time how much time could you spend for such a Result Demonstration Meeting? Hours/Minutes	No Writing Column Code	4. During 1983 who came to supervise your office or work and how much time did they spend? Name and designation of the officers _____ Time Spent(hrs) _____
No Writing Column Code	(e) Small Meetings are often organised to create general awareness. How many Small Meetings could you alone (not with any officer(s)) organise during last year (1983)? Number Excluding travel time on an average how much time could you spend for a single Small Meeting? Hours/Minutes	No Writing Column Code	

No. Writing Code	10	11
	<p>1. Name of the Thana/Upazilla/Subzone (Sp. Mill):</p> <p>2. Area of the Thana/Upazilla/Subzone (Sq. Miles):</p> <p>3. Total Length of Roads of Thana/Upazilla/Subzone (Miles)</p> <p>Types of Roads</p> <p>Metalic (Munha) Total (Miles) (Miles) (Miles)</p> <p>Road and High Way Deptt. District Council Thana/Upazilla Council Union Parishad</p>	<p>17. Amount of purchased inputs used in 1982-83 from all sources as actual requirement for implementing agricultural/sugar cane development programs.</p> <p>Inputs</p> <p>Fertilizer (Tons)</p> <p>Insecticides (Tons)</p> <p>Herbicides (Tons)</p> <p>Seeds (Mounds)</p> <p>Irrigation (Acres)</p>
	<p>4. Population:</p> <p>5. Total number of families:</p> <p>6. Total no. of farm families/cane growers:</p> <p>7. Literacy (%):</p> <p>8. Arable Land (Acres)/Area for cane plantation (Area):</p> <p>9. Total cropped land/actual cane plantation (Area):</p> <p>10. Cropping Intensity:</p> <p>11. Area of crop/sugar cane damage due to fast flood (Acre):</p> <p>12. Area of crop/sugar cane damage due to fast draught (Acre):</p> <p>13. Rainfall (from nearest meteorological centre) (1983):</p> <p>14. Temperature (from nearest meteorological centre) (1983):</p> <p>15. Number of clear sunny days (1983):</p> <p>16. Particulates of Irrigation (1983):</p> <p>Methods of Irrigation</p> <p>Length (Miles) (Miles)</p> <p>Canal</p> <p>Deep Tubewell</p> <p>Shallow Tubewell</p> <p>Power Pump</p> <p>Foot Pump</p> <p>Donk, etc.</p>	<p>19. Amount of credit seed and available from all sources for agricultural/sugar cane development programs.</p> <p>a) Requirement (Tk.)</p> <p>b) Made available (Tk.)</p> <p>19. Number of contact/supervised farmers</p> <p>20. Agricultural/sugar cane development targets and achievement in 1982-83.</p> <p>Items of Target</p> <p>Target</p> <p>Achievement</p>

No. Writing Column	Code	24. Particulars of different positions as in June 1983.	33
		<p>Positions</p> <p>Sanctioned/No. Filled/Vacant</p> <p>No. </p> <p> </p> <p> (No) (No) (No)</p>	
		<p>25. Particulars of annual Budget (1982-83) and actual expenses (1982-83).</p> <p>Heads of Accounts</p> <p>Proposed: Sanctioned/Actual</p> <p>Budget Actual Expenses</p> <p>(Tk.) (Tk.) (Tk.)</p>	
		<p>21. Particulars of visiting officers and their visits for 1982-83.</p> <p>Name and Designation of Visiting Officers Period of Visits (Drs)</p>	32
		<p>22. Particular of Permanent (P) temporary (T) committees concerning agricultures or cane development in 1983.</p> <p>Name of the Committees Status No. of Members</p> <p> (P/T) </p> <p>Officers/Staff/Farmers/Total</p>	
		<p>23. Distribution of printed materials in 1982-83</p> <p>Publications Number Distributed</p>	

Table 3: Attainments of Goals of Agricultural Extension Organization (N=887)

Code	Primary Administrative Units	Attainments of Component Goals (Percent of Potential Level)									
		Attitude Change (12)(F1189)	Knowledge/Skill Transfer (13)(F1187)	Development (14)(F1186)	Technology Diffusion (15)(F1185)	Productivity Increase (16)(F1184)	Income Increase (17)(F1203)	Living Level Improvement (18)(F1205)	Performance	Performance	Performance
PAU Agricultural Extension Units											
1.	Panchagarh	79.36	27.76	31.60	30.32	14.16	17.46	9.98	35.14		
2.	Mohari	80.25	16.42	30.79	25.04	13.42	15.50	5.68	31.76		
3.	Kaharol	79.17	34.75	33.04	21.50	21.38	20.90	7.22	35.77		
4.	Bochanganj	83.88	28.19	35.66	34.78	15.22	17.38	14.40	39.02		
5.	Dhulal	79.88	22.29	26.00	36.92	20.46	21.25	6.80	35.30		
6.	Bogra Sadar	91.25	61.67	50.12	65.75	19.29	21.96	5.12	50.12		
7.	Kahalo	77.00	26.67	29.21	37.21	19.38	22.29	7.09	36.73		
8.	Bagherpara	89.00	30.03	35.16	52.53	13.31	14.47	5.47	40.06		
9.	Keshabpur	77.64	15.11	18.06	27.39	14.29	19.18	4.82	30.26		
10.	Kaliganj	85.62	39.09	41.64	40.00	17.16	19.31	7.12	40.62		
11.	Jhenaidah	77.58	11.50	24.54	23.54	11.08	13.77	5.72	28.86		
12.	Souripur	83.12	14.25	35.82	33.20	19.42	20.42	6.44	35.39		
13.	Muktigacha	78.28	28.78	37.65	44.02	29.22	27.88	8.26	41.18		
14.	Fulbaria	80.91	16.94	36.22	29.47	31.16	33.81	5.79	38.33		
15.	Jasajpur Sadar	84.61	31.49	31.01	49.55	23.39	23.22	5.38	40.55		
16.	Jhenaidah	88.64	36.54	42.21	34.75	13.48	18.32	7.72	39.34		
17.	Bevanganj	84.27	8.45	21.54	44.73	18.73	22.00	4.81	34.54		
18.	Laxmapur	79.08	16.63	29.54	26.60	17.29	19.94	4.45	32.73		
19.	Raiganj	87.04	42.75	37.67	42.17	15.08	24.62	5.28	42.20		
20.	Fani	84.12	34.71	38.53	35.76	26.61	28.73	3.50	41.34		
PAU Subordinate Stations											
21.	Kochabari	84.25	54.00	46.25	67.05	13.35	15.25	7.52	45.57		
22.	Balidangi	80.33	15.83	23.42	46.25	11.75	12.92	4.35	32.85		
23.	Pirganj	88.38	24.71	26.32	54.14	20.08	19.62	7.21	39.52		
24.	Miligate-0(RJSH)	88.16	44.32	39.76	62.16	17.44	18.12	6.12	44.51		
25.	Rajshahi-A	84.88	29.56	30.86	36.31	17.94	18.31	7.17	36.76		
26.	Sarda	83.64	31.68	27.14	50.73	23.05	24.86	4.16	39.93		
27.	Miligate-4(KSM)	88.58	46.12	42.35	62.62	22.75	22.21	9.57	46.61		
28.	Allardaga	87.46	34.73	30.86	56.69	22.77	21.42	12.36	42.90		
29.	Madhupur	85.65	19.59	20.74	32.65	26.24	20.35	9.42	34.71		
30.	Miligate-4(ZSH)	91.61	56.39	47.94	62.38	26.48	19.83	8.40	48.63		
31.	Melanda	83.62	26.33	25.67	50.81	28.43	23.76	4.77	38.37		
32.	Mandina	84.59	41.25	34.95	63.95	26.05	20.20	5.83	43.71		
	MSS - Between Units	466.32***	4297.88***	1490.74***	4720.64***	744.67***	584.73***	170.08***	672.62***		
	MSS - Within Units	52.76	236.71	220.48	415.37	79.91	95.53	32.68	53.90		
	Grand Mean	83.51	30.15	33.67	42.25	19.22	20.98	4.86	38.79		
	Standard Deviation	6.08	19.43	16.29	23.79	18.16	10.61	6.12	8.69		

Note: *, **, *** Mean 0.05, 0.01, 0.001 Levels of Significance Respectively. F Means Fisher Ratio Base

Table 1: Magnitude and Variation in Quantitative Environmental Variables

Code	Primary Administrative Units	Agro-ecological Environment					Economic Environment				
		Solar Energy	Rainfall	Enviro-Mental Risk	Irrigation Coverage	Access-ibility	Operational-Fare	Subsistence-Pressure	Drift-Power	Family-Labour Availability	
		(KWH/yr.)	(mm)	(0-15)	(%)	(Miles/Sq.M.)	(Acres)	(Acres/Capita)	(Acres/Pair)	(Mandi/Acre)	
Public Agriculture: Upazilas											
1.	Panchagarh	153	152.9	5	25	7.47	11.72	6.72	0.93	2.63	
2.	Morri	153	152.9	5	21	2.61	4.52	5.15	0.58	3.01	
3.	Kaharol	153	152.9	5	14	18.05	9.08	5.64	0.88	3.04	
4.	Bochaganj	153	152.9	5	19	30.35	7.95	13.72	1.62	3.52	
5.	Khetlal	119	196.5	0	18	43.05	4.10	3.87	0.54	1.77	
6.	Boysa Sadar	119	196.5	5	37	24.35	4.33	2.60	0.38	2.29	
7.	Kahalo	119	196.5	10	26	50.36	3.84	4.11	0.64	2.15	
8.	Bagmopara	96	207.0	0	25	21.76	2.95	4.80	0.54	2.18	
9.	Keshabpur	96	207.0	10	32	14.01	2.81	3.67	0.42	1.91	
10.	Kaliganj	96	207.0	0	39	19.39	1.42	3.77	0.61	2.51	
11.	Jheraidah	96	207.0	5	24	4.05	3.37	5.29	0.66	2.36	
12.	Gouripur	134	219.8	0	38	16.80	6.70	3.57	0.56	2.78	
13.	Multagacha	134	219.8	15	41	28.11	2.54	4.12	0.58	2.61	
14.	Fultaria	134	219.8	5	33	37.52	1.67	2.59	0.33	1.69	
15.	Jamair Sadar	191	219.8	10	38	45.03	1.70	2.69	0.37	1.29	
16.	Jhainigati	191	219.8	5	36	29.24	3.50	5.42	0.69	3.06	
17.	Deवानganj	191	219.8	5	32	43.97	1.08	3.51	0.56	2.68	
18.	Laxmipur	135	227.2	5	29	5.32	3.40	3.39	0.40	1.78	
19.	Rampur	135	227.2	5	29	7.65	6.12	2.29	0.30	1.49	
20.	Fani	135	227.2	15	38	0.00	3.14	1.83	0.23	1.51	
Public Sugarcane: Sub-zones											
21.	Khochaberi	153	152.9	5	32	15.19	2.83	6.43	1.17	4.00	
22.	Balisdangi	153	152.9	5	22	0.34	7.14	5.28	0.61	2.90	
23.	Pirganj	153	152.9	5	30	15.98	2.43	4.15	0.59	2.19	
24.	Milligate-B(RJSM)	137	168.7	5	19	2.61	8.33	4.25	0.52	3.46	
25.	Rajshahi-A	137	168.7	5	19	28.04	6.88	6.48	0.61	3.01	
26.	Sarca	137	168.7	5	21	2.38	7.17	2.79	0.31	2.74	
27.	Milligate-A(KSM)	100	160.1	10	31	37.79	0.85	9.90	0.98	3.73	
28.	Allardanga	100	207.1	10	31	2.46	10.98	5.59	0.90	3.49	
29.	Madhupur	100	160.1	0	25	48.91	4.31	6.94	0.87	2.72	
30.	Milligate-A(ZSM)	191	219.8	5	32	26.35	3.33	7.74	0.88	3.53	
31.	Meleda	191	219.8	10	38	18.57	6.18	2.56	0.40	2.09	
32.	Mamda	191	219.8	10	38	1.72	5.71	4.55	0.49	2.57	
MSE: Between Units						6613.94***		179.18***	1.48**	14.40***	
MSE: Within Units						1079.72		53.43	0.48	3.54	
Grand Mean		139.68	193.2	3.93	24.12	19.70	4.72	4.80	0.62	2.50	
Standard Deviation		31.06	29.1	3.90	7.61	35.68	2.84	7.31	0.68	1.88	

Note: 1. 0.05, 0.01, 0.001 Level of Significance respectively; F, SP and or Mean Farmer, Service Personnel and Official Record data bases respectively

Table-1:Contd.

Code	Primary Administrative Units	Economic Environment			Socio-psychological Environment			Politi. Env. Organizational Environment				
		Commercialization (Market Difficulty)	Product (Family Size)	Client (Literacy)	Client (Formal Education)	Attitude (Change)	Socio-Political Influence	Inter-Organizational (Relational Conflict)	Inter-Organizational (Relational Conflict)	Inter-Organizational (Relational Conflict)		
		Percent	Scores	No.	Percent	Percent	Percent	Score	Score	Score	Score	Score
		120 (F1199)	121 (F1108)	122 (F1109)	123 (F1191)	124 (F1111)	130 (F1171)	133 (SP463)	134 (SP475)	135 (SP488)		
POU: Agricultural Units - Villas												
1.	Panchagar	55.79	16.14	7.34	32.27	27.71	23.58	12	103	94		
2.	Atcari	46.28	21.33	6.79	35.14	29.97	22.83	20	66	101		
3.	Kaharol	64.48	19.17	6.71	44.22	30.79	22.42	17	97	77		
4.	Bochanganj	62.30	17.59	6.81	46.23	33.78	22.47	19	92	68		
5.	Khetla	43.67	15.96	7.63	42.34	24.34	23.00	11	62	45		
6.	Bogra Sadar	44.70	12.71	7.08	50.51	30.66	25.92	13	98	76		
7.	Kahalo	40.68	18.63	6.33	53.27	38.97	20.42	18	82	58		
8.	Bagherpara	31.19	18.69	9.59	23.25	17.98	24.38	15	88	91		
9.	Keshabpur	20.16	18.00	6.50	33.74	23.45	22.57	32	168	91		
10.	Kaliganj	54.15	11.56	6.72	41.14	35.77	23.53	14	77	77		
11.	Jhenaidah	36.96	16.12	6.62	46.10	35.17	25.98	9	96	59		
12.	Bouripur	32.95	13.25	7.23	32.45	22.44	26.65	19	80	60		
13.	Muktagecha	18.18	14.23	7.45	19.82	9.04	22.98	20	102	100		
14.	Fulbaria	46.11	15.06	6.28	21.14	17.07	24.38	23	90	78		
15.	Jawalpur Sadar	31.22	15.06	7.82	27.67	22.51	23.29	22	71	75		
16.	Jhenaidah	31.22	10.00	7.32	25.51	15.78	25.68	19	85	92		
17.	Dewanganj	37.84	9.55	6.55	8.12	6.60	27.64	20	87	57		
18.	Laxmapur	20.28	10.03	7.74	26.70	24.48	22.54	25	64	61		
19.	Kaoponj	32.17	13.62	7.88	31.60	18.43	27.25	14	161	72		
20.	Fani	39.80	9.14	6.55	32.54	28.19	25.22	11	87	64		
POU: Suerkaler Sub-Zones												
21.	Khochabari	65.31	17.65	7.35	46.96	33.66	23.95	25	91	67		
22.	Baliadangi	64.25	19.92	9.33	33.66	17.35	21.46	11	91	61		
23.	Pirganj	57.78	17.00	7.33	37.56	27.64	22.29	15	92	79		
24.	Millegate-BRJSR	68.24	16.32	9.28	50.09	28.70	22.52	19	78	96		
25.	Rajshahi-A	69.80	20.94	10.69	20.31	17.88	21.44	14	96	71		
26.	Sarda	63.70	12.68	9.05	37.43	28.92	19.95	19	112	87		
27.	Millegate-A (NSR)	79.12	16.50	11.25	36.93	23.83	21.67	15	87	87		
28.	Allardanga	90.13	14.58	6.86	55.52	44.50	23.81	34	83	101		
29.	Nadupur	65.54	19.88	9.94	33.54	24.15	23.59	26	61	63		
30.	Millegate-A (BSR)	82.92	13.26	8.43	59.67	54.19	23.17	20	98	87		
31.	Melenda	58.09	16.38	6.29	35.33	29.05	20.62	15	66	70		
32.	Mandua	69.80	16.40	9.70	35.87	27.67	22.50	27	65	92		
	MSS : Between Units	10283.31***	299.28***	35.62***	13337.72***	12331.59***	87.36***	-	-	-		
	MSS : Within Units	540.76	14.99	11.72	377.61	470.74	6.67	-	-	-		
	Grand Mean	47.97	15.26	8.06	35.35	26.34	23.52	18.50	85.94	77.47		
	Standard Deviation	29.89	3.67	3.42	25.96	23.15	2.58	6.02	12.27	14.15		

Note : *, **, *** Means 0.05, 0.01, 0.001 Levels of Significance respectively
F and SP Mean Farmer and Service Personnel data bases respectively

Table 2: Intensity and Distribution of Qualitative Variables of Environment

Code No.	Primary Administrative Units	X16(FX114) Tenurial Structure				X25(FX144) Clients Mass Communication Exposure				X26(FX145) Clients Organization Participation								
		Owners	Share Croppers	Share Croppers	Total	Exposed	Not Exposed	Total	Members	Non Members	Total	Members	Non Members	Total				
No.		No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.				
PMU: Agriculture: Operatives																		
1.	Panchagar	37	74.0	13	25.0	0	0	50	5.6	22	44.0	29	56.0	50	62.0	50	5.6	
2.	Atoari	14	59.3	10	43.7	0	0	24	2.7	9	37.5	15	62.5	24	2.7	6	2.7	
3.	Taharshi	17	70.8	6	25.0	1	4.2	24	2.7	3	12.5	21	87.5	24	2.7	0	2.7	
4.	Bochaganj	20	62.5	6	25.0	6	18.8	32	3.6	8	25.0	24	75.0	32	3.6	5	3.6	
5.	Bhetal	15	62.5	6	25.0	3	12.5	24	2.7	5	20.8	19	79.2	24	2.7	5	2.7	
6.	Bogure	20	83.3	3	12.5	1	4.2	24	2.7	13	54.2	11	45.8	24	2.7	11	2.7	
7.	Kahalo	13	54.2	11	43.8	0	0	24	2.7	13	54.2	11	45.8	24	2.7	13	2.7	
8.	Bagherpore	26	81.3	6	25.0	0	0	32	3.6	6	18.8	26	81.3	32	3.6	7	3.6	
9.	Teshapur	20	71.4	8	29.6	0	0	28	3.2	6	21.4	22	78.6	28	3.2	12	3.2	
10.	Kaliganj	19	59.4	12	47.5	1	3.1	32	3.6	12	37.5	20	62.5	32	3.6	4	3.6	
11.	Jhenaidah	8	30.8	14	53.9	4	15.4	26	2.9	7	26.9	19	73.1	26	2.9	7	2.9	
12.	Gouripur	32	80.0	8	30.0	0	0	40	4.5	4	10.0	36	90.0	40	4.5	8	4.5	
13.	Muktapacha	32	80.0	8	30.0	0	0	40	4.5	8	20.0	32	80.0	40	4.5	13	4.5	
14.	Fulbaria	28	87.5	4	12.5	0	0	32	3.6	12	37.5	20	62.5	32	3.6	7	3.6	
15.	Jamapur	40	81.6	9	34.4	0	0	49	5.5	15	30.6	34	69.4	49	5.5	4	5.5	
16.	Jhenaidati	26	92.9	2	7.1	0	0	28	3.2	8	28.6	20	71.4	28	3.2	2	3.2	
17.	Dewanganj	9	81.8	2	7.1	0	0	11	1.2	1	9.1	10	90.5	11	1.2	0	1.2	
18.	Lalpur	23	65.7	12	44.2	0	0	35	3.9	5	14.3	30	85.7	35	3.9	1	3.9	
19.	Raiganj	20	83.3	4	15.7	0	0	24	2.7	2	8.3	22	91.7	24	2.7	4	2.7	
20.	Fani	40	81.6	9	34.4	0	0	49	5.5	6	12.2	43	87.8	49	5.5	1	5.5	
PMU: Sugarcane: Subzones																		
21.	Khorabari	9	45.6	11	55.0	0	0	20	2.3	9	45.0	11	56.0	20	2.3	4	2.3	
22.	Balidangi	20	83.3	4	15.7	0	0	24	2.7	3	12.5	21	87.5	24	2.7	2	2.7	
23.	Pirganj	12	57.1	9	42.9	0	0	21	2.4	2	9.5	19	90.5	21	2.4	2	2.4	
24.	Hills Gate - B(B)SW	22	88.0	3	12.0	0	0	25	2.8	8	32.0	17	68.0	25	2.8	4	2.8	
25.	Rajshahi - A	11	68.8	5	21.3	0	0	16	1.6	3	18.8	13	81.3	16	1.6	3	1.6	
26.	Sarda	21	95.5	1	4.5	0	0	22	2.5	4	18.2	18	81.8	22	2.5	2	2.5	
27.	Hills Gate - A(A)SW	13	54.2	11	45.8	0	0	24	2.7	16	66.7	8	33.3	24	2.7	13	2.7	
28.	Allardarga	26	100.0	0	0	0	0	26	2.9	18	69.2	8	30.8	26	2.9	11	2.9	
29.	Madhapur	14	82.4	3	17.6	0	0	17	1.9	2	11.8	15	88.2	17	1.9	5	1.9	
30.	Hills Gate - A(A)SW	15	65.2	8	34.8	0	0	23	2.6	9	39.1	14	60.9	23	2.6	3	2.6	
31.	Mejenda	9	42.9	12	57.1	0	0	21	2.4	2	9.5	19	90.5	21	2.4	0	2.4	
32.	Mendina	12	60.0	8	40.0	0	0	20	2.3	1	5.0	19	95.0	20	2.3	1	2.3	
	Total	643	72.5	228	25.7	16	1.8	907	100.0	242	27.3	645	72.7	907	100.0	179	79.8	
	Chi Square (c)		202.66***	(0.431)							120.97***	(0.346)					125.73***	(0.352)

Note: *, **, *** mean 0.05, 0.01, 0.001 levels of significance respectively
F and SP mean Farmer and Service Personnel data bases respectively

Table 2: Contd.

Code	x27(Fx150) Clients Co-operative Membership										x28(Fx156) Clients Leadership Experience										x29(Fx170) Client-Patron Relation																																																			
	Members			Non-Members			Total			Leader			Non-Leader			Total			Reition			Non Relation																																																		
No.	Σ	Σ	No.	Σ	No.	Σ	No.	Σ	No.	Σ	No.	Σ	No.	Σ	No.	Σ	No.	Σ	No.	Σ	No.	Σ	No.	Σ																																																
PAU: Agricultural Universities																																																																								
1. Pachagar	14	28.0	36	72.0	50	5.6	0	0.0	50	100.0	50	5.6	10	20.0	48	80.0	50	5.6	5.6	10	20.0	48	80.0	50	5.6																																															
2. Atauri	6	25.0	18	75.0	24	2.7	4	16.7	20	83.3	24	2.7	3	12.5	21	87.5	24	2.7	2.7	3	12.5	21	87.5	24	2.7																																															
3. Saharol	1	4.2	23	95.8	24	2.7	0	0	24	100.0	24	2.7	2	8.3	22	91.7	24	2.7	2.7	2	8.3	22	91.7	24	2.7																																															
4. Bochaganj	10	31.3	22	68.8	32	3.6	3	9.4	29	90.6	32	3.6	5	15.6	27	84.4	32	3.6	3.6	5	15.6	27	84.4	32	3.6																																															
5. Chetlal	6	25.0	18	75.0	26	2.7	1	4.2	23	95.8	24	2.7	4	16.7	28	83.3	24	2.7	2.7	4	16.7	28	83.3	24	2.7																																															
6. Agura	15	62.5	9	37.5	24	2.7	0	0	24	100.0	24	2.7	1	4.2	23	95.8	24	2.7	2.7	1	4.2	23	95.8	24	2.7																																															
7. Sango	17	70.8	7	29.2	24	2.7	4	16.7	20	83.3	24	2.7	12	50.0	12	50.0	24	2.7	2.7	12	50.0	12	50.0	24	2.7																																															
8. Bacherpara	11	34.4	21	65.6	32	3.6	0	0	32	100.0	32	3.6	21	65.6	11	34.4	32	3.6	3.6	21	65.6	11	34.4	32	3.6																																															
9. Teshabur	9	32.1	19	67.9	28	3.2	4	14.3	24	85.7	28	3.2	4	14.3	24	85.7	28	3.2	3.2	4	14.3	24	85.7	28	3.2																																															
10. Rajganj	9	28.1	23	71.9	32	3.6	3	9.4	29	90.6	32	3.6	13	40.6	19	59.4	32	3.6	3.6	13	40.6	19	59.4	32	3.6																																															
11. Henaiddh	9	34.6	17	65.4	26	2.9	0	0	26	100.0	26	2.9	4	15.4	22	84.6	26	2.9	2.9	4	15.4	22	84.6	26	2.9																																															
12. Souripur	12	22.5	31	77.5	40	4.5	8	20.0	32	80.0	40	4.5	0	0	40	100.0	40	4.5	4.5	0	0	40	100.0	40	4.5																																															
13. Muktagacha	28	70.0	12	30.0	40	4.5	2	5.0	38	95.0	40	4.5	4	10.0	36	90.0	40	4.5	4.5	4	10.0	36	90.0	40	4.5																																															
14. Fulbaria	11	34.4	21	65.6	32	3.6	1	3.1	31	96.9	32	3.6	3	9.4	29	90.6	32	3.6	3.6	3	9.4	29	90.6	32	3.6																																															
15. Jamalpur	10	20.4	39	79.6	49	5.5	1	2.0	48	98.0	49	5.5	4	8.2	45	91.8	49	5.5	5.5	4	8.2	45	91.8	49	5.5																																															
16. Henaigati	4	14.3	24	85.7	28	3.2	2	7.1	26	92.9	28	3.2	13	46.4	15	53.6	28	3.2	3.2	13	46.4	15	53.6	28	3.2																																															
17. Dewanganj	0	0	11	100.0	11	1.2	0	0	11	100.0	11	1.2	0	0	11	100.0	11	1.2	1.2	0	0	11	100.0	11	1.2																																															
18. Lakhapur	4	11.4	31	88.6	35	3.9	2	5.7	33	94.3	35	3.9	11	31.4	24	68.6	35	3.9	3.9	11	31.4	24	68.6	35	3.9																																															
19. Raanganj	4	16.7	20	83.3	24	2.7	1	4.2	23	95.8	24	2.7	12	50.0	12	50.0	24	2.7	2.7	12	50.0	12	50.0	24	2.7																																															
20. Fani	10	20.4	39	79.6	49	5.5	1	2.0	48	98.0	49	5.5	35	71.4	14	28.6	49	5.5	5.5	35	71.4	14	28.6	49	5.5																																															
PAU: Sugarcane Sub-zones																																																																								
21. Gochabari	14	70.0	6	30.0	20	2.3	2	10.0	18	90.0	20	2.3	14	70.0	6	30.0	20	2.3	2.3	14	70.0	6	30.0	20	2.3																																															
22. Saliadangi	2	8.3	22	91.7	24	2.7	1	4.2	23	95.8	24	2.7	0	0	24	100.0	24	2.7	2.7	0	0	24	100.0	24	2.7																																															
23. Pirganj	6	28.6	15	71.4	21	2.4	0	0	21	100.0	21	2.4	3	14.3	18	85.7	21	2.4	2.4	3	14.3	18	85.7	21	2.4																																															
24. Mills Gate-B (RSM)	5	20.0	20	80.0	25	2.8	1	4.0	24	95.0	25	2.8	12	48.0	13	52.0	25	2.8	2.8	12	48.0	13	52.0	25	2.8																																															
25. Rajshahi - A	3	18.8	13	81.3	16	1.8	3	18.8	13	81.3	16	1.8	1	8.0	15	68.8	16	1.8	1.8	1	8.0	15	68.8	16	1.8																																															
26. Sarda	4	18.2	18	81.8	22	2.5	1	4.5	21	95.5	22	2.5	9	40.9	13	59.1	22	2.5	2.5	9	40.9	13	59.1	22	2.5																																															
27. Mills Gate - A (KSM)	7	29.2	17	70.8	24	2.5	4	16.7	20	83.3	24	2.5	8	33.3	16	66.7	24	2.5	2.5	8	33.3	16	66.7	24	2.5																																															
28. Allardara	11	42.3	15	57.7	26	2.9	5	19.2	21	80.8	26	2.9	22	84.6	4	15.4	26	2.9	2.9	22	84.6	4	15.4	26	2.9																																															
29. Madhupur	13	76.5	4	33.5	17	1.9	1	5.9	16	94.1	17	1.9	1	5.9	16	94.1	17	1.9	1.9	1	5.9	16	94.1	17	1.9																																															
30. Mills Gate - A (ZSM)	2	8.7	21	91.3	23	2.6	3	13.0	20	87.0	23	2.6	16	69.6	7	30.4	23	2.6	2.6	16	69.6	7	30.4	23	2.6																																															
31. Melenda	5	23.8	16	76.2	21	2.4	1	4.8	20	95.2	21	2.4	15	71.4	6	28.6	21	2.4	2.4	15	71.4	6	28.6	21	2.4																																															
32. Sandina	3	15.0	17	85.0	20	2.3	4	20.0	16	80.0	20	2.3	9	45.0	11	55.0	20	2.3	2.3	9	45.0	11	55.0	20	2.3																																															
Total	262	29.5	625	70.5	987	100.0	63	7.1	824	92.9	887	100.0	275	31.0	611	68.9	887	100.0	2.3	275	31.0	611	68.9	887	100.0																																															
Chi Square (c)																								144.32*** (0.374)																								59.42** (0.251)																								299.91*** (e.496)

Note: *, **, *** mean 0.05, 0.01, 0.001 levels of significance respectively
F and SP mean Farmer and Service Personnel data bases respectively

Table 2: (Contd.)

Code No.	Primary Administrative Units	FRISE Personal Acquaintance with Extension Agents - X31(FRI147) Clients Political Consciousness - X32(FRI149) Clients Political Participation																	
		Acquaintance : No Acquaintance		Total		Party Members : Non-Members		Total		Participants/Non-Participants		Total							
No.	No.	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%				
PAW: Acquaintance: Realized																			
1.	Panchagar	32	64.0	18	36.0	50	5.6	0	0	50	100.0	50	5.6	49	98.0	1	2.0	59	5.6
2.	Atara	20	85.3	4	16.7	24	2.7	3	12.5	21	87.5	24	2.7	22	91.7	2	8.3	24	2.7
3.	Falguni	8	33.3	16	66.7	24	2.7	1	4.2	23	95.8	24	2.7	24	100.0	0	0	24	2.7
4.	Boogra	11	34.4	21	65.6	32	3.6	2	6.3	30	43.8	32	3.6	32	100.0	0	0	32	3.6
5.	Khetlal	17	70.8	7	29.2	24	2.7	2	8.3	22	91.7	24	2.7	22	91.7	2	8.3	24	2.7
6.	Bokhraj	17	70.8	7	29.2	24	2.7	2	8.3	22	91.7	24	2.7	22	91.7	2	8.3	24	2.7
7.	Lahar	15	62.5	9	37.5	24	2.7	5	20.8	19	79.2	24	2.7	19	79.2	5	20.8	24	2.7
8.	Bagherpara	23	71.9	9	28.1	32	3.6	2	6.3	30	93.3	32	3.6	31	96.9	1	3.1	32	3.6
9.	Keshobpur	12	42.9	16	57.1	28	3.2	5	17.9	23	82.1	28	3.2	24	85.7	4	14.3	28	3.2
10.	Falguni	26	81.3	6	18.6	32	3.6	1	3.1	31	96.9	32	3.6	30	93.8	2	6.3	32	3.6
11.	Jhenidah	17	65.4	9	34.6	26	2.9	2	7.7	24	92.3	26	2.9	25	96.2	1	3.8	26	2.9
12.	Sourpur	30	75.0	10	25.0	40	4.5	0	0	40	100.0	40	4.5	39	97.5	1	2.5	40	4.5
13.	Makhsaha	22	55.0	18	45.0	40	4.5	1	2.5	39	97.5	40	4.5	39	97.5	1	2.5	40	4.5
14.	Falbaria	6	16.8	26	83.3	32	3.6	4	12.5	28	87.5	32	3.6	31	96.9	1	3.1	32	3.6
15.	Jhenidah	41	82.0	20	57.1	49	5.5	2	4.1	47	95.9	49	5.5	44	89.8	5	10.2	49	5.5
16.	Jhenidah	21	75.0	7	25.0	28	3.2	0	0	28	100.0	28	3.2	28	100.0	0	0	28	3.2
17.	Dowsonji	1	9.1	10	90.9	11	1.2	0	0	11	100.0	11	1.2	11	100.0	0	0	11	1.2
18.	Lahar	31	88.6	4	11.4	35	3.9	2	5.7	33	94.3	35	3.9	34	97.1	1	2.9	35	3.9
19.	Ranganj	24	100.0	0	0	24	2.7	1	4.2	23	95.8	24	2.7	24	100.0	0	0	24	2.7
20.	Feni	41	82.0	8	16.3	49	5.5	1	2.0	48	98.0	49	5.5	47	95.9	2	4.1	49	5.5
PAW: Acquaintance: Sub-Total																			
21.	Chokchokri	20	100.0	0	0	20	2.3	3	15.0	17	85.0	20	2.3	17	85.0	3	15.0	20	2.3
22.	Balichongi	20	22.3	4	16.7	24	2.7	0	0	24	100.0	24	2.7	23	95.8	1	4.2	24	2.7
23.	Pilgony	17	81.0	4	19.0	21	2.4	1	4.8	20	95.2	21	2.4	20	95.2	1	4.8	21	2.4
24.	Mills Gate - B (20M)	18	75.0	7	29.0	25	2.8	1	4.0	24	96.0	25	2.8	21	84.0	4	16.0	25	2.8
25.	Rajshahi - A	13	81.3	3	18.8	16	1.8	2	15.5	14	87.5	16	1.8	14	87.5	2	12.5	16	1.8
26.	Sarda	9	49.8	13	59.1	22	2.5	3	13.6	19	86.4	22	2.5	14	63.6	8	36.4	22	2.5
27.	Mills Gate - A (15M)	23	95.8	1	4.2	24	2.7	3	12.5	21	87.5	24	2.7	19	79.2	5	20.8	24	2.7
28.	Allardiga	25	61.2	1	3.8	26	2.9	3	11.5	23	88.5	26	2.9	19	69.2	7	26.8	26	2.9
29.	Machpur	13	75.5	4	23.5	17	1.9	0	0	17	100.0	17	1.9	14	82.4	3	17.6	17	1.9
30.	Mills Gate-A (15M)	22	95.7	1	4.3	23	2.6	2	8.7	21	91.5	23	2.6	21	91.2	2	8.7	23	2.6
31.	Melenda	19	90.5	2	9.5	21	2.4	0	0	21	100.0	21	2.4	20	95.2	1	4.8	21	2.4
32.	Mandira	16	80.0	4	20.0	20	2.3	8	40.0	12	60.0	20	2.3	17	85.0	3	15.0	20	2.3
Total		510	68.8	277	31.2	887	100.0	62	7.0	825	93.0	887	100.0	322	90.4	85	9.6	887	100.0
Chi Square (c)		179.80*** (0.027)		74.76*** (0.229)		97.85*** (0.315)													

Note: *, **, *** mean 0.05, 0.01, 0.001 levels of significance respectively
F and SP mean Farmers and Service Personnel data bases respectively.

Appendix-B

EXTENT AND VARIATION IN STRATEGIC VARIABLES

Code	Primary Administrative Units	Models Approaches			Technological Strategy			Client Strategy			Management Strategy		
		Functional Exclusivity	University Contact	Technology/Adaptability	Technology/Adaptability	Orientation	Client Participation	Orientation	Client Participation	Orientation	Client Participation	Orientation	Client Participation
No.		Percent	Percent	Percent	Score	Score	Score	Score	Score	Score	Score	Score	Score
		(SP100)	(SP08)	(SP185)	(F140)	(F169)	(SP434)	(SP402)	(SP143)	(SP143)	(SP143)	(SP143)	(SP143)
(20) Agricultural Extension Units													
1.	Panchagar	64.56	5.47	22.02	17.02	17.55	8.45	22.09	20.73	33.62			
2.	Atari	52.80	5.80	20.67	17.92	13.10	4.90	26.09	25.70	52.99			
3.	Kaharol	43.89	6.81	24.13	20.38	19.89	3.11	33.33	20.44	36.33			
4.	Bochanganj	37.22	5.52	18.84	17.39	13.97	1.56	31.56	21.22	34.11			
5.	Bhettal	56.56	9.00	20.00	17.25	15.78	2.89	33.09	21.00	33.10			
6.	Bogra Sadar	63.57	9.84	22.63	23.88	13.56	3.30	19.50	21.43	32.83			
7.	Kahalo	64.56	8.31	21.13	20.21	14.90	2.90	23.48	16.80	31.69			
8.	Bagherpara	62.73	10.63	21.63	26.68	15.18	4.64	25.09	21.15	32.34			
9.	Keshabpur	47.69	9.61	19.46	14.50	15.23	1.00	19.61	22.38	32.81			
10.	Kaliganj	49.09	10.10	21.28	17.72	19.20	2.70	24.10	23.99	34.20			
11.	Jhenaidah	69.20	8.11	22.04	19.27	13.97	4.40	19.67	18.93	34.47			
12.	Bouripur	53.07	19.36	22.25	15.28	16.34	1.29	23.21	20.43	38.50			
13.	Muttaschha	61.06	12.92	22.10	16.33	16.53	3.88	29.41	21.12	33.04			
14.	Fulbaria	59.67	12.48	21.41	14.94	15.13	3.67	20.93	24.60	29.20			
15.	Jadpur Sadar	60.31	11.82	20.94	14.12	15.44	1.77	24.54	23.38	31.92			
16.	Jhenaisati	69.80	9.60	24.82	19.82	15.50	2.30	21.40	19.50	31.90			
17.	Bewanganj	51.54	8.96	22.09	15.13	15.54	2.36	23.73	24.45	35.82			
18.	Laxmapur	48.84	5.24	21.11	20.31	14.77	4.23	23.69	24.23	32.23			
19.	Raiganj	47.92	5.92	22.54	29.38	17.84	2.83	22.42	20.33	34.25			
20.	Feni	51.60	12.72	23.94	20.82	12.40	0.60	27.80	21.73	31.27			
(20) Sugar Cane Sub-Zones													
21.	Chochabari	28.33	52.50	23.45	20.70	14.54	4.33	24.67	19.00	37.56			
22.	Baladangi	20.00	72.73	20.92	19.53	18.11	2.56	26.34	20.44	32.11			
23.	Pirganj	28.89	63.25	22.10	12.89	13.67	9.22	24.22	22.44	36.78			
24.	Hilligate-Birjor	25.71	17.80	23.24	19.96	13.84	10.11	17.43	18.71	33.14			
25.	Rajshahi-A	26.67	48.41	23.09	15.94	14.78	10.78	35.22	22.71	35.00			
26.	Sarda	18.67	24.58	19.77	16.27	14.56	4.11	19.22	16.78	30.44			
27.	Hilligate-Kishor	34.17	48.63	23.67	21.83	13.83	22.23	23.00	16.83	33.33			
28.	Allardanga	39.50	40.48	22.50	14.81	12.25	7.62	19.38	21.50	31.25			
29.	Madhupur	34.00	25.54	19.53	14.76	8.20	14.10	16.90	24.10	29.40			
30.	Hilligate-Birjor	22.56	33.01	24.48	17.96	17.11	5.33	35.33	19.44	38.00			
31.	Melinda	17.20	22.58	21.76	17.86	18.80	5.09	20.09	16.80	38.50			
32.	Mandira	16.88	51.03	23.10	14.75	19.38	8.79	27.25	21.21	38.25			
	NSS - Between Units	292.46***	No Variance	54.29***	377.53***	77.42***	22.36*	258.50***	60.42***	73.29*			
	NSS - Within Units	354.95	No Variance	3.69	24.00	24.49	128.57	123.68	33.22	48.92			
	Grand Mean	46.62	21.87	21.86	18.21	15.27	5.22	24.65	21.10	33.74			
	Standard Deviation	24.22	19.26	1.92	5.16	5.57	11.79	11.65	5.94	6.93			

Note: *, **, ***, *** Means 0.05, 0.01, 0.001 Levels of Significance respectively
F and SP Mean Farmer and Service Personnel data bases respectively

Table I: Contd

Code No	Planning Process		Organizing Process				Staff Mgt. Process							
	Administrative/Program Soundness	Staff Participation	Role Conflict	Size of Client	Span of Authority	Flexibility	Salary Level	Incentive	Transfer Frequency	Management Success				
29. Madhupur	28.50	19.00	28.50	49	4.88	13	14.70	16.88	48.60	22.20	17.87	1.226	3.90	1.67
30. Moulvibazar	31.38	31.78	25.44	9	1.69	15	33.67	32.22	41.11	27.56	14.66	1.176	2.44	1.00
31. Meulendia	37.10	34.00	25.40	45	3.06	9	34.80	31.20	42.00	23.00	15.97	1.580	3.70	0.83
32. Mandhira	45.38	33.38	23.25	96	2.93	7	33.38	32.38	41.00	22.88	14.97	1.067	7.25	1.00
MS: Between Units	268.27***	282.17***	33.36***	-	-	-	208.30***	208.30***	30.78*	50.34***	38.74***	3.325***	17.48WS	-
MS: Within Units	92.87	113.82	12.97	-	-	-	59.65	62.23	13.50	22.36	25.97	3.290	14.56	-
Grand Mean	35.41	29.19	25.59	6.88	6.76	23.62	25.34	28.91	39.73	24.82	13.73	0.400	3.51	2.75
Standard Deviation	10.41	11.35	3.85	48.87	3.95	15.57	9.13	8.67	3.88	4.98	5.21	0.750	3.85	1.71

Note: *, **, *** Mean 0.05, 0.01, 0.001 levels of significance respectively
F and SP Mean Farmer and Service Personnel data base respectively

Appendix - B
Table 1
Page 3

Table 1: Contd.

Code No.	Primary Administrative Units	Implementation Process				Educational Process				Controlling Process				
		Coordination	Supervision	Monitoring	Reporting	Level of Education	Quality of Education	Span of Control	Level of Control	Dissemination of Information	Control of Information	Dissemination of Information	Control of Information	
1.	Panchagar	21.27	68	10.08	13.50	15.19	21.54	451.55	50.15	16.46	18	27.63	67.25	74
2.	Atari	18.40	5	13.58	11.40	15.70	18.60	163.00	38.42	17.88	16	27.10	94.99	33
3.	Kharol	23.33	56	11.57	13.11	11.67	20.33	324.89	74.57	26.42	17	38.67	196.75	23
4.	Bochanganj	20.33	123	11.75	12.44	11.67	14.33	114.00	65.80	20.78	22	37.00	189.25	35
5.	Methal	21.11	45	14.25	12.33	11.56	18.56	168.33	42.48	16.46	18	29.89	111.11	35
6.	Bogra Sadar	18.00	23	11.50	11.79	17.64	17.87	337.28	174.79	21.21	62	26.00	54.77	39
7.	Khalia	23.20	52	9.92	12.60	15.70	19.90	86.40	46.82	25.08	33	31.60	172.04	16
8.	Bagherpara	20.27	65	10.50	11.18	16.91	17.18	224.91	36.34	21.50	35	25.54	61.47	26
9.	Kabulpur	17.92	42	12.50	13.15	16.77	17.31	90.00	19.29	13.29	45	24.62	29.26	45
10.	Kailganj	20.30	24	13.67	12.90	14.90	21.60	376.00	64.01	20.78	42	38.90	195.21	18
11.	Jhenaidah	22.47	164	16.67	13.07	17.53	21.20	887.00	39.78	16.77	44	31.40	90.25	21
12.	Baripora	20.57	24	19.45	13.07	15.64	19.43	358.86	30.19	11.28	41	25.00	22.77	75
13.	Moktagacha	19.53	25	15.08	11.29	17.12	19.35	131.35	17.50	17.13	41	23.71	27.15	125
14.	Falbaria	19.27	25	11.17	12.73	18.27	14.33	301.33	27.81	13.44	49	30.80	164.40	50
15.	Jhalpur Sadar	21.46	271	12.38	13.77	13.46	22.31	272.23	19.03	14.73	75	30.77	87.03	0
16.	Jhenaidah	20.56	248	12.75	15.70	13.09	19.70	249.10	67.08	22.36	19	23.70	27.57	30
17.	Barisal	18.91	64	13.08	14.73	10.55	20.27	343.64	4.96	13.91	54	29.18	36.16	72
18.	Lalmonirhat	19.08	87	14.08	11.62	11.85	19.15	210.23	39.46	18.46	73	25.08	37.24	32
19.	Barisal	18.83	78	11.28	13.33	9.25	22.83	309.50	98.42	18.33	25	28.42	79.90	30
20.	Feni	19.13	79	16.67	12.80	16.80	20.87	245.60	25.92	38.39	66	29.00	72.14	40
PAK SUGARCOOP : Sub-Zones														
21.	Kochabari	24.33	27	19.19	12.33	10.78	21.22	910.44	39.60	25.00	30	28.56	21.53	13
22.	Baladangi	20.56	116	21.33	11.11	15.89	16.00	245.79	9.21	18.42	24	23.44	19.28	16
23.	Pirganj	22.78	278	15.90	12.44	14.00	23.11	472.78	6.05	10.96	30	21.11	32.86	3
24.	Mirzapur	22.29	50	21.90	12.29	16.71	20.29	408.28	46.43	30.68	16	20.57	1.29	25
25.	Rajshahi-A	20.78	189	18.50	14.00	14.78	18.78	120.22	53.86	25.13	12	30.78	56.19	22
26.	Sarad	22.22	238	17.50	13.22	13.22	16.89	133.56	15.19	18.91	18	24.56	17.28	9
27.	Mirzapur-Altan	18.83	59	21.75	12.50	15.00	18.92	418.67	47.41	21.00	35	24.42	8.63	20
28.	Mirzapur	20.00	169	20.73	11.62	13.00	15.38	632.00	22.30	23.15	24	26.52	99.12	35
29.	Mirzapur	15.80	24	21.00	10.30	13.40	125.20	4.75	15.12	20	22.80	28.84	20	
30.	Mirzapur-Altan	24.00	179	20.83	17.78	15.11	21.44	353.89	57.58	28.22	24	26.33	29.75	30
31.	Mirzapur	22.40	135	23.17	14.80	10.90	22.20	510.90	18.17	29.19	14	29.70	47.57	15
32.	Hatibanda	23.50	76	15.83	14.62	15.75	15.62	547.25	31.82	22.60	14	28.12	86.92	21

Table 1 : Contd.

Code No. of Administrative Units	Implementation Process				Educational Process				Controlling Process				
	Coordination Score	Supervision Score	Administrative Score	Supervisory Score	Level of Education Score	Quality of Instruction Score	Span of Control Score	Client Control Score	Level of Control Score	Span of Control Score	Client Control Score	Quality of Instruction Score	Span of Control Score
161	192	163	164	165	166	167	168	169	170	171	172	173	174
SP107)			SP141)	SP145)	SP146)	SP147)	SP148)	SP149)	SP150)	SP151)	SP152)	SP153)	SP154)
MSS : between units	15.14***	15.52	15.52	15.52	15.52	15.52	15.52	15.52	15.52	15.52	15.52	15.52	15.52
MSS : within units	13.73	7.31	24.86	27.77	28.23	28.23	28.23	28.23	28.23	28.23	28.23	28.23	28.23
Grand Mean	20.56	97.16	15.52	12.77	14.59	19.24	255.11	41.43	21.53	32.38	27.96	70.51	32.31
Standard Deviation	4.07	79.41	4.27	2.38	5.35	5.57	421.03	63.78	8.36	17.51	8.94	24.47	24.47

Note : *, **, *** Means 0.05, 0.01, 0.001 Levels of Significance respectively
F and SP Mean Finner and Service Personnel data bases respectively

Table 2: Intensity and Distribution of Qualitative Variables of Staff

Code	Sngt. Strategy										Staff Background															
	146(Spr17) Professionalization					174(Spr9) Staff Family Types					177(Spr9) Staffs Parents Occupation					TOTAL										
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
PAU: AGRICULTURE UPAZILLAS																										
1. Panchagar	6	54.5	5	45.5	11	3.1	7	63.6	4	36.4	11	3.1	6	54.5	5	4.2	0	0.0	11	3.1	0	0.0	11	3.1	11	3.1
2. Atauri	9	88.9	1	10.0	10	2.9	3	30.0	7	70.0	10	2.9	8	80.0	1	10.0	1	10.0	10	2.9	1	10.0	10	2.9	10	2.9
3. Kharol	8	88.9	1	11.1	9	2.6	4	44.4	5	55.6	9	2.6	5	55.6	2	22.2	2	22.2	9	2.6	2	22.2	9	2.6	9	2.6
4. Bichaganj	7	77.8	2	22.2	9	2.6	4	44.4	5	55.6	9	2.6	3	33.3	1	11.1	1	11.1	9	2.6	5	55.6	9	2.6	9	2.6
5. Khetlal	8	88.9	1	11.1	9	2.6	5	55.6	4	44.4	9	2.6	4	44.4	2	22.2	3	33.3	9	2.6	3	33.3	9	2.6	9	2.6
6. Bogura	10	71.4	4	28.6	14	4.0	8	57.1	6	49.9	14	4.0	8	57.1	2	11.3	4	28.6	14	4.0	4	28.6	14	4.0	14	4.0
7. Khabab	8	80.0	2	20.0	10	2.9	4	40.0	6	60.0	10	2.9	6	60.0	3	30.0	1	10.0	10	2.9	3	30.0	10	2.9	10	2.9
8. Bapthepara	7	63.6	4	36.4	11	3.1	4	36.4	7	63.6	11	3.1	6	54.5	3	27.3	2	10.2	11	3.1	3	27.3	11	3.1	11	3.1
9. Karchapur	5	38.5	8	61.5	13	3.7	5	38.5	8	61.5	13	3.7	9	69.2	3	23.1	1	7.7	13	3.7	3	23.1	13	3.7	13	3.7
10. Kaliganj	7	70.0	3	30.0	10	2.9	3	30.0	7	70.0	10	2.9	7	70.0	3	30.0	8	0.0	10	2.9	3	30.0	10	2.9	10	2.9
11. Jhenaidah	10	66.7	5	33.3	15	4.3	5	33.3	10	66.7	15	4.3	7	46.7	7	46.7	1	6.7	15	4.3	7	46.7	15	4.3	15	4.3
12. Gouripur	7	50.0	7	50.0	14	4.0	6	42.9	8	57.1	14	4.0	9	52.9	7	41.2	2	14.3	14	4.0	7	41.2	14	4.0	14	4.0
13. Matigacha	4	23.5	13	76.5	17	4.9	11	64.7	6	35.3	17	4.9	9	52.9	5	35.7	2	14.3	17	4.9	9	52.9	17	4.9	17	4.9
14. Fulbaria	9	60.0	6	40.0	15	4.3	5	33.3	10	66.7	15	4.3	10	66.7	3	20.0	2	13.3	15	4.3	10	66.7	15	4.3	15	4.3
15. Jaalpur	8	61.5	5	38.5	13	3.7	11	84.6	2	15.4	13	3.7	6	46.2	6	46.2	1	7.7	13	3.7	6	46.2	13	3.7	13	3.7
16. Jhenagati	6	60.0	4	40.0	10	2.9	7	70.0	3	30.0	10	2.9	9	90.0	0	0.0	1	10.0	10	2.9	0	0.0	10	2.9	10	2.9
17. Dewanganj	9	81.8	2	18.2	11	3.1	5	45.5	6	54.5	11	3.1	6	54.5	2	18.2	3	27.3	11	3.1	2	18.2	11	3.1	11	3.1
18. Lakhimpur	11	84.6	2	15.4	13	3.7	5	38.5	8	61.5	13	3.7	7	53.8	3	23.1	3	23.1	13	3.7	3	23.1	13	3.7	13	3.7
19. Rangaj	10	83.3	2	16.7	12	3.4	3	25.0	9	75.0	12	3.4	5	41.7	3	25.0	4	33.3	12	3.4	3	25.0	12	3.4	12	3.4
20. Feni	3	20.0	12	80.0	15	4.3	6	40.0	9	60.0	15	4.3	6	40.0	5	33.3	4	26.7	15	4.3	5	33.3	15	4.3	15	4.3
PAU: SUGARCANE SUBZONES																										
21. Khochari	1	11.1	8	88.9	9	2.6	4	44.4	5	55.6	9	2.6	5	55.6	2	22.2	2	22.2	9	2.6	2	22.2	9	2.6	9	2.6
22. Balidangi	4	44.4	5	55.6	9	2.6	4	44.4	5	55.6	9	2.6	7	77.8	1	11.1	1	11.1	9	2.6	1	11.1	9	2.6	9	2.6
23. Pirganj	0	0.0	9	100.0	9	2.6	5	55.6	4	44.4	9	2.6	5	55.6	1	11.1	1	11.1	9	2.6	3	33.3	9	2.6	9	2.6
24. Mills Gate-1(BASH)	1	14.3	6	85.7	7	2.0	3	42.9	4	57.1	7	2.0	5	71.4	1	14.3	1	14.3	7	2.0	1	14.3	7	2.0	7	2.0
25. Rajshahi-A	1	11.1	8	88.9	9	2.6	5	55.6	4	44.4	9	2.6	6	66.7	2	22.2	1	11.1	9	2.6	2	22.2	9	2.6	9	2.6
26. Sarda	0	0.0	12	100.0	12	3.4	4	33.3	8	66.7	12	3.4	8	66.7	1	8.3	3	25.0	12	3.4	3	25.0	12	3.4	12	3.4
27. Milligate-1(RSH)	9	12.5	7	87.5	8	2.3	2	25.0	6	75.0	8	2.3	3	37.5	3	30.0	2	16.7	8	2.3	3	37.5	8	2.3	8	2.3
28. Allardaga	3	30.0	7	70.0	10	2.9	6	60.0	4	40.0	10	2.9	6	60.0	3	30.0	1	10.0	10	2.9	3	30.0	10	2.9	10	2.9
30. Milligate-1(BSH)	1	10.0	8	88.9	9	2.6	4	44.4	5	55.6	9	2.6	6	66.7	1	11.1	2	22.2	9	2.6	1	11.1	9	2.6	9	2.6
31. Melinda	1	10.0	8	88.9	9	2.6	4	44.4	5	55.6	9	2.6	3	30.0	2	22.2	2	22.2	9	2.6	2	22.2	9	2.6	9	2.6
32. Mandina	0	0.0	8	100.0	8	2.3	5	62.5	3	37.5	8	2.3	3	37.5	5	62.5	0	0.0	8	2.3	5	62.5	8	2.3	8	2.3
TOTAL	166	47.4	184	52.6	350	100.0	165	47.1	185	52.9	350	100.0	196	56.8	90	25.7	64	18.3	350	100.0	64	18.3	350	100.0		
CHI SQUARE (C)																									48.61 (0.316)*	
																									6.40 (0.120)	

Table 2 Contd.

Code	Staff Background										Staff Behavior									
	Rural Background					Elite Representation					Member					Non-Member				
No.	Primary	Administrative	Units	Village	Towns	Cities	Total	Elite	Non-Elite	Total	Member	Non-Member	Total	Member	Non-Member	Total				
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.				
PRO-AGRICULTURE (UPAZILLA)																				
1.	9.1	4	35.4	6	54.5	11	3.1	1	10	54.9	11	3.1	7	63.6	11	3.1				
2.	0	0	0	10	100.0	10	2.9	0	0	100.0	10	2.9	2	20.0	8	21.9				
3.	0	0	0	0	0	0	2.6	0	0	0	0	2.6	2	22.2	7	77.8				
4.	11.0	2	22.2	6	66.7	9	2.6	2	22.2	7	77.8	9	2.6	4	44.4	8	88.9			
5.	0	0	0	0	0	0	2.6	3	33.3	6	66.7	9	2.6	2	22.2	7	77.8			
6.	0	0	0	1	11.1	13	92.9	14	4.0	14	100.0	14	4.0	8	57.9	14	100.0			
7.	0	0	0	3	30.0	7	70.0	10	2.9	5	50.0	10	2.9	4	40.0	6	60.0			
8.	9.1	0	0	10	100.0	11	3.1	0	0	100.0	11	3.1	5	45.5	6	54.5				
9.	0	0	0	0	0	0	3.7	1	7.7	12	92.3	13	3.7	0	0	100.0				
10.	0	0	0	10	100.0	9	90.0	10	2.9	20	200.0	10	2.9	8	80.0	10	100.0			
11.	0	0	0	0	0	0	4.3	3	30.0	12	56.0	15	4.3	3	30.0	12	56.0			
12.	0	0	2	14.3	12	85.7	14	4.0	7	13	92.9	14	4.0	2	14.3	12	85.7			
13.	0	0	1	5.9	16	94.1	17	4.9	5	16	94.1	17	4.9	4	23.5	13	76.5			
14.	0	0	2	13.3	13	86.7	15	4.3	33.3	10	66.7	15	4.3	4	26.7	11	73.3			
15.	0	0	2	15.4	11	84.5	13	3.7	15.4	11	84.5	13	3.7	2	15.4	11	84.5			
16.	0	0	1	10.0	9	90.0	10	2.9	10.0	9	90.0	10	2.9	1	10.0	9	90.0			
17.	0	0	1	9.1	10	90.9	11	3.1	18.2	9	81.8	11	3.1	3	27.3	8	72.7			
18.	0	0	3	23.1	10	76.9	13	3.7	15.4	11	84.5	13	3.7	3	23.1	10	76.9			
19.	0	0	1	8.3	11	91.7	12	3.4	16.7	10	83.3	12	3.4	5	41.7	7	58.3			
20.	0	0	1	20.0	12	80.0	15	4.3	20.0	12	80.0	15	4.3	5	33.3	10	66.7			
PHD: SugarCane: Subzones																				
21.	22.2	3	33.3	4	44.4	9	2.6	0	0	100.0	9	2.6	3	33.3	6	66.7				
22.	0	0	0	0	0	0	2.6	1	11.1	8	58.9	9	2.6	0	0	100.0				
23.	0	0	0	0	0	0	2.6	2	22.2	7	77.8	9	2.6	0	0	100.0				
24.	0	0	1	14.3	6	85.7	7	2.0	0	0	100.0	7	2.0	3	42.9	4	57.1			
25.	0	0	1	11.1	8	88.9	9	2.0	4	44.4	5	55.6	9	2.0	4	44.4				
26.	0	0	1	11.1	8	88.9	9	2.6	1	11.1	8	58.9	9	2.6	1	11.1				
27.	0	0	1	9.1	11	91.7	12	3.4	3	25.0	9	75.0	12	3.4	3	25.0				
28.	0	0	2	20.0	6	75.0	8	2.3	2	25.0	6	75.0	8	2.3	2	25.0				
29.	0	0	0	0	0	0	2.9	2	20.0	8	80.0	10	2.9	2	20.0	8	80.0			
30.	0	0	0	0	0	0	2.9	0	0	100.0	9	2.6	2	22.2	7	77.8				
31.	0	0	0	0	0	0	2.9	1	10.0	9	90.0	10	2.9	1	10.0	9	90.0			
32.	0	0	1	12.5	7	87.5	8	2.3	0	0	100.0	8	2.3	1	12.5	7	87.5			
Total:	5	1.4	38	10.9	307	87.7	35	100.0	54	15.4	296	84.6	350	100.0	85	24.3	265	75.7		
CHI SQUARE (C)																				
75.42 (0.384) **																				
40.01 (0.290)																				
45.88 (0.168)																				

MAGNITUDE AND VARIATION IN RESOURCE VARIABLES

Code No.	Primary Administrative Units	Clients Resource Need Fulfillment		Institutional Resource Need Fulfillment				Expense Per Clients Family	
		Input Need	Credit Need	Manpower Need	Travel Expense	Logistic Support	Contingent Expense		
		Percent	Percent	Percent	'000/Taka/POU	'000/Taka/POU	'000/Taka/POU		
		X94(FR208)	X95(FR206)	X96	X97	X98	X99		
ZM: Agriculture (Basilla)									
1.	Panchagar	35.56	32.78	94.44	15.489	6.254	19.273	14.30	
2.	Atara	42.42	20.71	75.00	13.420	7.170	18.540	18.16	
3.	Kabari	52.92	30.83	80.00	18.020	5.454	19.428	17.06	
4.	Bachangaj	75.56	63.31	68.18	23.022	5.204	19.794	17.37	
5.	Bhetlal	45.04	37.62	88.18	21.456	6.320	17.530	28.78	
6.	Jogra Sodar	66.54	14.33	98.39	63.540	36.130	15.223	18.40	
7.	Bahalo	70.08	80.83	87.88	33.514	19.701	41.029	24.63	
8.	Bagherpara	57.00	35.44	97.14	16.181	15.101	18.585	27.30	
9.	Beshabar	58.61	28.75	93.33	32.040	12.373	22.288	16.12	
10.	Kaliganj	42.62	36.94	76.19	24.440	17.634	16.925	22.73	
11.	Jhenaidah	19.19	38.15	75.00	27.959	21.940	23.171	13.41	
12.	Kouripur	58.08	18.85	85.37	29.774	15.390	25.658	17.78	
13.	Mitaghata	58.02	41.30	100.00	20.042	13.550	21.918	18.62	
14.	Fulbaria	94.69	30.16	89.80	28.111	14.275	21.467	24.97	
15.	Jawalpur Sodar	58.84	46.37	98.67	43.595	14.356	32.682	23.53	
16.	Jhenaidah	41.07	13.57	78.95	12.124	4.126	6.988	25.71	
17.	Dowarganj	45.55	19.29	100.00	37.554	93.124	34.513	30.61	
18.	Laxmapur	65.00	44.49	69.86	76.354	130.359	152.861	17.22	
19.	Ranganj	65.71	30.42	70.37	28.297	21.654	53.724	18.63	
20.	Fani	100.00	19.78	96.97	105.937	76.185	143.686	53.61	
PAU : SugarCane & Sugarcane									
21.	Khochabari	38.70	40.00	100.00	25.403	46.721	64.410	310.12	
22.	Balidangi	57.38	41.54	79.17	17.381	31.764	44.070	231.70	
23.	Birganj	22.10	22.24	80.00	24.066	44.262	61.020	300.76	
24.	Millisate-B (JSM)	69.64	38.00	93.75	6.484	25.788	59.376	118.55	
25.	Bajshahi-A	47.75	58.81	100.00	5.370	21.490	49.480	159.41	
26.	Sarda	53.09	14.54	100.00	6.484	25.788	59.376	88.51	
27.	Millisate-A (JSM)	40.83	41.25	100.00	22.740	45.100	47.620	212.09	
28.	Alardarga	70.38	31.46	91.67	17.055	33.825	35.710	132.55	
29.	Machpur	64.53	64.06	95.00	14.781	29.315	30.953	76.08	
30.	Millisate-A (JSM)	64.52	69.26	95.83	51.135	144.750	134.145	504.19	
31.	Nelanda	67.57	20.10	78.57	30.481	86.350	80.487	331.86	
32.	Nandina	44.50	19.05	85.71	23.963	67.550	62.601	349.71	
MSS : Between Units		9748.48***	11011.53***						
MSS : within Units		1637.08	2671.86						
Grand Mean		57.56	34.38	88.54	28.640	35.650	47.950	102.39	
Standard Deviation		40.46	51.69	10.33	28.650	35.650	5.82	129.60	

Linear and Quadratic Performance Functions of Discrete Organizational Variables

No	Variables	Linear Functions			Quadratic Functions		
		a	b	c	a	b	c
Environmental							
Agro-ecological Environment							
X9	Solar Energy	0.134 (3.89)	0.015 (0.020)	0.146 (3.644)	-0.046 (-0.186)	3.644	-0.043 (-0.0006)
X10	Rainfall	0.094 (3.09)	0.010 (0.022)	0.108 (3.662)	-0.056 (-0.222)	6.717	-0.0005 (-0.0014)
X11	Environmental Risk	0.200 (3.548)	0.068 (0.163)	0.200 (3.609)	-0.036 (-0.153)	26.097	0.196 (0.467)
X12	Productive Capacity of Land	0.352* (3.374)	0.103 (0.080)	0.365 (0.080)	0.073 (0.080)	24.153	0.0330 (0.0130)
X13	Irrigation Coverage	0.397 (3.504)	-0.023 (0.041)	0.101 (3.664)	-0.058 (0.041)	26.884	0.002 (0.130)
X14	Accessibility	0.071 (3.612)	-0.028 (0.229)	0.107 (3.662)	-0.057 (0.229)	28.417	-0.452 (0.091)
Economic Environment							
X15	Operational Farm Size	0.122 (3.594)	-0.018 (0.262)	0.182 (3.662)	-0.034 (0.262)	28.236	-0.514 (0.949)
X16	Regional Structure	0.156 (3.577)	-0.008 (0.040)	0.156 (3.638)	-0.943 (0.040)	24.596	0.040 (0.282)
X17	Subsistence Pressure	0.093 (3.506)	-0.024 (1.951)	0.094 (3.667)	-0.059 (3.667)	26.806	0.426 (6.419)
X18	Draft Power Availability	0.291 (3.465)	0.054 (0.632)	0.309 (3.393)	0.093 (3.393)	32.031	-4.286 (3.486)
X19	Family Labor	0.135 (3.568)	-0.014 (0.011)	0.244 (3.572)	-0.005 (0.011)	34.427	-0.092 (0.066)
X20	Commercialization	0.276 (3.481)	0.045 (0.035)	0.426 (3.333)	0.125 (3.333)	56.508	-0.406 (0.241)
X21	Product Market Difficulty	0.245 (3.511)	-0.026 (0.188)	0.432* (3.321)	0.131 (3.321)	8.206	-0.1060* (0.0489)

Linear and Quadratic Performance Functions of Discrete Organizational Variables

No	Variables	Linear Functions			Quadratic Functions			
		b	a	-2	b	a	-2	
Socio-psychological Environment								
X22	Far Family Size	0.028 (3.620)	26.538	-0.032	0.092 (5.528)	55.331	-0.026 (4.348)	0.403 (0.370)
X23	Clients Literacy	0.365* (3.371)	23.268	0.104	0.110* (0.051)	28.166	-0.197 (0.232)	0.0043 (0.0032)
X24	Clients Formal Education	0.308 (3.445)	23.989	0.065	0.122 (0.067)	27.895	-0.178 (0.254)	0.0054 (0.0044)
X25	Clients Mass Communication Exposure	0.410* (3.304)	24.951	0.140	0.084* (0.034)	26.577	-0.051 (0.132)	0.0019 (0.0019)
X26	Clients Organizational Participation	0.104 (3.002)	26.728	-0.022	0.024 (0.041)	27.293	-0.052 (0.138)	0.0015 (0.0026)
X27	Clients Cooperative Membership	0.175 (3.564)	26.284	-0.002	0.031 (0.032)	26.104	0.044 (0.125)	-0.00016 (0.0015)
X28	Clients Leadership Experience	0.077 (3.610)	26.902	-0.027	0.040 (0.094)	26.636	0.161 (0.263)	-0.0063 (0.0180)
X29	Client-Partner Relationship	0.482** (3.172)	25.072	0.207	0.068** (0.225)	-	-	-
X30	Clients Attitude Toward Change Political Environment	0.041 (3.618)	25.394	-0.032	0.077 (0.340)	-22.75	4.141 (7.082)	-0.0450 (0.1480)
X31	Clients Political Consciousness	0.172 (3.568)	26.621	-0.003	0.074 (0.078)	26.512	0.103 (0.186)	-0.0009 (0.0053)
X32	Clients Political Participation	0.097 (3.604)	30.282	-0.024	-0.034 (3.665)	25.083	-0.152 (0.390)	0.0003 (0.1060)
X33	Socio-Political Influence Organizational Environment	0.023 (3.621)	26.951	-0.033	0.014 (0.108)	20.854	0.664 (0.596)	-0.0160 (0.0140)
X34	Inter Organizational Relation	0.042 (3.618)	28.247	-0.032	-0.012 (0.053)	-0.514	0.673 (0.563)	-0.004 (0.003)

Linear and Quadratic Performance Functions of Discrete Organizational Variables

No.	Variables	Linear Functions			Quadratic Functions			
		a	b	c	a	b	c	
115	Inter Organizational Conflict: STRATEGY: Model and Approaches	0.326 (3.421)	0.077 (0.043)	20.834 (0.002)	0.206 (1.175)	0.597* (3.175)	-20.447 (1.427*)	-0.0095 (0.0085)
116	Extension Models	0.294 (3.461)	0.056 (0.811)	24.252 (0.811)	0.324 (3.444)	0.277 (1.539)	29.469 (5.236)	1.4310 (1.2580)
117	Functional Extensivity	0.244 (2.431)	0.038 (0.037)	29.653 (0.037)	0.277 (1.539)	0.015 (1.539)	31.620 (0.235)	0.0013 (0.0027)
118	University in Contact Technological Strategy	0.256 (3.501)	0.034 (0.033)	26.168 (0.033)	0.446 (1.222)	0.192 (1.222)	23.330 (0.121)	-0.3050* (0.0020)
119	Technology Adaptability	0.560** (2.986)	0.297 (0.378)	-3.556 (0.378)	0.589** (2.977)	0.302 (2.977)	102.072 (0.974)	0.2240 (0.2060)
120	Technological Diversity	0.322 (3.428)	0.074 (0.167)	21.500 (0.167)	0.322 (3.437)	0.042 (1.295)	21.738 (1.295)	0.0006 (0.032)
121	Client Strategy	0.076 (3.611)	-0.027 (0.237)	25.704 (0.237)	0.154 (1.639)	-0.044 (1.639)	16.017 (1.877)	-0.0468 (0.0630)
122	Client Participation	0.144 (3.594)	-0.012 (0.032)	25.564 (0.032)	0.334 (1.472)	0.050 (1.472)	32.478 (0.159)	0.0023 (0.0013)
123	Management Strategy	0.036 (3.619)	-0.038 (0.127)	26.504 (0.127)	0.269 (1.674)	-0.064 (1.674)	31.455 (1.213)	0.0073 (0.0228)
124	Coerciveness	0.335 (3.412)	0.083 (0.257)	37.743 (0.257)	0.306 (1.378)	0.090 (1.378)	-5.544 (3.757)	-0.1010 (0.0900)
125	Performance Aspiration	0.140 (3.575)	-0.007 (0.217)	19.838 (0.217)	0.192 (1.622)	-0.034 (1.622)	70.121 (6.229)	0.0830 (0.0910)
126	Professionalism	0.443 (3.246)	0.170 (0.033)	29.507 (0.033)	0.473 (3.246)	0.171 (3.246)	30.403 (0.079)	0.0009 (0.0009)

LINEAR AND QUADRATIC PERFORMANCE FUNCTIONS OF DISCRETE ORGANIZATIONAL VARIABLES

No.	Variables	Linear Functions			Quadratic Functions			
		R	a	b	R	a	b	c
MANAGEMENT PROCESS								
Planning Process:								
X17	Program Soundness	0.077 (3.611)	25.341 (0.124)	0.053 (3.572)	0.077 (3.572)	24.976 (0.169)	0.075 (0.179)	-0.30033 (0.179)
X18	Staff Participation (% program)	0.002 (3.621)	27.239 (0.125)	-0.001 (3.633)	0.164 (3.633)	9.176 (1.411)	1.257 (0.324)	-0.0210 (0.324)
X19	Role Conflict	0.036 (6.619)	26.584 (0.127)	0.025 (3.674)	0.069 (3.674)	31.495 (0.350)	-0.360 (0.024)	0.3073 (0.024)
Implementing Process:								
X20	Size of Operational Unit	0.168 (3.575)	19.219 (0.351)	0.312 (3.625)	0.178 (3.625)	64.461 (8.119)	-3.118 (0.150)	9.3646 (0.150)
X21	Size of Client/EA	0.471** (3.194)	30.071 (0.145)	-0.425** (3.211)	0.490** (3.211)	31.376 (0.610)	-0.917 (0.040)	0.0330 (0.040)
X22	Span of Supervision	0.061 (3.615)	26.873 (0.041)	0.014 (3.634)	0.163 (3.634)	28.671 (0.197)	-0.145 (0.003)	0.0025 (0.003)
X23	Strategic Authority	0.055 (3.619)	27.797 (0.127)	-0.024 (3.660)	0.113 (3.660)	16.495 (1.263)	-0.756 (0.025)	0.0150 (0.025)
X24	Tactical Authority	0.012 (3.621)	27.495 (0.156)	-0.010 (3.682)	0.028 (3.682)	24.661 (1.582)	0.201 (0.029)	-0.0038 (0.029)
X25	Formalization	0.217 (3.555)	9.468 (0.366)	0.445 (3.535)	0.217 (3.535)	9.468 (0.366)	0.445 (0.366)	-
X26	Flexibility	0.036 (3.619)	25.479 (0.296)	0.059 (3.527)	0.288 (3.527)	-95.316 (6.164)	9.946 (0.125)	-0.2003 (0.125)
Staff Management:								
X27	Staff Salary	0.124 (3.594)	24.179 (0.327)	0.223 (3.627)	0.174 (3.627)	5.607 (3.920)	2.843 (0.135)	-0.091 (0.135)
X28	Incentive	0.394** (3.328)	26.060 (0.105)	0.266** (3.380)	0.397 (3.380)	26.187 (0.439)	0.133 (0.026)	0.0077 (0.026)
X29	Transfer Frequency	0.217 (3.535)	25.679 (0.482)	0.596 (3.594)	0.217 (3.594)	25.764 (2.181)	0.526 (0.298)	0.0080 (0.298)
X30	Managerial Succession	0.297 (3.458)	28.880 (0.358)	-0.611 (3.514)	0.299 (3.514)	28.331 (2.540)	-0.091 (0.406)	-0.0840 (0.406)
Empire Building Process:								
X31	Coordination	0.220 (3.533)	19.337 (0.307)	0.379 (3.559)	0.257 (3.559)	59.587 (5.308)	-3.561 (0.128)	0.0960 (0.128)
X32	Supervision	0.069 (3.613)	26.901 (0.008)	0.003 (3.669)	0.087 (3.669)	27.271 (0.045)	-	-
X33	Supervisors' Mobility	0.183 (3.560)	24.935 (0.150)	0.152 (3.621)	0.184 (3.621)	25.959 (0.044)	0.0045 (1.438)	0.0051 (1.438)
X34	Horizontal Communication	0.059 (3.615)	24.974 (0.539)	0.174 (3.653)	0.128 (3.653)	-09.704 (8.799)	5.572 (0.339)	-0.230 (0.339)
X35	Supervisory Leadership (a)	0.017 (3.621)	26.862 (0.270)	0.250 (3.679)	0.050 (3.679)	31.491 (5.327)	-0.800 (0.190)	0.0019 (0.190)
X36	Supervisory Leadership (b)	0.097 (3.604)	24.504 (0.261)	0.140 (3.570)	0.264 (3.570)	61.342 (4.521)	4.328 (0.074)	3.1200 (0.074)

LINEAR AND QUADRATIC PERFORMANCE FUNCTIONS OF DISCRETE ORGANIZATIONAL VARIABLES

No.	Variables	Linear Functions			Quadratic Functions				
		R	$\frac{-2}{R}$	b	R	$\frac{-2}{R}$	a	b	c
Educational Process:									
X67	Level of Educational Activities	0.214 (3.538)	0.014	25.986 (0.021)	0.379 (3.373)	0.101	22.785	-	-
X68	Student Participation	0.443* (3.247)	0.169	25.193 (0.018)	0.453* (3.283)	0.151	25.792	0.023 (0.047)	0.00016 (0.00028)
X69	Quality of Participation	0.556** (3.010)	0.296	21.154 (0.096)	0.573* (3.018)	0.252	16.999	0.566 (0.429)	-0.0082 (0.0089)
Controlling Process:									
X70	Span of Control	0.034 (3.619)	-0.032	26.975 (0.037)	0.036 (3.681)	-0.368	25.947	0.015 (0.174)	-0.0001 (0.0021)
X71	Level of Control	0.114	-0.019	29.044 (0.149)	0.122 (3.656)	-0.353	35.213	-0.461 (1.582)	0.0061 (0.0262)
X72	Dispersion of Control	0.147 (3.582)	-0.011	27.251 (0.011)	0.194 (3.613)	-0.029	28.737	-0.039 (0.043)	0.0002 (0.0001)
X73	Severity of Punishment	0.086 (3.608)	-0.026	27.607 (0.026)	0.148 (3.643)	-0.346	28.496	-0.062 (0.080)	0.0004 (0.0007)
STAFF:									
X74	Staff Background	0.086 (3.608)	-0.026	27.607 (0.013)	0.148 (3.643)	-0.046	28.496	-0.062 (0.060)	0.0004 (0.0007)
X75	Staffs Family Type	0.092 (3.605)	-0.025	26.124 (0.045)	0.120 (3.657)	-0.054	28.801	-0.092 (0.277)	0.0012 (0.0003)
X76	Staffs Family Size	0.022 (3.633)	-0.033	27.695 (0.482)	0.043 (3.680)	-0.368	31.978	5.338 (0.3200)	0.0639 (0.3200)
X77	Staffs Family Income	0.008 (3.621)	-0.033	27.071 (0.931)	0.143 (3.645)	-0.047	18.288	5.724 (7.332)	-0.3738 (1.1200)
X78	Staffs Parents Occupation	0.110 (3.599)	-0.021	28.284 (0.046)	0.112 (3.660)	-0.055	27.694	0.012 (0.307)	-0.00034 (0.00260)
X79	Staffs Rural Background	0.203 (3.546)	0.009	31.911 (0.047)	0.247 (3.570)	-0.304	20.258	0.282 (0.410)	-0.0020 (0.0020)
X79	Elite Representation	0.102 (3.603)	-0.023	26.769 (0.050)	0.123 (3.655)	-0.053	27.040	-0.01* (0.136)	0.0012 (0.0031)
X80	Staff Ability	0.216 (3.556)	0.015	20.725 (0.165)	0.239 (3.756)	-0.008	18.790	-0.861 (1.846)	0.0153 (0.0266)
X81	Staff Education	0.305 (3.449)	0.063	45.259 (0.815)	0.305 (3.507)	0.031	64.511	0.127 (0.981)	-4.5640 (24.2320)
X82	Staffs Personal Quality	0.304 (3.450)	0.062	35.073 (0.129)	0.319 (3.491)	0.040	25.575	0.212 (0.623)	-0.0030 (0.0050)
X83	Staffs Work Experience	0.168 (3.570)	-0.004	25.873 (0.136)	0.172 (3.629)	-0.037	26.405	0.005 (0.024)	0.0203 (0.639)
X84	Extension Work Experience	0.014 (3.621)	-0.033	26.972 (0.036)	0.206 (3.604)	-0.024	41.796	-0.411 (0.367)	0.0028 (0.0024)

Linear and Quadratic Performance Functions of Discrete Organizational Variables

No.	Variables	Linear Functions			Quadratic Functions						
		R	a	b	a	b	c	-2	a	b	c
185	Total Inservice Training	0.003 (3.621)	27.211	-0.002 (0.013)	0.296 (3.519)	0.024	0.034	25.384	0.056 (0.036)	-0.0002 (0.0001)	
186	Retention Training	0.186 (3.558)	26.440	0.032 (0.031)	3.279 (3.537)	0.014	0.014	26.421	0.151 (0.106)	-0.0017 (0.0015)	
187	Organizational Renewal	0.241 (3.515)	25.701	0.173 (0.127)	3.269 (3.547)	0.008	0.008	24.338	0.482 (0.477)	-0.0130 (0.0200)	
188	Staff Behavior Professional Commitment	0.348* (3.403)	25.004	0.091* (0.046)	3.344 (3.458)	0.058	0.058	24.694	0.128 (0.160)	-0.0008 (0.0032)	
189	Level of Motivation	0.011 (3.621)	27.393	-0.010	3.015 (3.683)	-0.069	-0.069	26.948	0.037 (0.906)	-0.0012 (0.0220)	
190	Job Satisfaction	0.040 (3.618)	26.164	0.029 (0.132)	3.058 (3.677)	-0.065	-0.065	33.426	-0.369 (1.754)	0.0054 (0.0233)	
191	Absence from Duty Station	0.056 (3.616)	27.597	-0.025 (0.097)	3.075 (3.673)	-0.063	-0.063	29.371	-0.127 (0.394)	0.0027 (0.0102)	
192	Anxiety-Stress	0.358* (3.381)	18.189	0.263* (0.125)	3.402 (3.372)	0.104	0.104	41.168	1.208 (1.370)	0.0236 (0.0219)	
193	Intra-organizational Conflict	0.231 (3.523)	31.565	-0.089 (0.068)	3.284 (3.532)	0.017	0.017	17.404	0.490 (0.618)	-0.0055 (0.0060)	
RESOURCES:											
CLIENTS RESOURCE used											
194	Clients Input Need	0.307 (3.447)	29.358	-0.056 (0.032)	3.310 (3.502)	0.034	0.034	28.654	-0.015 (0.156)	-0.0005 (0.0019)	
195	Clients Credit Need	0.022 (3.621)	27.350	-0.008 (0.062)	3.051 (3.678)	-0.066	-0.066	27.988	0.001 (0.085)	-0.0720 (0.2660)	
ADDITIONAL RESOURCE used											
196	Manpower Need Fulfillment	0.794* (3.329)	15.177	0.136* (0.058)	3.428* (3.328)	0.127	0.127	56.013	-0.006 (1.198)	0.0070 (0.3069)	
197	Travel Allowance	0.154 (3.578)	26.446	0.026 (0.031)	3.158 (3.637)	-0.042	-0.042	26.171	-0.002 (0.1036)	0.0433 (0.1036)	
198	Logistic Support	0.244 (3.512)	26.332	0.024 (0.018)	3.318 (3.493)	0.039	0.039	25.238	-0.005 (0.0004)	0.091 (0.060)	
199	Contingent Expense	0.373* (3.360)	25.503	0.035* (0.012)	3.531* (3.116)	0.235	0.235	22.319	0.184* (0.057)	0.0009* (0.0004)	
200	Expense Per Client Family	0.447** (3.240)	25.945	0.012** (0.005)	3.450** (3.290)	0.147	0.147	26.108	0.0001 (0.0000)	0.0077 (0.0148)	

LINEAR AND QUADRATIC PERFORMANCE FUNCTIONS OF MIGRATIVE SYSTEMS AND PROCESSES

Aggregative System and Process	Linear Functions				Quadratic functions			
	R	b	a	c	R	b	a	c
Micro System and Processes								
19: Agro-ecological Environment	0.117 (16.238)	-0.019 (10.666)	89.901 (10.666)	0.522 (14.459)	0.143 (14.459)	-0.047 (14.459)	56.867 (14.459)	4.384 (10.2554)
20: Economic Environment	0.240** (13.737)	0.269 (10.595)	62.618 (10.595)	2.094** (13.821)	0.254** (13.821)	0.262 (13.821)	96.068 (13.821)	-1.705 (4.5081)
21: Socio-psychological Environment	0.373* (15.175)	0.110 (10.739)	77.804 (10.739)	0.525* (15.422)	0.374 (15.422)	0.081 (15.422)	81.895 (15.422)	0.310 (1.103)
22: Political Environment	0.119 (16.235)	-0.019 (11.233)	67.158 (11.233)	0.408 (16.512)	0.119 (16.512)	-0.054 (16.512)	85.312 (16.512)	1.044 (9.534)
23: Organizational Environment	0.291 (15.642)	0.054 (11.338)	72.737 (11.338)	2.233 (14.015)	0.538* (14.015)	0.241 (14.015)	119.752 (14.015)	49.845** (16.501)
24: Extension Approaches	0.140 (16.190)	-0.013 (17.462)	94.736 (17.462)	5.761 (16.156)	0.237 (16.156)	-0.009 (16.156)	80.181 (16.156)	46.228 (38.884)
25: Technological Strategies	0.281 (15.691)	0.048 (16.638)	62.659 (16.638)	1.013 (15.730)	0.325 (15.730)	0.044 (15.730)	415.610 (15.730)	-12.398 (14.546)
26: Client Strategies	0.203 (16.030)	0.009 (18.735)	79.925 (18.735)	5.932 (16.267)	0.206 (16.267)	-0.023 (16.267)	95.475 (16.267)	-8.124 (74.398)
27: Management Strategies	0.205 (16.005)	0.010 (16.119)	154.040 (16.119)	-0.134 (14.727)	0.465* (14.727)	-0.162 (14.727)	118.460 (14.727)	-1.403** (0.511)
28: Planning Process	0.221 (15.948)	0.017 (18.453)	23.327 (18.453)	16.479 (16.194)	0.228 (16.194)	-0.014 (16.194)	315.436 (16.194)	5.426 (17.599)
29: Organizing Process	0.302 (15.586)	0.061 (16.161)	110.757 (16.161)	-0.279 (15.648)	0.345 (15.648)	0.058 (15.648)	127.129 (15.648)	-1.177 (0.948)
20: Staff Management Process	0.254 (15.817)	0.033 (11.611)	81.360 (11.611)	1.450 (15.410)	0.376 (15.410)	0.062 (15.410)	159.046 (15.410)	-11.907 (8.338)
21: Implementation Process	0.168 (16.119)	-0.004 (11.373)	85.071 (11.373)	1.261 (16.346)	0.164 (16.346)	-0.033 (16.346)	125.014 (16.346)	-6.208 (18.062)
22: Educational Process	0.457** (14.545)	0.162 (16.262)	86.624 (16.262)	0.602** (14.723)	0.445 (14.723)	0.162 (14.723)	85.924 (14.723)	1.004 (0.652)

CONT.

LINEAR AND QUADRATIC PERFORMANCE FUNCTIONS OF AGGREGATE SYSTEMS AND PROCESSES

Micro-Systems and Processes	Linear Functions				Quadratic Functions				
	R	-- R _{RR}	a	b	R	-- R _{RR}	a	b	c
123 Controlling Process	0.316 (15.512)	0.070	110.538	-5.548 (3.041)	0.316 (15.777)	0.038	109.569 (15.138)	-4.644 (15.138)	-0.1745 (2.9233)
124 Staff Background	0.185 (16.068)	0.002	1111.554	-0.554 (0.536)	0.245 (14.125)	-0.005	151.277 (3.740)	-3.853 (0.0732)	0.0450 (0.0732)
125 Staff Quality	0.456** (14.518)	0.182	78.766	0.260** (0.092)	0.482 (14.571)	0.179	95.716 (0.442)	-0.152 (0.442)	0.0022 (0.0023)
126 Staff Behaviour	0.165 (16.162)	-0.005	82.345	0.164 (0.179)	0.250 (15.093)	-0.001	-9.351 (1.791)	2.053 (1.791)	-0.0095 (0.0089)
127 Clients Resource Need	0.138 (16.194)	-0.014	1105.289	-0.552 (0.695)	0.173 (14.381)	-0.037	95.885 (3.480)	1.395 (3.480)	-0.1007 (0.1780)
128 Institution Resource Use NATRO SYSTEM & PROCESSES	0.331 (15.478)	0.000	91.520	0.079* (0.041)	0.371 (15.447)	0.078	97.641 (0.0065)	0.005 (0.1409)	-0.5691 (0.1409)
129 Environment	0.519** (13.974)	0.245	13.973	0.556** (0.167)	0.327** (14.133)	0.228	90.262 (1.630)	-0.373 (1.630)	0.0045 (0.0078)
130 Strategy	0.111 (16.251)	-0.021	1106.006	-0.075 (0.122)	0.519* (14.213)	0.219	278.920 (1.199)	-3.892** (1.199)	0.0198** (0.0662)
131 Management	0.007 (16.351)	-0.033	98.297	0.096 (0.142)	0.273 (15.998)	0.011	163.928 (0.913)	-1.373 (0.913)	0.0048 (0.0045)
132 Staff	0.479** (14.388)	0.200	52.078	0.225** (0.079)	0.476* (14.624)	0.173	70.676 (0.889)	0.046 (0.889)	0.0005 (0.0022)
133 Resource	0.327 (15.454)	0.077	90.873	0.075 (0.042)	0.376 (15.453)	0.077	99.475 (0.001)	0.001 (0.001)	-0.0457 (0.1501)
134 Model Purity (51)	0.111 (16.250)	-0.021	97.833	4.28 (6.946)					
135 Model Interpretation (02)	0.342 (15.343)	0.008	94.569	11.194 (5.411)					

Magnitude and Direction of Relationships and Marginal Contributions of Organizational Variables to Performance at Different Levels of Interactions

No	Organizational Variables	Single Factor		Multiple Factors : Levels of Interaction		
		Simple Relationship Coefficient (R)	Regression Coefficient (b)	Micro System /Process (b)	Macro System /Process (b)	Total Interacting Situation (b)
MACRO SYSTEM : ENVIRONMENTAL						
Micro System : Agro-ecological						
X9	Solar Energy	0.135	0.315(1.821) (0.220)	0.003(0.074) (0.021)	-0.309(0.064) (0.018)	E
X10	Rainfall	0.084	0.310(0.073) (0.022)	-0.027(4.074) (0.030)	-0.025(4.544) (0.304)	E
X11	Environmental Risk	0.200	0.03(4.003) (0.163)	0.083(0.611) (0.180)	E	E
X12	Productive Capacity of Land	0.363*	0.170(13.192) (0.080)	0.246(13.202) (0.123)	0.217(9.385)* (0.079)	0.216(5.423)** (0.016)
X13	Irrigation Coverage	0.097	0.022(0.098) (0.041)	0.033(0.548) (0.048)	0.076(4.211)* (0.033)	0.221(0.321)* (0.009)
X14	Accessibility	-0.071	-0.080(0.051) (0.224)	0.182(1.351) (0.297)	-0.364(0.301) (0.213)	E
Coeff. of Det. R^2						
				0.445(0.006) (3.552)		
Micro System : Economic						
X15	Operational Fire Size	0.122	0.116(1.492) (0.262)	0.760(1.981) (0.942)	E	E
X16	Temeral Structure	0.156	0.034(2.438) (0.040)	0.029(1.511) (0.042)	0.123(4.511) (0.032)	E
X17	Substance Pressure	0.093	0.995(0.092) (1.951)	-4.998(0.341) (5.773)	-2.038(2.102) (2.500)	E
X18	Draft Power Availability	0.291*	0.053(8.472) (0.632)	0.113(0.472) (1.142)	2.269(5.241)** (0.867)	1.336(1.641)** (0.035)

Magnitude and Direction of Relationships and Marginal Contributions of Organizational Variables to Performance of at Different Levels of Interactions

No	Organizational Variables	Single Factor		Multiple Factors : Levels of Interaction			
		Simple Relationship (b)	Regression Coefficient (b)	Micro System /Process (b)	Macro System /Process (b)	Total Interacting Situation (b)	
X19	Family Labour Availability	-0.135	-0.088(1.822) (0.011)	E	0.016(0.582) (0.011)	E	E
X20	Commercialization	0.276	0.063(7.622) (0.035)	0.068(6.872) (0.045)	0.034(0.512) (0.039)	E	E
X21	Product Market Difficulty ¹	-0.245	-0.026(6.082) (0.128)	-0.420(5.08) (0.264)	E	E	E
Coeff. of Det. : R^2				0.492(0.061) (3.453)			
Micro System : Socio-psychological							
X22	Clients' Family Size	0.028	0.082(0.012) (5.528)	0.565(2.272) (0.520)	E	E	E
X23	Clients' Literacy	0.365*	0.118(13.322)* (0.551)	0.179(2.912) (0.098)	0.142(6.222) (0.066)	0.124(10.702)** (0.013)	E
X24	Clients Formal Education	0.308*	0.122(9.492) (0.369)	-0.192(4.622) (0.135)	-0.054(5.642) (0.094)	E	E
X25	Clients Mass Communication Exposure	0.418*	0.284*(6.812) (0.034)	0.122(9.122)* (0.055)	0.000(9.022) (0.040)	E	E

1. The Dimensions having Significant non-linear (quadratic) relationships with performance

E : Dimensions Excluded due to having no influence or influence beyond tolerance limit

Note: Figures in the parentheses: Underneath - Standard Errors and right side contribution

No	Organizational Variables	Single Factor		Multiple Factors : Levels of Interaction		
		Simple Relationship Coefficient (a)	Regression Coefficient (b)	Micro System /Process (b)	Macro System /Process (b)	Total Interacting Situation (b)
MACRO SYSTEM : ENVIRONMENTAL						
Micro System : Socio-psychology						
X26	Clients Organizational Participation	0.104	0.034(1.08%) (0.41)		-0.135(2.13%) (0.036)	-0.051(0.018%)E (0.030)
X27	Clients cooperative Membership	0.175	0.031(3.76%) (0.332)		0.0117(2.48%) (0.038)	0.034(0.57%)E (0.030)
X28	Clients Leadership Experience	0.077	0.049(0.06%) (0.384)	E	-0.066(2.67) (0.076)	E
X29	Clients Patron Relationship	0.485**	0.069(23.33%) (0.225)	**	0.049(23.28%) (0.025)	-0.047(32.20)** (0.019)
X30	Clients Attitude Towards Change	0.041	0.071(0.02%) (0.246)		0.455(1.35%) (0.323)	0.525(1.11%) (0.279)
Coeff. of Det. : (R²)						
0.693(0.300) (3.532)						
Micro System : Political						
X31	Clients Political Consciousness	0.172	0.074(2.96%) (0.079)		0.081(2.94%) (0.089)	0.226(5.47%)** (0.067)
X32	Clients Political Participation	0.097	-0.024(0.09%) (0.065)		-0.020(0.56%) (0.073)	0.138(4.51%) (0.051)
X33	Socio-Political Influence	0.023	0.014(0.01%) (0.118)		-0.053(0.27%) (0.192)	-0.229(3.34%) (0.081)
Coeff. of Det. : (R²)						
0.194(-0.065) (3.677)						
Micro System : Organizational						
X34	Inter Organizational Relationship	-0.042	0.012(0.02%) (0.352)		-0.037(1.50%) (0.052)	E
X35	Inter Organizational Conflict	0.27**	0.022(0.69%) (0.243)		0.090(10.74%) (0.095)	0.037(0.11%) (0.027)

No	Organizational Variables	Single Factor		Multiple Factors : Levels of Interaction		
		Simple Relationship (a)	Regression Coefficient (b)	Micro System /Process (b)	Macro System /Process (b)	Total Interacting Situations (b)
	Coef. of Det. : r^2 MACRO-SYSTEM : STRATEGY			0.349(0.06) (3.452)	0.964(0.758) (1.752)	**
X36	Micro-System : Approach Strategy Extension Model (Integration)	0.294*	1.368(0.64X) (0.811)	0.942(0.67X) (1.441)	-2.206(2.78X) (1.411)	1.703(0.73X) (0.580)
X37	Functional Exclusivity	-0.264	0.355(6.97X) (0.037)	-0.018(0.43X) (0.062)	-0.074(1.60X) (0.358)	E
X38	Universality Contact	0.256	0.047(6.55X) (0.033)	0.007(0.04X) (0.057)	E	E
	Coef. of Det. : r^2			0.502(-0.066) (3.573)		
	Micro System : Technological Strategy					
X39	Technology Adaptability	0.566**	1.106(32.03X)** (0.378)	1.282(32.00X)** (0.389)	0.598(32.01X) (0.543)	-0.198(32.01X) (0.099)
X40	Technological Diversity	0.322*	0.312(10.37X) (3.167)	0.167(2.76X) (0.152)	0.374(9.36X) (0.188)	E
	Coef. of Det. : r^2			0.589(0.202)** (2.976)		
	Micro System : Client Strategy					
X41	Client orientation	0.376	0.079(0.06X) (0.237)	0.179(1.79X) (0.251)	0.352(1.29X) (0.241)	E
X42	Client Participation	0.144	0.325(2.07X) (3.032)	0.033(2.10X) (0.034)	E	E

No	Organizational Variables	Single Factor		Multiple Factors : Levels of Interaction			
		Simple Relationship (a)	Regression Coefficient (b)	Micro System /Process (b)	Micro System /Process (b)	Total Interacting Situation (b)	Total Interacting Situation (b)
	Coef. of Det. : r^2			0.194(-0.029) (3.614)			
	MICRO SYSTEMS : MICROSYSTEMS SITUATION						
X43	Participativeness	0.056	0.025(0.083) (0.127)	0.064(0.003) (0.132)	E	E	-E
X44	Coerciveness	-0.335*	-0.302(11.223) (0.267)	-0.309(3.702) (0.272)	0.109(0.342) (0.264)	E	E
X45	Performance Aspiration	0.160	0.217(2.563) (0.535)	0.032(0.003) (0.261)	-0.254(1.621) (0.277)	E	E
X46	Professionalization	-0.442**	-0.050(19.621)** (0.018)	-0.043(19.701)* (0.021)	-0.078(6.223)** (0.037)	E	E
	Coef. of Det. : r^2			0.494(0.132) (3.319)	0.743(0.396) (2.768)		
	MICRO PROCESS : MANAGEMENT						
	MICRO PROCESS : EDUCATION						
X47	Program Soundness	0.077	0.053(0.064) (0.124)	0.156(3.702) (0.145)	0.373(0.404) (0.255)	E	E
X48	Staff Participation in Planning	-0.002	-0.001(0.004) (0.125)	E	E	E	E
X49	Role Conflict	0.160	0.025(2.563) (0.127)	0.551(2.603) (0.414)	0.401(0.233) (0.465)	E	E
	Coef. of Det. : r^2			0.251(-0.002) (3.565)			
	MICRO PROCESS : EDUCATION						
X50	Size of operational unit	-0.242	0.312(5.963) (0.331)	-0.034(2.632) (0.018)	E	E	E
X51	Size of client/E A	-0.071**	0.423** (22.103) (0.143)	-0.376(22.192)* (0.160)	-0.776(16.005)** (0.278)	-0.403(9.405)** (0.047)	-0.403(9.405)** (0.047)

No	Organizational Variables	Single Factor		Multiple Factors : Levels of Interaction			
		Single Relationship (a)	Regression Coefficient (b)	Micro System /Process (b)	Micro System /Process (b)	Micro System /Process (b)	Total Interacting Situation (b)
X52	Span of Supervision	0.161	0.014(0.044) (0.041)	0.101(0.022) (0.059)	E	E	E
X53	Strategic Authority	-0.035	-0.024(0.012) (0.127)	-0.041(0.122) (0.187)	0.163(1.142) (0.133)	0.173(0.682)** (0.028)	E
X54	Tactical Authority	-0.012	-0.010(0.005) (0.156)	0.148(1.962) (0.224)	-0.443(0.542) (0.232)	E	E
X55	Formalization	0.217	0.445(4.712) (0.366)	0.169(0.622) (0.367)	-0.377(3.232) (0.227)	0.516(1.922)** (0.067)	E
X56	Flexibility	0.036	0.039(0.012) (0.296)	0.140(2.326) (0.294)	0.201(1.022) (0.240)	E	E
Coeff. of Det. : R^2				0.607(0.186) (3.216)			
MICRO PROCESS : STAFF MANAGEMENT							
X57	Staff Salary Level	0.124	0.223(1.542) (0.227)	-0.222(0.802) (0.368)	-0.725(2.992)* (0.220)	-0.685(2.732)** (0.078)	E
X58	Incentive	0.394**	0.246(15.522)** (0.105)	0.215(15.602) (0.131)	0.216(2.192) (0.195)	E	E
X59	Transfer Frequency	0.217	0.596(4.712) (0.482)	0.276(0.502) (0.535)	0.323(0.352) (0.479)	E	E
X60	Managerial Succession	-0.297**	-0.411(0.602) (0.358)	-0.360(2.202) (0.376)	-0.315(0.142) (0.788)	-0.379(0.012)** (0.064)	E
Coeff. of Det. : R^2				0.437(0.071) (0.433)			

No	Organizational Variables	Simple Factor		Multiple Factors : Levels of Interaction		
		Simple Relationship Coefficient (r)	Regression Coefficient (b)	Micro System /Process (b)	Micro System /Process (b)	Total Interacting Situation (b)
MICRO PROCESS : IMPLEMENTATION						
61	Coordination	0.220	0.379(4.84E) (3.307)	0.356(4.94E) (0.376)	0.223(0.19E) (0.40E)	-0.377(1.44E)** (0.060)
62	Supervision	0.069	0.303(0.05E) (0.056)	-0.002(-0.12E) (0.609)	E	E
63	Supervisors Mobility	0.183	0.152(3.35E) (0.150)	0.135(2.37E) (0.140)	-0.152(3.44E)** (0.200)	-0.221(0.95E)** (0.04E)
64	Horizontal Communication	0.059	0.174(0.004E) (0.539)	E	-0.161(1.00E) (0.933)	E
65	Supervisory Leadership (RO)	0.017	0.250(0.00E) (0.270)	0.089(0.27E) (0.297)	-0.593(1.64E)** (0.254)	-0.049(3.25E) (0.050)
66	Supervisory Leadership (TO)	0.097	0.140(0.09E) (0.281)	0.069(0.20E) (0.295)	0.007(3.26E) (0.389)	E
Coeff. of det. (R ²)						
				0.297(-0.099) (3.735)		
MICRO PROCESS : EDUCATIONAL						
67	Level of Educational Activities	0.218	0.026(4.75E) (0.021)	0.019(2.87E) (0.017)	-0.009(0.14E) (0.920)	E
68	Client Participation (EA)	0.443**	0.040(19.62E)** (0.018)	0.027(4.82E) (0.018)	0.032(20.90E) (0.036)	0.034(9.66E) (0.31E)
69	Quality of Client Participation	0.556**	0.275(30.91E)** (0.09E)	0.216(30.91E)** (0.094)	0.180(30.91E) (0.158)	E

No	Organizational Variables	Single Factor		Multiple Factors : Levels of Interaction		
		Simple Regression Coefficient (a)	Regression Coefficient (b)	Micro System /Process (b)	Micro System /Process (b)	Total Interacting Situation (b)
	Coeff. of Det. (R ²)			0.620(0.110)** (2.94)		
	MICRO SYSTEMS : CONTROL					
X70	Span of Control	0.034 (0.037)	0.007(0.033) (0.037)	0.010(0.204) (0.038)	E	E
X71	Level of Control	-0.114 (0.149)	-0.094(1.208) (0.149)	E	0.144(0.242) (0.345)	E
X72	Dispersion of Control	-0.147 (0.011)	-0.009(2.164) (0.011)	-0.010(2.205) (0.012)	-0.028(0.292) (0.028)	E
X73	Severity of punishment	-0.086 (0.026)	-0.013(0.971) (0.026)	-0.017(1.204) (0.028)	-0.003(3.022) (0.039)	E
	Coeff. of Det. (R ²)			0.191(0.067) (3.679)	0.966(0.743)** (1.805)	
	MICRO SYSTEM : STAFF					
	MICRO SYSTEM : STAFF BACKGROUND					
X74	Staffs' Family Type	0.092 (0.045)	-0.013(3.004) (0.045)	0.034(0.80%) (0.061)	0.077(1.442) (0.042)	E
X75	Staffs' Family Size	-0.022 (0.045)	0.023(0.003) (0.045)	0.244(0.40%) (0.745)	E	E
X76	Staffs' Family Income	0.008 (0.482)	-0.008(0.003) (0.482)	-0.125(0.003) (1.161)	1.138(6.402) (0.719)	0.524(0.422)** (0.163)
X77	Staffs' Parents' Occupation	-0.111 (0.731)	0.043(1.212) (0.731)	-0.016(0.402) (0.051)	0.087(6.192)* (0.034)	E
X78	Staffs' Rural Background	-0.203 (0.046)	-0.028(4.122) (0.046)	-0.049(4.105) (0.053)	0.206(2.542)** (0.052)	0.340(0.252)** (0.310)
X79	Elit Representation	0.102 (0.047)	-0.054(1.042) (0.047)	0.023(0.602) (0.058)	-0.034(0.921) (0.039)	E

No	Organizational Variables	Single Factor		Multiple Factors : Levels of Interaction		
		Simple Relationship (R)	Regression Coefficient (b)	Micro System /Process (b)	Micro System /Process (b)	Total Interacting Situation (S)
				0.251(-0.062) (3.040)		
	Coeff. of Det. \bar{R}^2					
	MICRO SYSTEM : Staff Availability					
X80	Staff Age	0.216	0.200(4.66%) (0.165)	0.141(0.392) (0.478)	-0.802(4.392)** (0.250)	E
X81	Staffs' Education	-0.205*	-1.431(9.302) (0.815)	-0.797(9.312) (1.379)	-4.574(4.112)** (0.063)	E
X82	Staffs' Personnel Quantities	-0.305*	-0.129(9.302) (0.326)	-1.142(6.52%) (0.094)	-0.133(2.98)* (0.063)	E
X83	Staffs' work Experience	0.168	0.112(2.82%) (0.145)	-1.430(1.98) (0.558)	E	E
X84	Staffs' Extension Work Experience	0.014	0.693(0.002) (0.076)	-0.033(2.42%) (0.038)	-0.040(2.73) (0.102)	E
X85	Inservice Training of Staff	-0.002	-0.002(0.002) (0.013)	-0.004(0.28%) (0.018)	0.292(2.04) (0.024)	E
X86	Extension Training of Staff	0.136	0.032(3.46%) (0.031)	0.054(5.83) (0.042)	E	E
X87	Staffs' Organizational Tenure	0.241	0.173(5.91%) (0.127)	0.347(0.20%) (0.391)	E	E
				0.510(0.136) (3.538)		
	Coeff. of Det. \bar{R}^2					
	MICRO SYSTEM : Staff Behavior					
X88	Staffs' Professional Commitment	0.342*	0.051(11.702) (0.046)	0.106(16.24%) (0.044)	0.203(16.842)** (0.047)	0.132(5.54) (0.011)
X89	Level of Motivation	-0.011	-0.010(0.60%) (0.160)	-0.270(6.79%) (0.165)	0.205(2.42%) (0.160)	E
X90	Job Satisfaction	0.040	0.003(0.02%) (0.132)	E	E	E
X91	Absence from duty station	-0.056	-0.025(0.03%) (0.095)	0.012(0.07%) (0.069)	0.114(2.19%) (0.065)	E

No	Organizational Variables	Single Factor		Multiple Factors : Levels of Interaction				
		Simple Relationship Coefficient (R)	Regression Coefficient (b)	Macro System /Process (b)	Macro System /Process (b)	Macro System /Process (b)	Total Interesting Situation (b)	
X92	Anxiety - Stress	0.358*	0.253(12.822)† (0.125)	0.452(12.822)†† (0.137)	0.557(12.822)†† (0.137)	E	E	
X93	Intra Organizational conflict	-0.231	-0.089(5.344) (0.068)	-0.080(4.104) (0.659)	-0.231(2.822)†† (0.041)	E	E	
	Coeff. of Det. \bar{R}^2			0.630(0.294)* (2.994)	0.892(0.528)†† (2.172)			
	MACRO SYSTEM : RESOURCES							
	MICRO SYSTEM : CLIENT RESOURCE							
X94	Clients' Input Need Fulfillment	-0.307*	-0.056(9.422) (0.032)	-0.068(9.404) (0.036)	E	E	E	
X95	Client Credit Need Fulfillment	-0.022	-0.008(0.002) (0.062)	0.050(1.702) (0.067)	E	E	E	
	Coeff. of Det. \bar{R}^2			0.333(0.050) (3.473)				
	MICRO SYSTEM: (UNITARY) LOCAL RESOURCES							
X96	Manpower Need Fulfillment	0.394*	0.136(15.522)* (0.058)	0.101(10.072) (0.054)	0.102(19.072)* (0.054)	0.100(9.731)†† (0.314)		
X97	Travel Allowances	0.114	0.026(1.302) (0.031)	-0.015(0.192) (0.050)	E	E	E	
X98	Logistic Support	0.244	0.024(5.951) (0.018)	-0.052(6.312) (0.031)	-0.054(5.312) (0.035)	-0.020(1.022)†† (0.003)		
X99	Contingent Expenses 1	0.373*	0.035(13.712)† (0.016)	0.048(3.842) (0.034)	0.054(13.942)* (0.025)	E	E	
X100	Expense Per Client Family	0.446	0.012(19.892)†† (0.005)	0.013(19.942) (0.007)	0.012(19.942) (0.005)	E	E	
	Coeff. of Det. \bar{R}^2			0.635(0.239) (3.004)	0.634(0.313)†† (2.953)	0.998(0.907)†† (0.410)		