Curriculum and Practice of Environmental Education at Primary Schools in Bangladesh

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Curriculum and Practice of Environmental Education at Primary Schools in Bangladesh

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DECLARATION

I do hereby declare that the thesis titled "**Curriculum and Practice of Environmental Education at Primary Schools in Bangladesh**" is my original research work, and contains no materials which have been published by any other person. Materials are used in the study have been properly acknowledged and mentioned in the text as well as in the reference section. The content of the thesis is the result of my own research work which I have conducted during my submission of MPhil degree. No part of this work has been submitted to anywhere for any other degree. To the best of my knowledge any other higher degree has not been offered to any one on this particular topic. The work has been done under the guidance of Professor Dr. Mohammad Ali Zinnah and Professor Dr. Mahbub Ahsan Khan, Institute of Education and Research, University of Dhaka, Bangladesh.

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ABSTRACT

Primary curriculum of Bangladesh has been revised in 2012 with updated contents and teaching-learning processes to provide effective primary education, and environmental education (EE) was also part of this revision and supposed to be implemented through different subjects. In this situation, it is important to know how far the EE related part of 2012 primary curriculum is being implemented at schools. The study took it as a problem and analyzed the practice of EE at schools compare to 2012 primary curriculum. The study chosen grade V "Primary Science" and "Bangladesh and Global Studies" as the sample subjects because both the subjects cover EE most. However, fifteen primary schools from eleven districts were selected purposively for the study. Total thirty teachers of grade V "Primary Science" and "Bangladesh and Global Studies" were selected purposively, and their teaching-learning activities related to EE were observed through a five-point scale starts from "zero" denoting "not practiced at all" and ends at "four" denoting "completely practiced" to explore the practice of EE at primary schools focusing two major categories "presenting contents" and "conducting teaching-learning processes" compare to 2012 primary curriculum. Moreover, ten students of grade V from each school were selected randomly for the focus group discussions (FGD). The FGDs were conducted through a structured guideline to know teachers' practice of EE. In addition, headmasters of all schools and previously selected thirty teachers were interviewed to get their insights and know the factors behind their practices. Data gathered from different sources were triangulated and analyzed in mixed approach. It is found that most of the teachers know the concept of subject-based terminal competencies and grade-wise achievable competencies but no teachers could tell any subject-based terminal competencies correctly though very few of them could tell grade-wise achievable competencies correct. However, the teachers who told competencies wrong, their answers were closer to learning outcomes most of the cases. On the other hand, teachers' have good idea about the concept of learning outcomes though majority of them could tell only 1-2 learning outcomes correctly. It is found that almost all the contents mentioned in the curriculum were presented by the teachers except contents related to weather change because they did not find the contents in the textbooks clearly. On the other hand, teachers followed teaching-learning processes related to previous curriculum learned from different trainings. They started lessons typically through motivation followed by showing flip charts, making student read the textbooks and finally asking questions for evaluation. Teachers argued that they did not get any training on new curriculum. However, subject teachers and headmasters mentioned unavailability of 2012 primary curriculum at schools as one of the most important factors behind teachers' lack of knowledge and practice though this curriculum is available in online. Moreover, lack of teacher's guide is found as another factor behind teachers' performance. The study suggests that respective authorities should concentrate on EE through designing effective training for teachers and developing teacher's guide on present curriculum, establishing necessary infrastructures at schools, implementing regular monitoring and mentoring activities, introducing continuing professional development processes in schools, etc.

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ACRONYMS

AEE	Alliance for Environmental Education
APA	American Psychological Association
AUEO	Assistant Upazila Education Officer
COP21	21st Conference of the Parties
CS	Community School
DPE	Directorate of Primary Education
EE	Environmental Education
EFA	Education for All
EL	Environmental Literacy
FGD	Focus Group Discussion
FYP	Five Year Plan
GoB	Government of Bangladesh
GPS	Govt. Primary School
ha	hectare
ICT	Information and Communication Technology
IEEP	International Environmental Education Programme
ILO	International Labour Organization
km	kilometer
MDG	Millennium Development Goals
mm	millimeter
MoE	Ministry of Education
MoPME	Ministry of Primary and Mass Education
MS Excel	Microsoft Excel
NAPE	National Academy for Primary Education
NCTB	National Curriculum and Textbook Board
NGO	Non-Government Organization
NIEPA	National Institute of Educational Planning and Administration, New Delhi
NNPS	Newly Nationalized Primary School
NRNGPS	Non Registered Non Govt. Primary School
PTI	Primary Training Institute
RNGPS	Registered Non Govt. Primary School
ROSC	Reaching Out School Children
SK	Shishu Kollyan (Children Welfare)
SPSS	Statistical Package for the Social Sciences
UEO	Upazila Education Office
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UPE	Universal Primary Education
URC	Upazila Resource Center

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Tangible augmentation of industrial production since the industrial revolution is chronologically degrading the global environment and nature's life support systems without which livings cannot exist. According to Nath (n.d.), the situation gets into a phenomenon that if nothing is done effectively or left unwarranted, future generations are at high risk of inheriting diluted resources of earth which happens to be leading an unacceptable quality of life. Like some of the countries which are particularly vulnerable at sea level, Bangladesh is often exposed to severe natural disasters. It is found in Akter (2009) that Bangladesh is about 80% flatlands where 20% of the land is one meter or less above sea level. Bangladesh is particularly vulnerable for sea level rise as twelve out of its nineteen districts are directly exposed to the sea. Roughly five hundred thousand people of Bhola Island have been relocated during the floods in 2005. More examples of severe climatic catastrophes can be drawn, for instances, cyclones like Sidr and Aila, and mostly recent occurrences of frequent earthquakes.

The society of the twenty first century realizes the significance of knowledge and information. According to Chowdhury (2004), generating creative knowledge and information are simultaneously playing vital role of developing new technologies, leading towards sustainable growth of economy harmonize with the environment and mitigating risk incurrent as much as possible.

As the environment is a global issue, the importance of environmental education (EE) in human life is absolute. Fortunately after realizing the urgency, many scholars of the world

put thoughts on environment. EE is probably as old as human civilization. Through the centuries, people have learned how to interact with their surroundings environment. Thus in early days, EE has mainly consisted of learning how to master and make wise use of the natural environment. Nevertheless nature is perceived as an unlimited reserve of resources now in many cases (Chowdhury, 2004).

The professional field of EE has been begun a little over forty years ago out of growing concern for the state of the natural environment. The first significant effort to define the goals and objectives of EE was an attempt to help legitimize the field through the Tblisi declaration in 1978 by the United Nations Education, Scientific, and Cultural Organization (UNESCO). According to Neil (2006), the main goals and objectives of the EE are to protect environment, to aware and concern students about economic, social, political and ecological interdependence, to provide opportunities them to improve students' environment, to make attitudes, skills and behavior of students towards the environment and develop their problem-solving skills for taking decision about the solutions of environmental problems.

Many researchers and EE professionals put their effort to promote the growth and expansion of EE through both formal and non-formal means. Still, there is continuous ambiguity in regards to what subjects should and should not be included in EE curriculum, what should be the best way to implement it into schools, and who should teach it (Haugen, 2011). Government of Bangladesh is also concerned about providing EE to the school students and as a first step a subject called environmental studies has been introduced into the primary and junior secondary curriculum of Bangladesh in 1978 (Kabir & Mahmud, 2009).

It is known that primary education is very important for students' learning. It is the fundamental stage of children's development. In this stage, citizens grow with a certain vision, quality and competence. However, the primary curriculum of Bangladesh has been changed in 2012. After reviewing all the subject based curriculums of this 2012 primary curriculum it is found that EE is now being provided mainly through two different subjects named "Primary Science" and "Bangladesh and Global Studies" (NCTB, 2012a, 2012b, 2012c, 2012d, 2012e, 2012f, 2012g, 2012h, 2012i, 2012j, 2012k, 2012l, 2012m). The ultimate goal of the EE in Bangladesh is improving the quality of life of the people by conserving environment. According to NCTB (2012a), there is a goal, thirteen objectives and twenty nine terminal competencies in the 2012 primary curriculum of Bangladesh. Among the terminal competencies of this primary curriculum, eight are directly related to EE. These competencies would be attained by the two core subjects "Primary Science" and "Bangladesh and Global Studies". EE has been included in these subjects as interdisciplinary content. The curriculum consists of terminal competencies of these subjects, achievable competencies for specific grades, achievable competencies for specific units and learning outcomes for associated concepts. Moreover, 2012 primary curriculum provides instructions regarding teaching-learning processes and learning activities for EE (NCTB, 2012a, 2012b, 2012c, 2012d, 2012e, 2012f, 2012g, 2012h, 2012i, 2012j, 2012k, 2012l, 2012m). Though curriculum instructs updated and effective processes of EE for primary schools, these should be implemented properly. Without effective implementation, curriculum is nothing like waste paper. Thus, it is very important to know how far the curriculum is being implemented at the primary schools. To achieve the goal of EE, how much the teachers follow EE related parts of this 2012 primary curriculum? Do they know EE related parts of this curriculum properly? Do they cover the contents related to EE in their lessons prescribed in this curriculum? Do they

practise suggested teaching-learning processes for EE prescribed in this curriculum? Do they face any challenges in following EE related parts of this curriculum?

A study is required to get answers of the above questions. That is why the present study has been taken aiming to analyze the practice of EE at primary schools in compare to the 2012 primary curriculum of Bangladesh.

1.2 Statement of the Problem

The utmost challenges for education is to ensure measurable results, and EE is not exempted from it and targeted to make children realize the environmental problems, rationalize them and make them enable to take appropriate actions to mitigate these problems. But it is not an easy job and depended on many things such as well-structured curriculum, updated textbooks, teachers' capacity, facilities, etc. The primary curriculum of Bangladesh has been revised recently in 2012 and prescribes EE for students to provide exciting opportunities for enhancing learning, sharpening observation and problem-solving skills, and producing measurable outcomes. Though curriculum prescribes the process of EE but it will not be fruitful until it is practised properly. Teachers and schools are the key vehicles of providing EE and capacity of them is vital. Can the teachers and schools follow 2012 primary curriculum and deliver EE properly? Are the teachers ready to implement EE according to this curriculum? Do the teachers know about EE related parts of this curriculum? Do the teachers face challenges during implementation of the EE at primary schools according to this curriculum? If yes, what are the challenges? All the questions and issues are closely relevant and significant to implement EE at primary schools as well as know the status of implementation of this 2012 primary curriculum. In this point, the main problem is, during deliver the EE at primary schools, do the teachers

follow the 2012 primary curriculum? If yes, how much they do? Researcher has chosen the topic as a problem for his study. The study analyzes the practice of EE at primary schools in comparing to 2012 primary curriculum of Bangladesh.

1.3 Rationale of the Study

To solve environmental problems and protect the earth, we need to build today's students for future. Environmental knowledge, skills, attitudes, values, ethics and problem solving skills should be enhanced and installed into the learners' mind (Spork, 1992).

At present, environmental knowledge, skills, attitudes and values would be provided to the students of primary education in Bangladesh. However, Feldber et al. (2006) has explored that primary education of Bangladesh suffers for insufficient classrooms, absence of teachers, low academic performance of students and economic conditions of families. Learning achievement of functional literacy and numeracy of the students are poor.

Therefore, it is very important to know that to what extents the primary school teachers practise EE according to the 2012 primary curriculum. It is not only important to know this but also need to know the challenges they face during implementing EE according to this curriculum. It is established that sustainable learning is depended on practice. If any learning is not practised, it might be forgotten and useless. It is also important to identify students' and headmasters' view on how their teachers are practising activities related to EE. That is why the study is very rationale to reveal the practice of EE at primary schools and relation between practice and 2012 primary curriculum.

1.4 Objectives of the Study

The main objective of the study is to analyze the practice of EE at primary schools compare to 2012 primary curriculum of Bangladesh.

The specific objectives of the study are to:

i) explore the primary school teachers' knowledge about EE related parts of 2012 primary curriculum;

ii) explore the practice of EE at primary schools by teachers compare to 2012 primary curriculum; and

iii) find out the challenges behind teachers' practice of EE at primary schools compare to 2012 primary curriculum.

1.5 Research Questions of the Study

The research questions of the study are:

i) What do the primary school teachers know about EE related parts of 2012 primary curriculum?

ii) To what extent 2012 primary curriculum is followed by teachers during practice of EE at primary schools?

iii) What challenges are faced by the teachers to follow 2012 primary curriculum during practice of EE at primary schools?

1.6 Significance of the Study

The study explores the situation regarding implementation of EE compare to 2012 primary curriculum which includes teachers' know-how about the curriculum and their practices related to EE. The study also explores challenges of implementing EE at primary schools which might be useful for understanding the needs of students, teachers

and schools. Considering objectives, the study findings can be helpful to enhance quality of EE in terms of quality of teachers, teaching learning process, schools, curriculum implementation process, etc. Based on the findings, the study forms few recommendations which might be helpful for implementing 2012 primary curriculum successfully and ensuring quality education at primary schools in Bangladesh.

Thus, the study might be helpful for the curriculum experts, educationists and subject specialists to update curriculum and other materials. The study can also be helpful for the trainers and educators for designing and developing training and related materials. It may be resourceful for the education managers to think and design effective monitoring and administration ensuring better implementation of EE. In addition, the study might be resourceful for the government and non-government authorities to develop the learning facilities at schools required for EE. For the above mentioned reasons, this study seemed so significant to the researcher.

1.7 Operational Definitions

This study aim is to explore current practice of EE at primary schools in compare to 2012 primary curriculum in Bangladesh. The key variables of this study are EE curriculum, practice of EE and primary schools. These are the operational terms in this research work. Definitions of these operational terms are given below.

1.7.1 Environmental Education Curriculum

EE curriculum is such a curriculum which draws a skeleton consisting of what contents related to environment should be provided and how these contents delivered to a certain age group. According to UNESCO (1994), EE curriculum is designed to support students

for developing their environment literacy. The design must be a functional instructional model which includes units, modules, activities, etc. However, 2012 primary curriculum of Bangladesh covers different subjects such as Bangla, English, Mathematics, Primary Science, Bangladesh and Global Studies, etc. There is no separate subject on EE at primary education as well as 2012 primary curriculum in Bangladesh. EE is provided through few subjects as integrated way in primary education of Bangladesh. EE issues are covered in the aims, objectives and terminal competencies of this curriculum. In 2012 primary curriculum of Bangladesh, two subjects titled "Primary Science" and "Bangladesh and Global Studies" cover almost all the issues related to EE. Therefore, curriculum components such as subject-based terminal competencies, grade-wise achievable competencies, learning outcomes, contents, teaching learning strategies, learning activities, evaluation strategies related to EE are covered in the curriculum of above mentioned subjects. Thus in this research EE curriculum means EE related parts of 2012 primary curriculum and especially curriculum of "Primary Science" and "Bangladesh and Global Studies" covering environmental issues.

1.7.2 Practice of Environmental Education

Practice of EE means implementation of EE at primary schools in Bangladesh in compare to EE related parts of 2012 primary curriculum. According to European Commission (2015), teaching practice refers two concepts – one is teacher's instructional practices and other one is teacher's collaborative practices. Teacher's instructional practices focus on what teacher does in the classroom which covers instructional strategies, classroom management, time management, assessment, etc. On the other hand, teacher's collaborative practices focus on what teacher does outside the classroom which covers teacher's behaviors and professional development initiatives to improve teaching inside

the classroom. However, in this research, implementation of EE covers following instructions of the curriculum by teachers focusing contents presentation, teaching learning strategies, learning activities and evaluation strategies. Though EE is being provided in two subjects "Primary Science" and "Bangladesh and Global Studies", practice of EE is considered as implementation of the curriculum of "Primary Science" and "Bangladesh and Global Studies" related to environment issues. Therefore, practice of EE covers delivery of environment related contents and ways of teaching and learning these contents at primary schools.

1.7.3 Primary Schools

In Bangladesh, a primary school is a school in which children receive elementary education from the age of about six to ten, coming before secondary school and after preschool. Primary school covers grade I to grade V education. According to the Ministry of Primary and Mass Education (2015), there are seventy two thousand one hundred and fifty five (72,155) primary educational institutions in Bangladesh managed by MoPME and DPE, where thirty eight thousand three hundred and six (38,306) are GPS, twenty five thousand two hundred and forty are (25,240) NNPS, one hundred and twelve (112) are RNGPS, one thousand nine hundred and twenty six (1,926) are NRNGPS, fifty five (55) are experimental schools, one hundred and six (106) are CS, six thousand two hundred fifty eight (6,258) are ROSC schools, and one hundred and fifty two (152) are SK schools. Moreover, there are ten thousand and thirty (10,030) primary educational institutions managed by MoE, eighteen thousand three hundred and seventy one (18,371) managed by MoC, two thousand six hundred sixty eight (2,668) managed by other authorities, and eighteen thousand nine hundred and fifty two (18,952) managed by NGO

bureau. Total one hundred twenty two thousand and one hundred seventy six (122,176) primary educational institutions exist in Bangladesh.

1.8 Limitations of the Study

As the study was conducted to fulfill the requirement of the Master of Philosophy (MPhil) in Education degree, researcher could not explore each aspect of practicing EE at primary schools due to shortage of resources. The study mainly covered teachers' practice of EE according to the components of 2012 primary curriculum such as presentation of contents, conduction of learning activities, etc. Moreover, the study did not reveal teachers' content knowledge rather knowledge on components of 2012 primary curriculum such as competencies, learning outcomes, teaching-learning processes, learning activities, etc. In addition, it also explored the views of students and headmasters to triangulate the findings through observing teachers' practice. The study did not explore students' knowledge and achievement on EE as it is the outcome of EE but not the primary goal of the research.

The ultimate goal of the study was to compare the practice of EE by the teachers at primary schools to 2012 primary curriculum, not assess the curriculum as good or bad.

However, the study would be more significant if researcher could conduct case studies and explore views of other stakeholder such as education managers, teacher trainers, curriculum experts, subject experts, etc. Considering the above mentioned limitations, researcher focused on the practice of EE by the teachers at primary schools comparing to the instructions of 2012 primary curriculum. On the other hand, the study was limited into

few selected schools and few units of the selected subjects due to shortage of resources, and not analyzing data according to geographical locations and gender criteria.

1.9 Organization of the Study

The study was conducted through a rigorous and systematic process. Researcher followed major five steps to organize the study. Firstly, researcher developed the detail study methodology through analyzing different literatures. Then, researcher made data collection tools and piloted these for final use. Thirdly, researcher collected data from the respondents and then analyzed the data according to study objectives and research questions. Finally, researcher wrote the detail study report maintaining guideline of research ethics and referencing. Researcher followed APA style guide (6^{th} ed.) and guideline from Swales (2012) during writing this research report.

1.10 Chapter Summary

This chapter has described about the background of the study and statement of the problem which has stated the situation as well as explored the problem on which the study has been taken. The chapter has also described rationale and significance of the study which has illustrated logic and importance of the study related to Bangladesh education. Moreover, objectives and research questions have also been added in this chapter for focusing study area. Finally, the chapter has acknowledged study limitations as well as presented study organizations. On the other hand, the next chapter presents detail literature review for the study. Literatures have been reviewed according to the objectives of the study.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter presents a detail literature review for this study. The literatures have been reviewed aligned with the study objectives. Many literatures have been found related to the present study such as research articles, book chapters, newspaper articles, research journals, curriculums, textbooks, education policies, policies related to environment, etc. After reviewing the literatures, few aspects are presented in the following sections in relation with the objectives of the study.

2.2 Aspects of the Literature Review

The aspects are discussed in this literature review section are environment, Bangladesh policies related to environment, EE, EE curriculums, primary education, etc. These aspects are discussed in detail with necessary subsections.

2.2.1 Environment

According to NIEPA & UNESCO (1990), environment is the combination of physical, biological, social and cultural conditions that affects lives of the earth. Environment is also considered as vibrant system where its' sub systems are interacting with each other.

On the other hand, in 1977 Intergovernmental Conference on Environmental Education has defined environment in Tbilisi Report (1978) as, environment is the mixture of nature, material and social components which includes humans' cultural and personal values.

So, environment means surrounding and everything that affect an organism during its lifetime is collectively known as its environment. However, information and communication technology (ICT) plays a significant role on the human and environmental elements in both active and passive ways now-a-days. So, ICT should be included in the definitions of environment. Therefore, it can be said that environment consists of human, nature, material, social and ICT components which are affecting each other.

2.2.1.1 Environmental Situation in Bangladesh

The area of Bangladesh is one lac forty four thousand five hundred and seventy square km which lies between 20°34'-26°38'N and 88°01'-92°42'E. India is situated to the west, the north and the north-east border of Bangladesh and Myanmar is situated to the south-east border of Bangladesh. Moreover, Bangladesh is bounded by the Bay of Bengal to her south. The climate of Bangladesh is basically sub-tropical monsoon climate with a distinct dry season (Ministry of Environment and Forest, 2014).

It is found in the Ministry of Environment and Forest (2014) that temperature of Bangladesh varies from 5°-23°C in winter, raises up to 40°C in summer. Average rainfall varies from 1229-4338 mm annually. Forests cover about 14% of the country and per capita forest cover is 0.016 ha. The rate of forest destruction has been measured eight thousand ha per annum in 1980 and the annual deforestation rate has been estimated 3.3%. Consequently, per capita forest land has been declined from 0.035 ha in 1969 to 0.02 ha in 1995.

Bangladesh is situated in the Ganges-Brahmaputra-Meghna river systems, the second largest river system in the world, which drains an area of one million eighty six thousand square kilometers from China, Nepal, India and Bangladesh. Because of this unique geophysical location, the country has been endowed with rich biological diversity, hosting a rich variety of species superbly evolved to populate the ecosystems of the country. But land is being used by a mix of both traditional and modern methods, all very closely adapted to the heterogeneous conditions. This utilization patterns are keeping important implications for the vulnerability and depletion of the natural resource base. Moreover, neither the physical environment nor technologies remain static. For example, rapid and frequent natural changes are taking place in the river systems, and they are also subject to the influence of various human interventions. Thus, there are dynamic changes taking place in the hydrological system all the time. These changes influence land use patterns in turn. Bangladesh has comparatively low natural resource base with a high growth rate of population and with almost half of the population below fifteen years of age. Most of the people are among the poorest in the world, and depended mainly on the natural resource base for their livelihood. But now the resource base is under serious threat, as many natural resources are either being over exploited or used sub-optimally. Besides the effects of anthropogenic stresses, the low land-man ratio in the country is often further threatened by natural hazards. Thus, for the survival of Bangladesh's dense population, it is essential to have environmental planning and management that conserves and sustains the ecosystems that support their livelihoods (Ministry of Environment and Forest, 2014).

Therefore, besides the globe, environmental issues have become major concerns in Bangladesh due to impact on public health and development. Land, air and water

pollution, groundwater contamination, nuisance from solid wastes and noise pollution are the main environmental pollutions in Bangladesh. Dhaka city is one of the most polluted cities in the world. Environmental problems occur mainly due to population growth, urbanization, industrialization, rapid rise in transportation, inadequate and improper traffic management, poor sanitation systems and inefficient solid waste management. Moreover, e-waste materials are going to be a significant environment pollutant in coming days due to rapid increase of use of cell phones, computer and ICT gadgets. Researchers and the policy makers in the environment domain need to think about e-waste management seriously.

2.2.1.2 Importance of Environment

All species of the world are interconnected and dependent on each other, such as bacteria and insects break down organic material to produce soil and nutrients so that plants can grow. Consequently, plants provide oxygen and food for animals. Bees, other insects, and animals pollinate the plants so that they can reproduce and keep the cycle going. The processes that take place between species and the environment are extremely complex and vulnerable. Extinction of one species causes extinction of many species and simultaneously declines elements of life-support system for us and future generations. That is why environment is so important and must be cared of (A Critical Decision, 2014).

According to Masters (2002), it is projected by the economists and environmental scientists that nature provides us thirty three trillion dollars support in every year that is double of GNP of all the countries in the world combined. For instance, soil erosion, landslides and floods are prevented by the forests. Moreover, air and water purity are also

maintained by the forests. Not only that forests affect local and global rainfall, temper climatic fluctuations, and promote watersheds and biodiversity. In addition, healthy forests prevent local fires from becoming widespread by retaining the proper moisture content within their foliage and soil. Unfortunately, this moisture content is being declined from over harvesting and fragmentation. Consequently, large-scale fires are becoming increasingly prevalent throughout the world. Other ecosystems like mangroves, wetlands, grasslands, shrubs, deserts, oceans, coral reefs, tundra-arctic regions, and so on provide similar and unique benefits.

However, the simplest explanation about why the environment is so much important, as human environment of the earth is our home. It is where we live, breathe, eat, raise our children, etc. Our entire life support system is depended on the well-being of all the species living on earth (Love to Know, 2014).

In summary, it can be said that due to human activities and continuous increase of using ICT materials, environmental degradation is in an alarming rate now and as a result various environmental issues such as global warming, ozone layer depletion, greenhouse effects, rise of sea water level, improper monsoon, acid rain, etc. are being created. ICT including other science and technologies have brought immense benefits but we are paying a high price for it. We are destroying our living place day by day. To live life healthy and peacefully, environment is so much important that we have to conserve and protect it through proper planning and practices.

2.2.2 Bangladesh Policies Related to Environment

According to Hossain (2014), in the early years of the independence, there was no precise environmental policy in Bangladesh. But, environment issues were not neglected, and also considered as key concerns and reflected in national planning processes and several policies.

It is noted that after independence of Bangladesh, economic development was the main target for all planning activities. As a result, in the successive development plans, environmental issues were not included as an integral part of development approach though different sectorial strategies addressed some of the major environmental considerations. However, in the First Five Year Plan (1973-78), the major concerns related to environment were focused on agriculture and water sector including rural institutions, irrigation and flood control and got the highest share of resources. This sector included crop production, livestock, forestry, fishery, irrigation, flood control and development works programme (Planning Commission, 1973).

Similarly, the Two Year Plan (1978-80) focused to achieve higher economic growth where little consideration was gone to use of ground water through expansion of shallow and deep tube wells (Planning Commission, 1978).

After that the key objective of the Second Five Year Plan (1980-85) was to improve living standard by ensuring adequate supplies of the basic needs. However, forestry development strategies were re-structured and reoriented during the second FYP and emphasis was given on the development of forest with the participation of people (Planning Commission, 1980).

The first FYP emphasized on economic development and the second FYP emphasized on improvement of living standard. But the Third Five Year Plan (1985-90) emphasized on population growth reduction. However, one of the major objectives of the third FYP was to improve general environment and public health (Planning Commission, 1985).

According to the Hossain (2014), 1990's decade is the beginning of the history of environmental policy in Bangladesh. The developments taking place during this decade gave a new direction to the policy makers in the field of environment protection. In the following FYP, emphasis was given on environmentally desirable integrated development first time. During the 1990s, the environmental policy in Bangladesh was shaped. The policy perspectives were reflected in the Fourth Five Year Plan (1990-95), and subsequent five year plans.

Significantly the fourth FYP included a separate chapter on environment and sustainable development. This plan identified environmental degradation as major challenge but solution of overcoming the challenge was not discussed. Natural resource management was not discussed also in the plan (Planning Commission, 1990).

The Fifth Five Year Plan (1997-2002) included major sectors of development and intervention and emphasized on environment and sustainable livelihood. The objectives of the fifth FYP were to promote sustainable livelihood, ensure participation of the poor and women in environment protection, promote environment friendly development interventions, preserve natural resources, control environment pollution, create public awareness and conserve non-renewable resource and sustain renewable resources (Planning Commission, 1997).

On the other hand, focus of the Sixth Five Year Plan (2011-2015) and the Seventh Five Year Plan (2016-2020) was almost similar to increase development and growth.

The sixth FYP was taken with the slogan "Accelerating Growth and Reducing Poverty" (Planning Commission, 2010) whereas the seventh FYP's slogan is "Accelerating Growth and Empowering Citizen" (Planning Commission, 2015). Basically the seventh FYP is the continuation of sixth FYP where emphasis is given on youth, power, construction, employment, rural development and economic growth, etc. It is stated in the seventh FYP that growth activities should be environment friendly to ensure environmental sustainability.

According to Department of Environment (2007), Bangladesh signed forty four international conventions, treaties, and protocols related to conservation and protection of environment and ecology.

Moreover, the Government of Bangladesh (GoB) signed and agreed with some important international environmental initiatives such as the Rio declaration 1992, the Stockholm Conference 1972, the UNFCCC 1992, Kyoto Protocol 1987, and Johannesburg Conference 2002 to tackle the external and internal environmental problems of the country (Mohammad, 2013).

According to Aminuzzaman (2010), GoB formulated few other policies where environment issues are addressed. The policies are the Forest Policy (1994), the Fisheries Policy (1998), the Water Policy (1998), the New Agriculture Extension Policy (1995), the Energy Policy (1995). Besides these sectorial policies, the National Conservation Strategy

(NCS) and especially the National Environment Management Action Plan (1995) were formulated to provide action plans to respond to environmental issues.

On the other hand, Bangladesh has recently agreed with the Sustainable Development Goals (SDG) formulated and declared by the United Nations (UN) in the UN Summit held between 25-27 September 2015 focusing on poverty, protecting the planet and ensuring prosperity for all. There are seventeen goals and one hundred sixty nine indicators in SDG which are aimed to achieve by 2030, and formal actions to attain these goals have been started from 1 January 2016 (United Nations, 2017a). According to UNEP (2017), all the goals are directly and indirectly related to environment. The environmental aim of SDG is to develop and enhance inclusive methodologies for reducing environmental risks and increasing resilience of societies that will improve the health of environment and bring social and economic benefits. However, International Labour Organization (ILO) analyzed and found that seven goals are closely related to environment. These are SDG 6 - Clean Water and Sanitation, SDG 8 - Decent Work and Economic Growth, SDG 11 - Sustainable Cities and Communities, SDG 12 - Responsible Consumption, SDG 13 - Climate Action, SDG 14 - Life below Water, and SDG 15 - Life on Land (ILO, 2017).

Moreover, UN Paris Climate Agreement has been adopted by one hundred ninety six parties of the United Nations Framework Convention on Climate Change (UNFCCC) in Paris on 12 December 2015 which is known as 21st Conference of the Parties (COP21), and later has signed by the one hundred seventy five countries on 22 April, 2016 where Bangladesh is one of them. This agreement is focused on to keep the global spotlight on climate change and builds a strong political momentum from Paris. In the agreement, all

countries agreed to work to limit global temperature below 2 degrees Celsius, and given the serious risks, to attempt for 1.5 degrees Celsius. Implementation of the Paris Agreement is essential for the achievement of the SDG, and provides a roadmap for climate actions that will reduce emissions and build climate resilience. The COP meets each year to take decisions that further the implementation of the Convention and to combat climate change (United Nations, 2017b).

However, it is seen that various policies are available to protect environment and guide practices for environment conservation. But key questions, are the policies being implemented properly? To what extent the policies are being implemented? Authorities should sincere about the proper implementation of the policies as well as monitor it.

2.2.3 Environmental Education

The first definition of EE is given by William Stapp. According to Stapp (1969), EE produces knowledgeable citizen to solve environmental problems.

On the other hand, to describe the goal of EE, it is found in UNESCO (1976), the Belgrade Charter denotes that the ultimate goal of EE is to build citizen who will be concerned about the environment and related problems and also work for solving the problems.

According to UNESCO (1994), EE is the education which develops students as environmentally knowledgeable, skilled and motivated to work for environment in both individually and group to achieve symmetry of life and environment.

In recent times, the definition of EE is being changed where action is getting preferences. According to US Environmental Protection Agency (EPA) (2016), EE is a complete procedure which facilitates students to research, examine and explore environmental issues, participate in problem solving, and take action to improve the environment. Thus, students develop a complete understanding of environmental issues and achieve the skills to make informed and responsible decisions.

However, EE has five major components which are related to awareness and sensitivity, knowledge and understanding, attitude, skills and participation towards environmental conservation. EE tries to instill these components into the students so that they can aware of environment and environmental challenges, they have proper knowledge and understanding about environment and environmental challenges, and they have positive attitude and enough skills to participate in the conservation and improvement of environment. EE does not advocate a particular viewpoint or course of action. Rather, EE teaches students how to weigh various sides of an issue through critical thinking and it enhances their own problem-solving and decision-making skills.

2.2.3.1 Environmental Literacy

Environmental literacy is a set of competencies achieved by the students through EE. According to Partnership for 21st Century Learning (P21) (2017), students have environmental literacy can show proper understanding of environment and circumstances affecting it, and effects on environment by human beings. They also can design proper solutions through analyzing environmental issues and take appropriate actions to face environmental challenges individually and groups.

However, Californians Dedicated to Education Foundation (2015) developed a working definition of environmental literacy as follows:

> *"An environmentally literate person has the capacity to act individually and with others to support ecologically sound, economically prosperous, and equitable communities for present and future generations. Through lived experiences and education programmes that include classroom-based lessons, experiential education, and outdoor learning, students will become environmentally literate, developing the knowledge, skills, and understanding of environmental principles to analyze environmental issues and make informed decisions."*

The above definition focuses both classroom and outdoor learning to develop environmentally literate people who can take proper actions in both individual and group to support environment.

2.2.3.2 History of Environmental Education

EE is sometimes compared to banyan tree with many branches bearing the diversity and variety in the field. According to McCrea (2006), Jean Jacques Rousseau, an educational philosopher has first opined in 1762 in his novel "Emile" that education should include environment issues. Then, Wilbur Jackman wrote a book "Nature Study for the Common School" in 1891 which defined nature study movement. After that in 1905, Liberty Hyde Baily, a botanist and educator rejected the term "Environment Education" because he thought it has been theoretical and pompous. Then he established the American Nature Study Society in 1908. In 1920s ecology was being developed as a scientific field. After that in 1930s and onwards John Dewey led progressive education movement and promoted student-centered and holistic approach to education. The movement included many important aspects of EE.

Significantly in 1935, Wisconsin first stated about the conservation of nature through education and advised teachers to take adequate preparation for the conservation of nature. In the history of EE, the University of Wisconsin-Stevens Point first offered a degree on conservation education. In 1948, Thomas Pritchard, Deputy Director of the Nature Conservancy in Wales used the term "Environmental Education" at a meeting in Paris of the IUCN. Then the Conservation Education Association was formed to support conservation education in 1953. Then foundation of modern EE was started and in 1969 Professor Clay Schoenfeld began The Journal of Environmental Education and Dr. William Stapp and his students at the University of Michigan formally developed a definition of EE. After that US Congress passed the National Environmental Education Act in 1970. Then a professional association for environmental educators titled "National Association for Environmental Education" was formed in 1971. The United Conference on the Human Environment in Stockholm, Sweden was held in 1972 with the recommendation of EE (UNEP, 1972). In the same year, the Alliance for Environmental Education (AEE) was formed.

However, in 1975, based on the recommendations of the United Nations Conference on the Human Environment, UNESCO and the United Nations Environmental Programme (UNEP) launched the International Environmental Education Programme (IEEP). In 1977, the Intergovernmental Conference on Environmental Education (Tbilisi), considering that there was a need in all countries for international cooperation in this field, called upon UNESCO and UNEP to continue their efforts for further development of this education within the international community (UNESCO, 1978). In accordance with the recommendations of the Tbilisi Conference, EE activities were included in the programmes and budgets approved by the UNESCO General Conference at its twentieth

in Paris in 1978, twenty-first in Belgrade in 1980, twenty second in Paris in 1983, and twenty-third in Sofia in 1985 sessions. The declaration and recommendations of the Tbilisi conference made it possible to define the nature, objectives and pedagogical principles of EE and established broad guidelines for action in this field at the national and international levels. Since, 1977 and following on from the Tbilisi conference, a vast effort was given both internationally and nationally to develop precise definition of the content of EE and the methods for its development (UNESCO-UNEP Congress, 1988).

Thus, it is seen that EE is not a recent area of knowledge rather it is in teaching for more than thousand years. EE is being considered as a significant phenomenon and a formal area of knowledge from almost two hundred fifty years ago. From then, EE is a key subject of study and its importance is growing day by day. Aims, objectives, contents, methods and techniques of EE are being revamped continuously with new environmental challenges and modern technologies.

2.2.4 Primary Education

Primary education is the first stage of compulsory education in a range of basic subjects. It generally requires no previous formal education and is typically the beginning of systematic studies. It is also known as elementary education. According to Rahman (2003), primary education ensures basic education for children for living their lives. It also develops platform for taking lifelong education. Primary education is very important for developing every child's enjoyable present and productive future.

The primary education usually starts from the age of six to seven and ends in ten to thirteen in different countries. In Bangladesh, the first formal educational stage, primary

education starts from six years and ends in ten to thirteen years of age. According to the Ministry of Primary and Mass Education (2015), formal primary education refers to education from grade I to V having a prescribed national curriculum, textbooks, school hours and the school years as determined by the government for the children of age group 6+ years to 10+ years, which begins in January and ends in December. Characteristics of a typical primary education are the formal tuition of reading, writing and mathematics. The primary curriculum usually emphasizes reading and writing, arithmetic, social studies, and science. A basic teaching strategy involves moving the student from the immediate and familiar to the distant and unfamiliar. In Bangladesh, grade I to V is the primary level of education. But, according to the latest education policy 2010 (Ministry of Education, 2010), it has been decided to increase the level of primary education up to grade VIII within 2018.

The second United Nations Millennium Development Goal (MDG) was to achieve Universal Primary Education (UPE), more specifically, to ensure that by 2015, children everywhere, boys and girls alike would be able to complete a full course of primary schooling (UNDP, 2012).

To ensure UPE, Education for All (EFA) movement was launched in 1990 by UNESCO, UNDP, UNFPA, UNICEF and the World Bank. The main goal of the EFA movement was to provide quality basic education for all children, youth and adults of the world through ensuring UPE and reduce illiteracy significantly by the end of the decade (UNESCO, 2014a). However, ten years later, it was seen that many countries far from having reached this goal. Thus, the international community met again in Dakar, Senegal, and rescheduled the commitment to achieve EFA by the year 2015. During this

conference, six EFA goals were identified which aim to meet the learning needs of all children, youth and adults by 2015 (World Education Forum, 2000). Early childhood care and education, access and equity of the girls in education and improvement of the quality of education were the key concentrations of the six goals of EFA which were settled according to internationally agreed aim to meet the learning needs of all children, youth and adults by 2015 (UNESCO, 2014b).

On the other hand, among the seventeen goals of SDG, SDG 4 - Quality Education is directly related to education. SDG 4 has seven outcome targets and three means of implementation to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all (United Nations, 2017a). Moreover, education is not only covered in the SDG 4 rather it is linked to all the goals and closely covered in the targets of six goals: SDG 3 - Health and Wellbeing, SDG 4 - Quality Education, SDG 5 - Gender Equality, SDG 8 - Decent Work and Economic Growth, SDG 12 - Responsible Consumption and Production and SDG 13 - Climate Change Mitigation (UNESCO, 2017).

However, according to UNESCO (2017), education related goals under SDG are different from both the education-related MDG and EFA in terms of scope, geographical coverage and policy focus. MDG were focused on children and access to primary education, and EFA had a broader agenda aimed at meeting the basic learning needs of children, youth and adults. Though EFA commitment, ensuring the right to basic education for all, was not achieved by the deadline 2015, SDG 4 therefore pursues this unfinished education agenda, but also goes beyond, committing all countries to ensure equal opportunity in access to quality learning opportunities at all levels of education in a lifelong perspective.

SDG 4 focuses on the relevance of learning outcomes both for the world of work, as well as for citizenship in a global and interconnected world. Thus, it can be concluded that SDG 4 basically focus on ensuring inclusive quality education in all levels - primary, secondary as well as tertiary.

2.2.5 Environmental Education in Bangladesh Primary Curriculum

EE is usually provided as across the curriculum approach which helps individuals and groups to understand the environment with the ultimate aim to develop caring and committed attitudes that will foster their desire and ability to act responsibly towards the environment. EE is concerned not only with knowledge, but also with the feelings, attitude, skills and social action.

According to the Tbilisi (UNESCO, 1978) report, EE is an integral part of the educational process. EE should be focused on practical problems and provided as interdisciplinary content. It should aim to build up a sense of values, contribute to public well-being and concern itself with the survival of the human species.

2.2.5.1 Environmental Education in Previous Primary Curriculum

According to Chowdhury (2014), it is seen in the previous national curriculum (2000) of primary and secondary education that environmental issues were described mostly from knowledge point of view, not in an interactive manner. EE did not get proper weight in this previous curriculum. Syllabus was not only brief, random, and fragmented but also incomplete. There was a general lack of continuity or logical progression. For example, key contents related to environment covered in the previous primary curriculum of grade V “Introduction to Environment: Science” were weather, climate, air, environmental

pollution, population and environment. It is seen that weather and climate came before air, environment pollution, population and environment though weather and climate comparatively difficult and complex to understand for the students. On the other hand, present primary curriculum (2012) of grade V "Primary Science" covers the same contents in reverse order. For instance, environment has been presented first, and then environment pollution, water for lives, air, etc. have been presented. Weather and climate have been presented later and finally population and natural environment have been presented. This order is quite logical and comfortable for students' learning. Moreover, there were no observation, field visit and assigned tasks in the lessons in the previous curriculum where specific observation, field visit, participation and assigned tasks have been introduced in every lessons of 2012 primary curriculum which are more participatory, attractive and effective for learning.

However, contents of the previous curriculum on environment were broadly organized under two distinct textbooks entitled "General Science" and "Social Science" that were used at three school levels: primary school (grade I to V), junior high school (grade VI to VIII) and secondary high school (grade IX and X). After analyzing contents of these textbooks, it is revealed that textbooks represented an array of traditional geographic themes. For example, contents on air, water, soil including some contemporary environmental problems such as pollution, natural disasters, etc. were found in these textbooks. After analyzing the grade V "Introduction to Environment: Science" textbook, it is found that (NCTB, 2005) the physical geographical aspects of the environment were the main focus of the textbook, but environmental problems such as natural resources degradation and depletion, biodiversity, energy, urbanization etc. were not presented well. The only enduring environmental problem which was well covered in the text was natural

disasters in Bangladesh. Emerging environmental issues such as climate change and human adaptations, however, did not get any attention at all, and were missing from the texts. On the other hand, in the present textbooks according to 2012 primary curriculum, environmental contents are more life centric such as most of the contents have been presented with implications on life. For instance, water for life, food for life, etc. have been presented in the grade V "Primary Science" textbook. Moreover, climate change and natural resources have been presented in separate units with more concentrations and elaborately in the grade V "Primary Science" textbook (NCTB, 2012).

2.2.5.2 Environmental Education in 2012 Primary Curriculum of Bangladesh

According to the 2012 primary curriculum (NCTB, 2012a), social development of children and building their scientific attitude have been emphasized in the aim of primary education. Analysis of EE related parts of 2012 primary curriculum is given below.

There are thirteen objectives determined in the 2012 primary curriculum. Among them only two objectives (11 & 12) are closely related to the EE. The objectives emphasize on letting the students know about nature, environment and globe, motivate them to preserve environment, and addressing to aware them to lead healthy life (NCTB, 2012a). Objectives related to EE stated in 2012 primary curriculum are given below in *Table 2.1*.

Table 2.1: *Objectives related to EE stated in 2012 primary curriculum*

Total objectives	Serial number of objectives	Objectives
2	11	Help to know and love nature, environment and universe and motivate to conserve environment.
	12	Make them active for living safe and healthy life.

On the other hand, there are twenty nine terminal competencies settled for the primary students. Among these, eight terminal competencies (1, 6, 16, 20, 22, 23, 24 and 26) of primary curriculum are closely related to EE. Basically to create love for every creation of the globe, rules of nature, effective use of resources and preservation of resources, natural disasters and its preventions, to know about the nature, environment, globe, climate change, effect of population on environment, to lead healthy life, etc. have been determined as terminal competencies of EE. Especially climate change, natural disasters, and ICT are highly emphasized in the 2012 primary curriculum (NCTB, 2012a). Terminal competencies related to EE stated in 2012 primary curriculum are given below in *Table 2.2*.

Table 2.2: *Terminal competencies related to EE stated in 2012 primary curriculum*

Total terminal competencies	Serial number of terminal competencies	Terminal competencies
8	1	Believe Allah is the Almighty, creator and sustainer of the universe and motivate by love towards all creatures.
	6	Achieve knowledge of science through knowing rules of nature.
	16	Careful about the uses and conservation of personal, families, social and state resources.
	20	Know about the barriers and disasters and be skilled and confident to face these.
	22	Know and love nature, environment and universe and be inspired of developing and conserving environment.
	23	Be active of playing positive role for facing the problems of weather and climate changes.
	24	Know about the effect of population on human basic needs and environment and know about the importance of human resources.
	26	Build habit of living safe and healthy life.

However, EE is mainly provided through two subjects “Bangladesh and Global Studies” and “Primary Science” though there are almost twelve subjects including compulsory and

optional. Moreover, some special characteristics have been added in the 2012 primary curriculum. First time, planned work for students has been introduced in this curriculum. Almost for every learning outcome, planned works have been introduced. To present the concepts in more interesting and easier way, the teaching-learning methods have been also changed to more student centric ways (NCTB, 2012a, 2012b, 2012c, 2012d, 2012e, 2012f, 2012g, 2012h, 2012i, 2012j, 2012k, 2012l, 2012m).

Terminal competencies, grade-wise achievable competencies, learning outcomes, contents and teaching learning processes related to EE mentioned in the "Bangladesh and Global Studies" curriculum of primary education are analyzed below.

In the curriculum of "Bangladesh and Global Studies" (NCTB, 2012f), there are sixteen terminal competencies for students. Among them, five competencies (1, 5, 10, 11 and 12) are closely related to environmental issues and education. Basically, contents related to environment, relation of the different components of environment, resources, disasters, environmental pollution and role of population on environment have been covered in these terminal competencies. Terminal competencies related to EE stated in the "Bangladesh and Global Studies" curriculum of primary education are given below in *Table 2.3*.

Table 2.3: *Terminal competencies related to EE stated in the "Bangladesh and Global Studies" curriculum*

Number of related terminal competencies	Serial number of terminal competencies	Terminal competencies
5	1	Know about the society, environment and different components of environment and understand about the importance of their relation.
	5	Introduce, appropriate use, conservation and prevention of misuse of personal, families, social and state resources.
	10	Know about disaster and being skilled to face disaster.
	11	Know about the reason of environment pollution and participate in environment conservation and development.
	12	Know about the population problem and possibilities.

It is found that only one terminal competency (competency no. 10) is left to be achieved at grade V from the above mentioned five competencies. This terminal competency is related to disasters and development of skills for facing disasters. Terminal competencies related to EE stated in the grade V "Bangladesh and Global Studies" curriculum are given below in *Table 2.4.*

Table 2.4: *Terminal competencies related to EE stated in the grade V "Bangladesh and Global Studies" curriculum*

Number of related terminal competencies	Serial number of terminal competencies	Terminal competencies
1	10	Know about disaster and being skilled to face disaster.

On the other hand, there are twenty two grade-wise achievable competencies for students in the 2012 primary curriculum of "Bangladesh and Global Studies" (NCTB, 2012f). Among them, only two competencies (10.1 and 10.2) are closely related to environmental issues. The grade-wise achievable competencies are related to disasters caused by weather and climate changes and their social effects. Grade-wise achievable competencies related to EE stated in the grade V "Bangladesh and Global Studies" curriculum are given below in *Table 2.5*.

Table 2.5: *Grade-wise achievable competencies related to EE stated in the grade V "Bangladesh and Global Studies" curriculum*

Number of related grade-wise achievable competencies	Serial number of grade-wise achievable competencies	Grade-wise achievable competencies
2	10.1	Know about disasters caused by weather and climate change and social effects of Bangladesh and achieve necessary knowledge and skill to protect these.
	10.2	Abstain from the activities which occurs natural disasters.

Moreover, there are seventy two learning outcomes stated in the grade V "Bangladesh and Global Studies" curriculum and among them only seven learning outcomes (10.1.1, 10.1.2, 10.1.3, 10.1.4, 10.1.5, 10.1.6 & 10.2.1) are closely related to environmental issues. Learning outcomes are mostly focused on disasters caused by weather and climate changes and their effects in Bangladesh. Learning outcomes also cover skill development of students to abstain them for causing disasters. Learning outcomes related to EE stated in the grade V "Bangladesh and Global Studies" curriculum are given below in *Table 2.6*.

Table 2.6: *Learning outcomes related to EE stated in the grade V "Bangladesh and Global Studies" curriculum*

Number of related grade-wise achievable competencies	Serial number of grade-wise achievable competencies	Learning outcomes
7	10.1.1	Able to describe about the weather
	10.1.2	Able to tell about climate
	10.1.3	Able to explain the reason behind the weather and climate change
	10.1.4	Able to tell about disasters caused by weather and climate change
	10.1.5	Able to describe about the effect of weather and climate change on individual, family, society and environment.
	10.1.6	Able to tell about the disaster area of Bangladesh and the problems occur there
	10.2.1	Abstain from the activities which damages environmental balance

However, from the above mentioned seven learning outcomes stated in the grade V "Bangladesh and Global Studies" curriculum, six learning outcomes (10.1.1, 10.1.2, 10.1.3, 10.1.4, 10.1.5 & 10.1.6) cover cognitive domain and one (10.2.1) covers psychomotor domain whereas no learning outcome is found related to affective domain. Learning outcomes related to cognitive domain are mostly focused on understanding and learning disasters caused by weather and climate changes and their effects in Bangladesh where the learning outcome related to psychomotor domain covers skill development of students to abstain them for causing disasters. Detail learning outcomes are given in *Table 2.6* & *Table 2.7.*

Table 2.7: *Domain based learning outcomes related to EE stated in the grade V "Bangladesh and Global Studies" curriculum*

Domain	Cognitive domain	Affective domain	Psychomotor domain
Item No.	6 (10.1.1, 10.1.2, 10.1.3, 10.1.4, 10.1.5 & 10.1.6)	-	1 (10.2.1)

After analyzing the contents related to EE of the 2012 curriculum, it is found that most of the contents are closely tightened with the learning outcomes. Moreover, learning activities prescribed in the curriculum are mainly activity based and participatory. The contents are focused on weather and climate, disasters caused by climate change, effect of climate change, skills to face disasters, etc. On the other hand, various teaching-learning processes are prescribed such as information collection, group work, presentation, demonstration, role-play, etc. Contents and teaching-learning processes related to EE stated in the grade V "Bangladesh and Global Studies" curriculum are given below in *Table 2.8*.

Table 2.8: *Contents and teaching-learning processes related to learning outcomes of EE stated in the grade V "Bangladesh and Global Studies" curriculum*

<table>
<tr><th></th><th>Learning outcomes</th><th>Contents</th><th>Teaching-learning process</th></tr>
<tr><td rowspan="8">Item No.</td><td>10.1.1</td><td rowspan="6">Climate and Natural disasters
- Weather and climate.
- Disasters caused by climate change.
- Effect of climate change on individuals, family, and society.
- Preparation and skill to face disasters.
- Disaster areas of Bangladesh and problem.</td><td rowspan="8">• Report preparation
• Group work
• Presentation
• Information collection
• Picture collection
• Demonstration
• Rehearsal
• Role-play</td></tr>
<tr><td>10.1.2</td></tr>
<tr><td>10.1.3</td></tr>
<tr><td>10.1.4</td></tr>
<tr><td>10.1.5</td></tr>
<tr><td>10.1.6</td></tr>
<tr><td>10.2.1</td><td>- Abstain from the activities which damages environmental balance such as chopping trees, hills, hunting birds, destructing wild animals, filling marsh land, etc.</td></tr>
</table>

Detail subject-based terminal competencies, grade-wise achievable competencies, learning outcomes, contents and learning activities related to EE stated in the grade V "Bangladesh and Global Studies" curriculum are given in the **Appendix 1**.

On the other hand, terminal competencies, grade-wise achievable competencies, learning outcomes, contents and teaching learning processes related to EE mentioned in the "Primary Science" curriculum are analyzed below.

In the 2012 "Primary Science" curriculum (NCTB, 2012e), there are eighteen terminal competencies for students. Among them, eleven competencies (1, 2, 3, 4, 5, 6, 12, 13, 14, 17 & 18) are closely related to environmental issues. The competencies are focused on knowing environment, components of environment such as air, water, soil, and their effective uses, living and non-living things, cause-effect of natural phenomena, universe, weather and climate change, disaster, effective use of natural resources, and effect of population on environment, etc. Terminal competencies related to EE stated in the "Primary Science" curriculum are given below in *Table 2.9*.

Table 2.9: *Terminal competencies related to EE stated in the "Primary Science" curriculum*

Number of related terminal competencies	Serial number of terminal competencies	Terminal competencies
11	1	To be active to preserve environment knowing environment, components of environment, environmental change and environmental pollution.
	2	To know about the living and non-living things of our environment.
	3	To use and reserve water effectively knowing about importance of water as component of environment.
	4	To use and reserve soil effectively knowing about importance of soil as component of environment.
	5	To use the components of air effectively knowing about importance of air and then stop air pollution.
	6	To know scientific explanation cause-effect of familiar natural phenomena.
	12	To know the characteristics and the interrelations of different elements of the universe.
	13	To know about weather and climate and their interrelations and cause-effect.
	14	To know about the problem of climate change and other disasters and be skilled and self-confident to face these problems.
	17	To be aware about effective uses and preservation of the natural resources of Bangladesh.
	18	To know about basic human needs, effect of population on environment, and importance of population.

It is found that only nine terminal competencies (1, 3, 5, 6, 12, 13, 14, 17 and 18) from the above mentioned eleven competencies are left to be achieved at grade V. The terminal competencies are focused on knowing environment, elements of environment, environmental pollution, natural incidences, weather, climate change, etc. Terminal competencies related to EE stated in the grade V "Primary Science" curriculum are given above in *Table 2.9.*

On the other hand, there are forty nine grade-wise achievable competencies for grade V students in the 2012 curriculum of "Primary Science" (NCTB, 2012e). Among them, twenty seven competencies (1.1, 1.2, 1.3, 1.4, 3.1, 3.2, 3.3, 3.4, 3.5, 5.1, 5.2, 5.3, 5.4, 6.1, 6.2, 6.3, 12.1, 12.2, 12.3, 12.4, 13.1, 13.2, 13.3, 14.1, 17.1, 18.1 & 18.2) are closely related to environmental issues. The grade-wise achievable competencies are related to disasters caused by weather and climate changes and their social effects. Grade-wise achievable competencies related to EE stated in the grade V "Primary Science" curriculum are given below in *Table 2.10.*

Table 2.10: *Grade-wise achievable competencies related to EE stated in the grade V "Primary Science" curriculum*

Number of related grade-wise achievable competencies	Serial number of grade-wise achievable competencies	Grade-wise achievable competencies
27	1.1	To understand about the relation and dependency of different components of environment.
	1.2	To know about the causes and effects of environmental pollution.
	1.3	To active to preserve environment realizing its importance.
	1.4	To be conscious for creating favorable environment for plants and animals.
	3.1	To describe the necessity of water for plants and animals.
	3.2	To achieve the concept of water cycle.
	3.3	To discuss about the result or effect of water pollution on human life.
	3.4	To know the reasons behind water pollution and the ways of prevent it.
	3.5	To know the techniques of water purification.
	5.1	To know about the uses of air flow.
	5.2	To know about the reason behind the air pollution.
	5.3	To know about the bad effects of polluted air for health.
	5.4	To know about the dos of preventing air pollution.
	6.1	To know about the scientific explanation of air flows.

Number of related grade-wise achievable competencies	Serial number of grade-wise achievable competencies	Grade-wise achievable competencies
	6.2	To know about the scientific explanation of storm.
	6.3	To understand the explanation of day-night, new moon-full moon, and season changes.
	12.1	To realize the vastness of the universe.
	12.2	To understand the scientific explanation of day-night.
	12.3	To know about the reasons behind season change.
	12.4	To understand how new moon and full moon happen.
	13.1	To understand the relationship and difference between weather and climate.
	13.2	To know about the factors of weather and climate.
	13.3	To know about the reasons of natural disasters and adverse weather like storm, flood, tornedo, thunderbolts, cyclone, etc.
	14.1	To be able to select techniques of adaptation knowing cause-effect of climate change.
	17.1	To understand about the planned uses of resources and know these ways.
	18.1	To realize the effect of population growth on natural resources and environment.
	18.2	To know about the role of science for building human resources.

Moreover, there are ninety seven learning outcomes stated in the grade V "Primary Science" curriculum and among them fifty nine learning outcomes (1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.2.1, 1.2.2, 1.2.3, 1.2.4, 1.2.5, 1.2.6, 1.2.7, 1.2.8, 1.2.9, 1.3.1, 1.3.2, 1.3.3, 1.4.1, 3.1.1, 3.2.1, 3.2.2, 3.3.1, 3.4.1, 3.4.2, 3.5.1, 5.1.1, 5.1.2, 5.2.1, 5.2.2, 5.3.1, 5.4.1, 5.4.2, 6.1.1, 6.2.1, 6.3.1, 6.3.2, 6.3.3, 12.1.1, 12.1.2, 12.2.1, 12.3.1, 12.4.1, 13.1.1, 13.1.2, 13.2.1, 13.2.2, 13.3.1, 13.3.2, 13.3.3, 14.1.1, 14.1.2, 14.1.3, 14.1.4, 17.1.1, 17.1.2, 18.1.1, 18.1.2, 18.1.3 & 18.2.1) are closely related to environmental issues. The learning outcomes are mostly focused on environmental elements, cause-effect of environmental pollution, necessity of environmental elements for plants and animals, weather and climate change, cause-effect of climate change, etc. Learning outcomes related to EE stated in the grade V "Primary Science" curriculum are given below in *Table 2.11*.

Table 2.11: *Learning outcomes related to EE stated in the grade V "Primary Science" curriculum*

Number of related learning outcomes	Serial number of learning outcomes	Learning outcomes
59	1.1.1	Able to describe about the dependency of living and non-living things.
	1.1.2	Able to explain about the dependency of plants and animals.
	1.1.3	Able to explain the importance of physical components of environment to survive plants and animals.
	1.1.4	Able to tell about food chain and food net.
	1.1.5	Able to describe about the way of transferring solar energy to living things through food chain.
	1.2.1	Able to tell about environment pollution.
	1.2.2	Able to mention the causes of environment pollution.
	1.2.3	Able to identify the sources of pollution.
	1.2.4	Able to tell about the ways of soil, water, and air pollution.
	1.2.5	Able to explain the effect of soil pollution on human and environment.
	1.2.6	Able to explain about the harmful effects of air pollution.
	1.2.7	Know about sound pollution and able to identify the sources of sound pollution.
	1.2.8	Able to describe the reasons and harmful effects of sound pollution.
	1.2.9	Able to participate to prevent sound pollution.
	1.3.1	Able to tell about environment reservation.
	1.3.2	Able to explain about the necessity of environmental reservation for human and other living things.
	1.3.3	Motivate others to reserve environment and participate actively.
	1.4.1	Will be able to explain the importance of plants and animals reservation.
	3.1.1	Able to explain about the necessity of water for plants and animals.
	3.2.1	Able to explain and narrate water cycle.
	3.2.2	Able to explain the reason of storing water drops on the glass bottle of cold water or ice.
	3.3.1	Able to explain about the result or effect of water pollution on human life.
	3.4.1	Able to tell about the reasons behind water pollutions.
	3.4.2	Able to identify the necessary ways to prevent water pollution.

Number of related learning outcomes	Serial number of learning outcomes	Learning outcomes
	3.5.1	Able to purify water.
	5.1.1	Able to list uses of air in daily activities.
	5.1.2	Able to tell the uses of air flows.
	5.2.1	Able to provide example about air pollutions.
	5.2.2	Able to tell the reasons behind air pollutions.
	5.3.1	Able to explain how the polluted air is bad for health.
	5.4.1	Able to explain about the necessity of oxygen, carbon di oxide, and nitrogen for keeping environmental balance.
	5.4.2	Able to determine about the responsibilities for preventing air pollution.
	6.1.1	Will explain about the reasons behind air pollutions.
	6.2.1	Will explain the reason of storm.
	6.3.1	Will show the process of happening day-night through the earth model.
	6.3.2	Will be able to show new moon – full moon through experiment.
	6.3.3	Will be able to explain the scientific reasons of season changes.
	12.1.1	Can describe the vastness of the universe
	12.1.2	Can tell about the types of earth motion
	12.2.1	Can describe about how day night occurs through an experiment
	12.3.1	Can explain the reason of season change
	12.4.1	Can show the new moon and full moon through drawing different sizes of moon
	13.1.1	Can explain the relationship between weather and climate.
	13.1.2	Can differentiate between weather and climate.
	13.2.1	Can tell the name of the factors of weather.
	13.2.2	Can explain the effect of the factors in changing weather.
	13.3.1	Can describe about high and low air pressure.
	13.3.2	Can explain the reason of nor-wester.
	13.3.3	Can explain the reason of cyclone.
	14.1.1	Will be able to explain the concept of climate change.
	14.1.2	Will be able to explain the relationship between climate change and human activities.
	14.1.3	Will be able to describe the effect of climate change on Bangladeshi peoples.
	14.1.4	Will be able to select techniques to adapt in new and adverse situation created by climate change.
	17.1.1	Will be able to describe about the importance and limitations of natural and artificial resources.

Number of related learning outcomes	Serial number of learning outcomes	Learning outcomes
	17.1.2	Will be able to describe about the planned uses of natural resources.
	18.1.1	Will be able to describe about the interrelationship of overpopulation and its negative effects on natural resources and environment.
	18.1.2	Will be able to describe about the relationship between human basic needs and population.
	18.1.3	Will be able to explain the effect of population growth.
	18.2.1	Will be able to describe the role of science for building human resources from population.

However, from the above mentioned fifty nine learning outcomes stated in the grade V "Primary Science" curriculum, fifty three learning outcomes (1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.2.1, 1.2.2, 1.2.3, 1.2.4, 1.2.5, 1.2.6, 1.2.7, 1.2.8, 1.3.1, 1.3.2, 1.4.1, 3.1.1, 3.2.1, 3.2.2, 3.3.1, 3.4.1, 3.4.2, 5.1.1, 5.1.2, 5.2.1, 5.2.2, 5.3.1, 5.4.1, 5.4.2, 6.1.1, 6.2.1, 6.3.3, 12.1.1, 12.1.2, 12.3.1, 12.4.1, 13.1.1, 13.1.2, 13.2.1, 13.2.2, 13.3.1, 13.3.2, 13.3.3, 14.1.1, 14.1.2, 14.1.3, 14.1.4, 17.1.1, 17.1.2, 18.1.1, 18.1.2, 18.1.3 & 18.2.1) cover cognitive domain and only six (1.2.9, 1.3.3, 3.5.1, 6.3.1, 6.3.2, 12.2.1) cover psychomotor domain whereas no learning outcome is found related to affective domain. Learning outcomes related to cognitive domain are mostly focused on understanding and learning on living and non-living things, physical components of environment, food chain, solar energy, environment pollution, environment conservation, storm, day-night process, universe, earth motion, season change, weather and climate change, disaster, natural and artificial resources, human basic needs, population, human resources, etc. On the other hand, learning outcomes related to psychomotor domain cover participation of preventing sound pollution, motivate others to conserve environment, ability to purify water, showing the

process of day-night and moon stages, etc. Learning outcomes related to EE stated in the grade V "Primary Science" curriculum are given in *Table 2.11* & *Table 2.12*.

Table 2.12: *Domain based learning outcomes related to EE stated in the grade V "Primary Science" curriculum*

	Cognitive domain	Affective domain	Psychomotor domain
Item No.	53 (1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.2.1, 1.2.2, 1.2.3, 1.2.4, 1.2.5, 1.2.6, 1.2.7, 1.2.8, 1.3.1, 1.3.2, 1.4.1, 3.1.1, 3.2.1, 3.2.2, 3.3.1, 3.4.1, 3.4.2, 5.1.1, 5.1.2, 5.2.1, 5.2.2, 5.3.1, 5.4.1, 5.4.2, 6.1.1, 6.2.1, 6.3.3, 12.1.1, 12.1.2, 12.3.1, 12.4.1, 13.1.1, 13.1.2, 13.2.1, 13.2.2, 13.3.1, 13.3.2, 13.3.3, 14.1.1, 14.1.2, 14.1.3, 14.1.4, 17.1.1, 17.1.2, 18.1.1, 18.1.2, 18.1.3 & 18.2.1)	-	6 (1.2.9, 1.3.3, 3.5.1, 6.3.1, 6.3.2, 12.2.1)

After analyzing the contents of the curriculum it is found that most of the contents are closely tightened with the learning outcomes. Moreover, learning activities prescribed in the curriculum are mainly activity based and participatory. The contents are focused on living and non-living things, physical components of environment, food chain, solar energy, environment pollution, environment conservation, storm, day-night process, universe, earth motion, season change, weather and climate change, disaster, natural and artificial resources, basic needs of human being, population, human resources, etc. On the other hand, various teaching-learning processes are prescribed such as observation, drawing, listing, group work, demonstration, chart preparation, discussion, report

preparation, presentation, debate, news collection, experiment, use of multimedia, model development, etc. Contents and teaching-learning processes related to EE stated in the grade V "Primary Science" curriculum are given below in *Table 2.13*.

Table 2.13: *Contents and teaching-learning processes related to learning outcomes of EE stated in the grade V "Primary Science" curriculum*

<table>
<tr><th rowspan="20">Item No.</th><th>Learning outcomes</th><th>Content</th><th>Teaching-learning processes</th></tr>
<tr><td>1.1.1</td><td rowspan="5">- Dependency of living things on environment
- Inter dependency of plants and animals
- Food chain and food net</td><td rowspan="15">- Observation and report writing on the dependency of plants and animals
- Drawing on the dependency of plants and animals (food chain and food net)
- Listing of the effects of environmental pollutions through environment observation
- Group work
- Preparing charts
- Demonstration
- Discussion
- Report writing
- Group discussion</td></tr>
<tr><td>1.1.2</td></tr>
<tr><td>1.1.3</td></tr>
<tr><td>1.1.4</td></tr>
<tr><td>1.1.5</td></tr>
<tr><td>1.2.1</td><td rowspan="9">- Environmental pollution
- Sources and causes of environmental pollution
- Effect of soil, water and air pollution
- Sound pollution and its effect</td></tr>
<tr><td>1.2.2</td></tr>
<tr><td>1.2.3</td></tr>
<tr><td>1.2.4</td></tr>
<tr><td>1.2.5</td></tr>
<tr><td>1.2.6</td></tr>
<tr><td>1.2.7</td></tr>
<tr><td>1.2.8</td></tr>
<tr><td>1.2.9</td></tr>
<tr><td>1.3.1</td><td rowspan="3">- Environmental reservation, importance of reservation, and way of reservation.</td></tr>
<tr><td>1.3.2</td></tr>
<tr><td>1.3.3</td></tr>
<tr><td>1.4.1</td><td>- Importance of plants and animals</td></tr>
<tr><td>3.1.1</td><td>- Necessity of water in plants and animals life</td><td rowspan="8">- Drawing on the water cycle
- Observation on how water polluted
- Discussion
- Debate</td></tr>
<tr><td>3.2.1</td><td rowspan="2">- Water cycle</td></tr>
<tr><td>3.2.2</td></tr>
<tr><td>3.3.1</td><td>- Negative effect of water pollution in human life</td></tr>
<tr><td>3.4.1</td><td>- Reasons behind water pollution</td></tr>
<tr><td>3.4.2</td><td>- Prevention of water pollution</td></tr>
<tr><td>3.5.1</td><td>- Water purification</td></tr>
<tr><td>5.1.1</td><td>- Different uses of air</td><td rowspan="3">- Group discussion
- Preparing list
- Collecting news on air</td></tr>
<tr><td>5.1.2</td><td>- Uses of the flow of air</td></tr>
<tr><td>5.2.1</td><td>- Air pollution, causes and</td></tr>
</table>

Item No.	Learning outcomes	Content	Teaching-learning processes
	5.2.2	prevention ways of air pollution	pollution
	5.3.1		
	5.4.1		
	5.4.2		
	6.1.1	- Air Flow	- Experiment - Demonstration - Drawing
	6.2.1	- Storm	
	6.3.1	- Day-night, new moon, full moon, diurnal motion, annual motion, season change	
	6.3.2		
	6.3.3		
	12.1.1	- Vastness of the universe	- Observation - Experiment - Demonstration using multimedia
	12.1.2	- Motion of the earth: diurnal motion and annual motion	
	12.2.1	- Day night	
	12.3.1	- Causes of season change	
	12.4.1	- New moon and full moon	
	13.1.1	- Relationship between weather and climate.	- Presentation - Calculation - Picture Presentation
	13.1.2	- Difference between weather and climate.	
	13.2.1	- Factors of weather.	
	13.2.2	- Effect of the factors of weather in changing weather.	
	13.3.1	- High air pressure, low air pressure	
	13.3.2	- Adverse weather like storm, cyclone, tornedo, flood, etc.	
	13.3.3		
	14.1.1	- Climate change and its cause	- Model development by students - Demonstration
	14.1.2	- Effect of climate change on Bangladeshi people	
	14.1.3		
	14.1.4	- Techniques of adaptation to climate changes	
	17.1.1	- Our natural resources - Use of solar and air energy - Limitations of resources and planned uses	- Picture presentation
	17.1.2		
	18.1.1	- Natural resources and the effect of population on environment	- Discussion - Drawing - Explanation - Presentation
	18.1.2		
	18.1.3		
	18.2.1	- Role of science to build human resource from population, human basic needs, and effect of population increasing	

Detail subject-based terminal competencies, grade-wise achievable competencies, learning outcomes, contents and learning activities related to EE mentioned in the grade V "Primary Science" curriculum are given in the **Appendix 2**.

2.2.6 Teacher Training Related to Environmental Education

Teacher training is very important to implement any education at any level. According to Doyran (2012), impact of any educational system can only be as powerful and effective as the teachers or the educational leaders who actually perform this profession. The lives of all students are shaped by the teachers. A teacher can easily become an educational leader, can create positive change in the classroom and in the lives of the students, and can shape the environment, or even the future of the country. On the other hand, a teacher can also ruin the lives of individuals. How should these role models be trained and skilled then? It has long been debated and no perfect answer was found to solve this argument. Even if there are good programmes or curricula to prepare future teachers, there is always room for improvement.

However, primary education is the foundation of education in a country. In principle, education can provide solutions to virtually all economic, social, and political problems. Accordingly, there is now a consensus that basic or primary education is a fundamental right considering its importance. But quality of primary education is important to get the full benefit of education. To ensure quality education, teacher training for primary school teachers surely a key component. Various trainings are offered for the primary school teachers in Bangladesh. According to Mullick (2008), teacher education structure and responsible institutes are different at primary education and secondary education sub-sector in Bangladesh. Teachers of primary schools usually receive in-service training

namely Certificate in Education (C-in-Ed). However, Diploma in Education (Dip-in-Ed) is also being offered for the primary school teachers through PTIs. Besides these professional courses, number of subject based and pedagogical trainings are being offered by various government and non-government organizations in Bangladesh though there is no specific training on EE. Moreover, continuous professional development trainings for primary school teachers are offered through different govt. and non-govt. education projects. In addition, regular training named sub-cluster training is offered under govt. education management structure through the UEOs. Furthermore, URCs are also providing regular subject and issue based training to the primary school teachers such as ICT training, Bangla training, English training, Assessment training etc. Thus, it can be concluded that no training is available on only EE in Bangladesh whereas it is covered through various subject based trainings such as training on "Primary Science" and training on "Bangladesh and Global Studies".

2.3 Context of the Study

The study has been designed to explore the current practice of EE at primary schools in compare to latest primary curriculum. The problem of the study is to identify the gaps between classroom practice at primary schools and instructions of curriculum related to EE. In the present primary curriculum, most of the issues of EE have been presented in the two subjects titled "Bangladesh and Global Studies" and "Primary Science". However, the significant change from previous curriculum to present curriculum is revamping teaching-learning processes from lecture method to participatory and activity based learning which would play important role to transmit the knowledge and skills of EE into the students. Numbers of terminal competencies, grade-wise achievable competencies and learning outcomes have been settled for delivering EE to the primary

school students of Bangladesh. It may be general situation and considerable if a minimum level of gap will be found during implementing new curriculum at schools compare to written instructions. But the level of differences is important if the differences will be higher or critical for different aspects. Moreover, reasons behind the differences should be explored to take appropriate measures. According to Thompson (2013), successful implementation of curriculum is very important to get the outcome of education and teacher is the main actor in this regard. But teachers get little time to prepare themselves for the new curriculum and its components such as new topics, and yet there has widespread voluntary adoption of the new standards. The role of teachers and the national teachers' organization in making the change has been crucial. Therefore, the study has focused on EE curriculum and tried to reveal the situation to understand the level of implementation of EE and reason behind this. This is the key problem for this study.

2.4 Conceptual Framework of the Study

Various literatures have been reviewed to understand the problem of the study as well as define and design study scopes. The study framework is connected with few concepts such as environment problems, EE, EE curriculum, practice of EE curriculum at schools, what are practised and what are not, and challenges of practice. *Figure 2.1* below shows framework of the study on how concepts are connected.

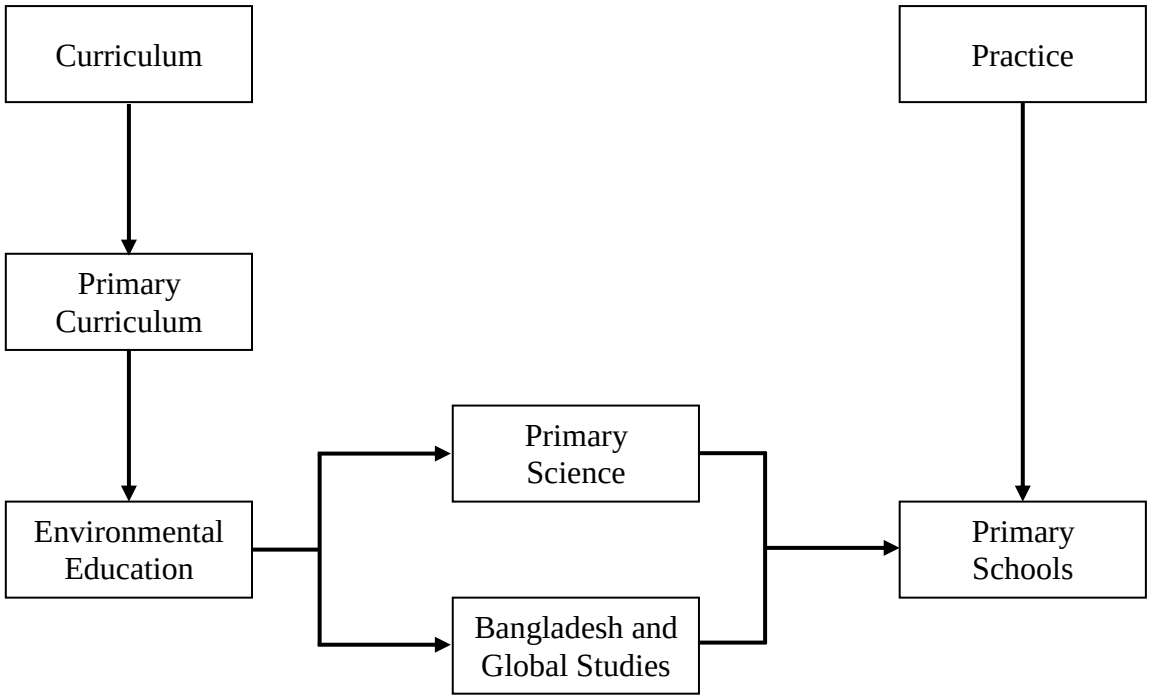

Figure 2.1: Conceptual framework of the study

In this study, researcher has tried to analyze the primary curriculum of Bangladesh according to the aspects and contents of EE. In the second level of framework, researcher has analyzed instructions regarding implementing EE at primary schools through "Primary Science" and "Bangladesh and Global Studies" subjects. On the other hand, researcher has brought practical scenarios from primary schools regarding EE how it is being implemented there through "Primary Science" and "Bangladesh and Global Studies" subjects and compare the practices with the curriculum. That is the findings of the study which is showing gaps between the curriculum and implementation of EE at primary schools. The EE curriculum has been analyzed through literature review in different aspects to develop study tools such as terminal competencies, grade-wise achievable competencies, learning outcomes, contents presentation, teaching learning process, evaluation process, etc. The study framework has followed mixed method approach and comprised both quantitative and qualitative data. However, the study has

used different techniques and tools for data collection from different key respondents selected purposively. After collecting all qualitative and quantitative data, the study has revealed the actual practice of EE at schools in comparing to the present primary curriculum using both quantitative and qualitative data analysis technique.

2.5 Chapter Summary

This chapter has presented the review of literatures related to the study and study objectives. Literature review has been organized in few aspects according to the requirement of study objectives and presented in separate sections. The chapter has also analyzed EE related parts of 2012 primary curriculum of Bangladesh. During analyzing the primary curriculum, this chapter has focused only two subjects: "Primary Science" and "Bangladesh and Global Studies". Finally this chapter has analyzed a detail historical background of EE from Bangladesh to global scene and presented current situation so that the review of literature become rationale. On the other hand, the next chapter describes detail methodology of the study including nature, sample, sampling technique, data collection and analysis of the research.

CHAPTER THREE
METHODOLOGY OF THE STUDY

3.1 Introduction

This chapter presents a detail methodology of the study. The study was undertaken for exploring the practices of EE by the teachers at primary schools in accordance to the 2012 primary curriculum of Bangladesh. 2012 primary curriculum was reviewed to identify the suggested practice of EE and design the data collection instruments. This chapter consists of different elements of study methodology such as study nature, sample and sampling process, data collection strategy and tools, data analysis technique and reporting, etc.

3.2 Nature of the Study

The study objective was to analyze the practice of EE at primary schools comparing to 2012 primary curriculum of Bangladesh. To analyze the practice of EE at primary schools, the study objective was split into three more specific objectives. One of the objectives was to explore teachers' practice of EE at primary schools in compare to 2012 primary curriculum. To fulfill this research objective, statistical data were gathered through a structured tool prepared from the guidance of 2012 primary curriculum so that teachers' practice of EE can be explored comparing to 2012 curriculum. In this regard, quantitative research method was considered useful to fulfill this objective. On the other hand, other two objectives were focused on knowing teachers' knowledge about EE related parts of 2012 primary curriculum and challenges behind the practice of EE by the teachers. This qualitative information was gathered from the teachers and students to fulfill the study objectives. In this point, the objectives required qualitative design of research. According to Creswell (2012), mixed method design is a suitable study design for addressing such kind of situation where both qualitative and quantitative methods of

study required. Mixed method study provides a better understanding of the research objectives than either method by itself. It consists of merging, integrating, linking, or embedding the two methods "qualitative" and "quantitative". In this study design, data were "mixed" in a mixed method study. Though the study objectives and data required, the mixed method of study was chosen to analyze the practice of EE at primary schools comparing to 2012 primary curriculum of Bangladesh. There are various types of design in mixed method study, and convergent parallel design (Creswell, 2012) is suitable to meet the research objectives. Both qualitative and quantitative method of inquiry were applied to explore the practice of EE by the teachers at primary schools and analyzed it in compare to 2012 primary curriculum with the views of students and headmasters to triangulate and interpret the findings.

3.3 The Sample and Sampling Process

As the study aimed to explore the practice of EE by the teachers at primary schools in accordance with 2012 primary curriculum, the key sample of the study was the teacher. 2012 primary curriculum was reviewed as secondary data source and it was found that EE was delivered mainly through the subject "Primary Science" and "Bangladesh and Global Studies". On the other hand, grade V was the terminal grade of primary education of Bangladesh and comparatively in-depth knowledge and activities would be done in this level. Though, no specific teacher was recruited for specific subject at primary schools in Bangladesh, teachers were usually assigned for specific subjects at schools based on the interest of school authority, teachers' interest and their subject-based knowledge, skills and training. Therefore, researcher selected the teachers those who were assigned to conduct classes at grade V "Primary Science" and "Bangladesh and Global Studies".

For this study, researcher selected fifteen primary schools purposively from fourteen upazilas (sub-district) of eleven districts of Bangladesh. List of the sample schools is given in **Appendix 11**. Different geographic locations were chosen to explore differences in findings if any would be found for the locations. After that researcher selected thirty teachers purposively (two from each school): fifteen teachers those who took lessons at grade V "Primary Science" and fifteen teachers those who took lessons at grade V "Bangladesh and Global Studies". Though data were collected during the first half of the academic year from January to April 2015, selected teachers' teaching-learning processes related to EE of the chapters during that time were observed. One chapter of each subject related to EE was observed during the data collection in each school. Moreover, in-depth interview with the selected teachers was conducted to explore their knowledge about 2012 primary curriculum related to EE. On the other hand, headmasters of the selected schools (total fifteen) were also selected as sample of the study to know about practice of EE of selected teachers' at schools. In addition, ten students from grade V of each school (total one hundred and fifty) were selected purposively to conduct focus group discussion (FGD) for knowing teachers' usual practice of EE at schools. *Table 3.1* below shows the number of selected sample.

Table 3.1: *The selected sample*

S/N	Sample	Number of Sample in Each School	Number of School	Total Sample
01	Grade V "Primary Science" Teacher	01	15	015
02	Grade V "Bangladesh and Global Studies" Teacher	01	15	015
03	Headmaster	01	15	015
04	Grade V Students	10	15	150
Total Sample		13	15	195

3.4 Tools for Data Collection

Both qualitative and quantitative data collection tools were used for this study. Observation checklist was used to collect quantitative data. The quantitative tool was developed from the literature where learning outcomes, contents and teaching learning strategies were discussed. As a quantitative tool, the observation checklist was used to get answer the research question of the study which mentioned to explore teachers' practice of EE at primary schools in Bangladesh. On the other hand, interviews and FGDs were conducted to collect qualitative data for the study. The qualitative study tools were also developed based on the literature related to curriculum components such as terminal competencies, grade-wise achievable competencies, learning outcomes, contents, teaching learning strategies, teaching aids, etc. The qualitative tools were used to get answer of the first and third research questions which were set to explore teachers' knowledge related to 2012 primary curriculum and challenges behind the practice of EE. Details of the qualitative and quantitative data collection tools are given below in *Table 3.2*.

Table 3.2: *Tools for data collection*

S/N	Tools	RQs addressed	Detail RQs
01	Observation checklist	2nd	To what extent 2012 primary curriculum is followed during practice of EE at primary schools?
02	Interview schedule for teachers	1st & 3rd	What do the primary school teachers' know about 2012 primary curriculum related to EE?
			What challenges are faced by the primary school teachers to follow the curriculum during practice of EE at primary schools?
03	Interview schedule for headmaster	1st & 3rd	What do the primary school teachers' know about 2012 primary curriculum related to EE?
			What challenges are faced by the primary school teachers to follow the curriculum during practice of EE at primary schools?
04	FGD guideline	2nd	To what extent 2012 primary curriculum is followed during practice of EE at primary schools?

3.4.1 Observation Checklist

An observation checklist was developed to collect information regarding teachers' practice of EE through the selected subjects at schools. This observation checklist represented teachers' performance and was developed from the literatures related to curriculum and its components such as learning outcomes, contents and teaching learning strategies. Teachers' performance was observed in different criteria which were described in various statements. Though data were collected during the first half of the academic year, it was found four chapters of "Primary Science" and only one chapter of "Bangladesh and Global Studies" were closely related to EE and would be covered in that period. That is why observation checklist was developed on those chapters. Observation checklist on the first chapter of "Primary Science" contained seven statements related to contents and fifteen statements related to teaching-learning activities; second chapter contained twenty five statements related to contents and twelve statements related to teaching-learning activities; third chapter contained eight statements related to contents and seven statements related to teaching-learning activities and fourth chapter contained seven statements related to contents and two statements related to teaching-learning activities. On the other hand, observation checklist on the sixth chapter of "Bangladesh and Global Studies" contained fifteen statements related to contents and four statements related to teaching-learning activities. However, teachers' performance against each statement was categorized into five points: zero to four. Zero denoted not practised and four denoted completely practised. *Table 3.3* below shows the categories of the scale for measuring teacher's performance.

Table 3.3: *Observation scale for measuring teacher's performance*

Points of the Scale	Performance Categories
0	Not practised
1	Partially practised
2	Moderately practised
3	Highly practised
4	Completely practised

Detail lesson observation checklists of "Primary Science" and "Bangladesh and Global Studies" are given in **Appendix 6** and **Appendix 7** respectively.

3.4.2 Interview Schedule for Teachers

An interview schedule was developed for exploring teachers' know-how about 2012 primary curriculum. The interview was basically focused on the components of the 2012 primary curriculum and teachers' practice of EE at schools. However, the interview schedule was developed from the literature related to 2012 primary curriculum and contained eleven questions with few supplementary questions. The questions were set not only to know the teachers' knowledge about curriculum but also to know the reasons of their practice of EE at schools. It helped researcher to interpret the findings from the observation.

Detail interview schedule for teachers of "Primary Science" and "Bangladesh and Global Studies" used before the lesson observation is given in the **Appendix 5** and the interview schedule which used after the lesson observation is given in **Appendix 8**.

3.4.3 Interview Schedule for Headmasters

Another interview schedule for the headmasters was prepared to know about the selected teachers' practice of EE at their schools. The interview was also conducted aiming to get

the views of headmasters about EE related parts of 2012 primary curriculum and its' practice at schools. This interview schedule was also developed from the literature related to 2012 primary curriculum. Data from this interview were also used to triangulate the findings of the study. However, the interview schedule consisted of eight questions with few supplementary questions related to 2012 primary curriculum and teachers' practice of EE at schools.

Detail interview schedule for the headmasters of selected schools is given in the **Appendix 10**.

3.4.4 Focus Group Discussion Guideline

A focus group discussion guideline was designed to conduct FGD with the selected grade V students of the selected schools. The aim of the FGD was to cross-check teachers' opinion and practice with the students. This FGD was also developed from the review of literatures related to 2012 curriculum and mainly focused on getting students' views about teachers' usual practice of EE in accordance with the curriculum at their schools. However, the FGD guideline consisted with eight focused issues related to contents, teaching-learning activities done by the teachers and their feelings towards teachers' activities.

Detail focused group discussion guideline for the selected grade V students is given in the **Appendix 9**.

3.5 Field Testing and Finalization of Data Collection Tools

Prior to finalize, all the data collection tools were tested at field level by the researcher to validate the instruments. Data collection tools were piloted in a school which was not included as sample for the final data collection. Teachers understood most of the parts of the data collection instruments but did not understand few items same way which were revised and checked again to test the validity of the instruments. On the other hand, during piloting the instruments, researcher included one of his colleagues from similar academic background to ensure the reliability of the tools. Researcher and his colleague executed the tools and found same results during the pilot. Few more findings of the pilot incorporated immediately into the tools such as appropriateness of language used, approaches of enquiry, ethical issues, and the relevancy with the study. However, data were also collected by the enumerators from similar academic background.

3.6 Data Coding, Analysis and Interpretation Process

As the study was conducted in mixed method approach, the researcher analyzed and presented the findings through few themes generated from both qualitative and quantitative data. For instance, qualitative data were collected through interview with the teachers to answer the first objective and research question of the study. The interview consisted eleven items focused on teachers' preparation, contents, teaching-learning processes, teaching aids, evaluation, reading 2012 primary curriculum, relationship between 2012 primary curriculum and teaching-learning processes, subject based terminal competencies, grade-wise achievable competencies, learning outcomes, etc. related to EE. Both qualitative and quantitative data were emerged from the interview such as teachers' knowledge on EE related parts of 2012 primary curriculum as well as teaching-learning processes. On the other hand, number of teachers' know-how on different areas related to

curriculum and practice of EE provided data on quantitative perspective. From this qualitative and quantitative data, seven sub-themes such as subject based terminal competencies, grade-wise achievable competencies, learning outcomes, contents, teaching-learning process, learning activities and evaluation were developed from which a main theme titled "Teachers' Knowledge on Primary Curriculum related to Environmental Education" was emerged.

Similarly, classroom observation checklist provided quantitative data related to number of contents presented by the teachers, number of teachers followed instructions of curriculum, etc. which helped to develop few sub themes related to teachers' practice of EE such as contents presentation, practice of teaching learning process, practice of learning activities, and practice of evaluation. Few qualitative data were also generated from this classroom observation tool such as which contents were not usually presented or which instructions of curriculum were not followed by teachers, etc. These data also helped to develop previously mentioned sub themes. However, a main theme titled "Teachers' Practice of Primary Curriculum related to Environmental Education" was emerged from these sub themes which also addressed second research objective and research question.

Finally, qualitative data from teachers' interview, headmasters' interview, students' FGD and quantitative data from classroom observation were presented together to address the final research objective and research question. Few qualitative data such as reasons behind not knowing and following instructions of curriculum by the teachers were found from the above tools. On the other hand, quantitative data on number of teachers' responses on different reasons of not knowing and following instructions of curriculum

were calculated also from these tools. A main theme titled “Teachers’ Practice Compare to Primary Curriculum” was emerged with few sub themes such as subject based terminal competencies, grade-wise achievable competencies, learning outcomes, contents presentation, teaching learning process, learning activities and evaluation from these data to answer the third research objective. *Table 3.4* below shows how the theme and sub themes were emerged from the qualitative and quantitative data aligned with the tools and objectives of the study.

Table 3.4: *Themes and sub themes emerged from data*

S/N	Objective	Tools	Qualitative data	Quantitative data	Sub-themes	Main theme
01	To explore primary school teachers' knowledge about the components of 2012 primary curriculum related to EE	Interview schedule for teachers	About reading primary curriculum and source of reading	Number of teachers reviewed resources and tell the contents	Contents	Teachers Knowledge on Primary Curriculum related to Environment Education
			About reviewed resources for lesson's preparation			
			About contents and reviewed resources for selecting contents			
			About teaching-learning strategies and reviewed resources for making strategies	Number of teachers reviewed resources and tell about the teaching learning strategies including teaching aids and learning activities	Teaching learning process	
			About teaching aids and reviewed resources for selecting teaching aids			
			About relationship between primary curriculum and applied teaching-learning process		Learning Activities	
			About evaluation strategies and reviewed resources for planning the strategies	Number of teachers know about the evaluation strategies	Evaluation	
			About subject based terminal competencies related to the presented chapter	Number of teachers know about the number of subject based terminal competencies	Subject based Terminal Competencies	
			About grade-wise achievable competencies related to the presented chapter	Number of teachers know about the number of grade-wise achievable competencies	Grade wise Achievable Competencies	

S/N	Objective	Tools	Qualitative data	Quantitative data	Sub-themes	Main theme
			About learning outcomes related to the presented chapter	Number of teachers know about the number of learning outcomes	Learning Outcomes	
02	To explore the practice of EE at primary schools by teachers comparing to 2012 primary curriculum	Classroom observation checklist	About contents presented/covered by the teachers during lesson presentation	Number of contents instructed by the curriculum presented by the number of teachers	Contents Presentation	Teachers' Practice of Primary Curriculum related to Environment Education
			About teaching learning activities done by the teachers during lesson presentation	Number of teachers follow the teaching learning activities instructed by the curriculum	Practice of Teaching Learning Process	
			About learning activities done by the teachers during lesson presentation	Number of teachers follow the learning activities instructed by the curriculum	Practice of Learning Activities	
			About teaching aids applied by the teachers during lesson presentation	Number of teachers use teaching aids instructed by the curriculum		
			About evaluation activities done by the teachers during lesson presentation	Number of teachers follow the evaluation strategies instructed by the curriculum	Practice of Evaluation	
03	To find out the challenges behind teachers' practice of EE at primary schools compare to 2012 primary curriculum	Interview schedule for teachers	Reasons behind not reading primary curriculum	Number of teachers told different reasons for not reading the primary curriculum	- Subject based Terminal Competencies - Grade-wise Achievable Competencies - Learning Outcomes - Contents Presentation	Teachers' Practice Compare to Primary Curriculum
			Reasons behind not following the instructions of primary curriculum during EE lessons	Number of teachers told different reasons for not knowing the subject based terminal competencies		
				Number of teachers told different reasons for not		

S/N	Objective	Tools	Qualitative data	Quantitative data	Sub-themes	Main theme
				knowing the grade-wise achievable competencies	- Teaching Learning Process - Learning Activities - Evaluation	
				Number of teachers told different reasons for not knowing the learning outcomes		
				Number of teachers told different reasons for not following the curriculum during contents presentation		
				Number of teachers told different reasons for not following the curriculum during teaching learning process		
				Number of teachers told different reasons for not following the curriculum during learning activities		
				Number of teachers told different reasons for not following the curriculum during evaluation		
		Interview schedule for headmasters	About reading primary curriculum by the teachers who teach “Primary Science”	-		
			About reading primary curriculum by the teachers who teach “Bangladesh and Global Studies”	-		

S/N	Objective	Tools	Qualitative data	Quantitative data	Sub-themes	Main theme
			About following instruction of primary curriculum by the teachers who usually teach “Primary Science”	-		
			About following instruction of primary curriculum by the teachers who usually teach “Bangladesh and Global Studies”	-		
			About teaching-learning process applied by the teachers who usually teach “Primary Science”	-		
			About teaching-learning process applied by the teachers who usually teach “Bangladesh and Global Studies”	-		
		Focused group discussion guideline for students	Usual teaching-learning process applied by the teacher	Number of students told about the teaching learning process usually applied by the teachers		
			Outside the classroom engagement activities applied by the teachers during teaching-learning process	Number of students mentioned outside the classroom engagement activities during teaching learning process		
			Engagement in drawing pictures, collecting pictures and making posters during teaching-learning process	Number of students mentioned about drawing pictures, collecting pictures and making posters during		

S/N	Objective	Tools	Qualitative data	Quantitative data	Sub-themes	Main theme
				teaching-learning process		
			Engagement in discussion and presentation during teaching-learning process	Number of students mentioned about discussion and presentation during teaching-learning process		
			Covered contents of the textbook during teaching-learning by the teachers	Number of teachers covered number of contents from textbook during lesson presentation		
		Lesson observation checklist	-	Number of contents instructed by the curriculum presented by the number of teachers		
			-	Number of teachers follow the teaching learning activities instructed by the curriculum		
			-	Number of teachers follow the learning activities instructed by the curriculum		
			-	Number of teachers use teaching aids instructed by the curriculum		
			-	Number of teachers follow the evaluation strategies instructed by the curriculum		

Quantitative data were analyzed using SPSS and MS Excel, and mean and standard deviation were calculated and used to describe the result with the presentation of bar graphs and pie charts generated by MS Excel. On the other hand, qualitative data were presented in narrative way to describe the situation of teachers' knowledge, practice and challenges in implementing EE at primary schools with the triangulation of both qualitative and quantitative data. In presenting quotes from the respondents, structured and standard alpha-numerical codes were used. Thirty teachers' interviews were coded from **$InTe_{01}$** to **$InTe_{30}$**. Similarly, fifteen headmasters' interviews were coded from **$InHm_{01}$** to **$InHm_{15}$**. On the other hand, students' comments from fifteen FGDs were coded as **$F_{01}St_{01\text{-}15}$** to **$F_{15}St_{01\text{-}15}$**. *Table 3.5* below presents codes for qualitative data.

Table 3.5: *Coding of qualitative data*

Code	Explanation
$InTe_{01}$	Interview of 1st teacher
$InTe_{30}$	Interview of 30th teacher
$InHm_{01}$	Interview of 1st headmaster
$InHm_{15}$	Interview of 15th headmaster
$F_{01}St_{01}$	1st student of 1st FGD
$F_{01}St_{15}$	15th student of 1st FGD
$F_{15}St_{01}$	1st student of 15th FGD
$F_{15}St_{15}$	15th student of 15th FGD

However, in interpreting the resulting data from the observation, teachers' individual performance scores were calculated and divided into five equal levels from lowest to highest: not practised at all, poorly practised, moderately practised, highly practised, and completely practised. *Table 3.6* below shows the framework for interpreting teacher's performance.

Table 3.6: *Framework for interpreting teacher's performance*

Score Ranges	Performance Categories
0.00 – 0.80	Not practised at all
0.81 – 1.60	Poorly practised
1.61 – 2.40	Moderately practised
2.41 – 3.20	Highly practised
3.21 – 4.00	Completely practised

3.7 Ethical Consideration

Ethical consideration is one of the most important issues for conducting any kind of research. The researcher considered ethical issues during this whole study. Data were collected with the consent of all samples including headmasters of the selected schools. The significance of the study, the identities of the researcher and the activities that were wished to perform at the schools were clearly informed to the headmasters and the sample participants. The researcher took written permission from the teachers and headmasters as guardians of every student those who were selected for the study. As part of the process of gaining informed consent, all the respondents were ensured that their provided information would be used only for research purposes. Above all, international child rights and child safety instructions were strictly followed during the entire research process.

3.8 Report Format

Researcher followed the guidelines of American Psychological Association (APA) during writing the report including font, spacing, presentation of tables and figures, and referencing. Times New Roman was chosen as font and 12 pt. was selected as size of the font. Justified text style and double spacing were followed throughout the report. Single spacing was followed only for presenting quotes. However, researcher maintained

grammatical instructions described in the Swales (2012) Academic Writing for Graduate Students (3rd ed.).

3.9 Chapter Summary

This chapter has presented the detail methodology of the study including study nature, sample and sampling process, data collection method and tools, data coding and interpretation process, report format, etc. The chapter has also explained rationale behind the selection of sampling process, data collection tools, data interpretation process, etc. Moreover, this chapter has presented framework for interpreting teachers' performance and key ethical issues considered for this study. However, the next chapter illustrates detail findings of the study according to study objectives. Next chapter presents teachers' knowledge and practice of EE, gap between teachers' practice and curriculum, and factors behind teachers' practice of EE.

CHAPTER FOUR
FINDINGS

4.1 Introduction

This chapter demonstrates the findings of analyzed data related to EE collected by the study tools for full-filling the objectives of the study titled *"Curriculum and Practice of Environmental Education at Primary Schools in Bangladesh"*. The study was conducted in mixed method with the help of both qualitative and quantitative data. Data were gathered through lessons observation, interview with the subject teachers and headmasters and focus group discussions with the students. Though EE was mostly provided by the subjects "Primary Science" and "Bangladesh and Global Studies", the observation of practices of EE was limited into the selected chapters of the above mentioned textbooks of grade V as stated in the study methodology.

Moreover, data were collected during the first half of the academic year of the secondary schools; as a result, observation was limited to few chapters of the mentioned subjects that were covered during that time and had close relationship with the EE. To meet the study objectives, fifteen sample schools were chosen purposively. Then, thirty teachers from that fifteen schools (two from each school: one from "Primary Science" and one from "Bangladesh and Global Studies") were selected purposively because the teachers were fixed to take the selected lessons at grade V. Moreover, one hundred and fifty students (ten from each school) from grade V were selected purposively for the focus group discussion. Finally, the headmasters of selected schools were taken as study sample for interview. Though data were collected from different geographic locations of Bangladesh and on several variables such as school type, gender, number of students, etc. but these were not presented in the findings under the themes and sub themes. Aim of

collecting these data was to explore variations or significant differences caused for these variables. But there was no significant difference found after analyzing these data. However, the analysis of collected data was done in both narrative and statistical ways. Triangulation of data was also done for cross-checking the connections of the collected data as well as getting the qualitative insights from the participants.

4.2 Major Findings

As the study was conducted in mixed method approach, the researcher analyzed and presented the findings through few themes generated from both qualitative and quantitative data. Firstly, data from teachers' interview were categorized in few themes on teachers' knowledge on EE related parts of 2012 primary curriculum as well as teaching-learning process. Then, data from lessons observation were categorized according to the components of curriculum to explore teachers' practice of EE. Finally, data from teachers' interview, headmasters' interview, students' FGD and lessons observation were presented together through similar themes to meet the third objective of the study. Major findings based on the study objectives are presented below.

4.2.1 Teachers' Knowledge about 2012 Primary Curriculum Related to Environmental Education

To meet the first objective, teachers' knowledge on EE related parts of 2012 primary curriculum was explored through the interview with the teachers. The findings of the data are presented below through few sub sections based on the components of curriculum such as subject-based terminal competencies, grade-wise achievable competencies, learning outcomes, contents, teaching-learning process, learning activities and evaluation related to the EE.

4.2.1.1. Teachers' Knowledge about Subject-based Terminal Competencies Related to Environmental Education

There were five subject-based terminal competencies related to EE under the lessons observed in "Bangladesh and Global Studies" and "Primary Science". It was found from the interview with the subject teachers that no subject teacher could tell any subject-based terminal competencies related to EE. Though 63% of the respondents knew about the subject-based terminal competencies, only 43% respondents tried to tell a few related to the lessons but their answers were incorrect and 20% did not tell anything right or wrong. *Figure 4.1* below shows percentage of teachers knowing terminal competencies related to EE.

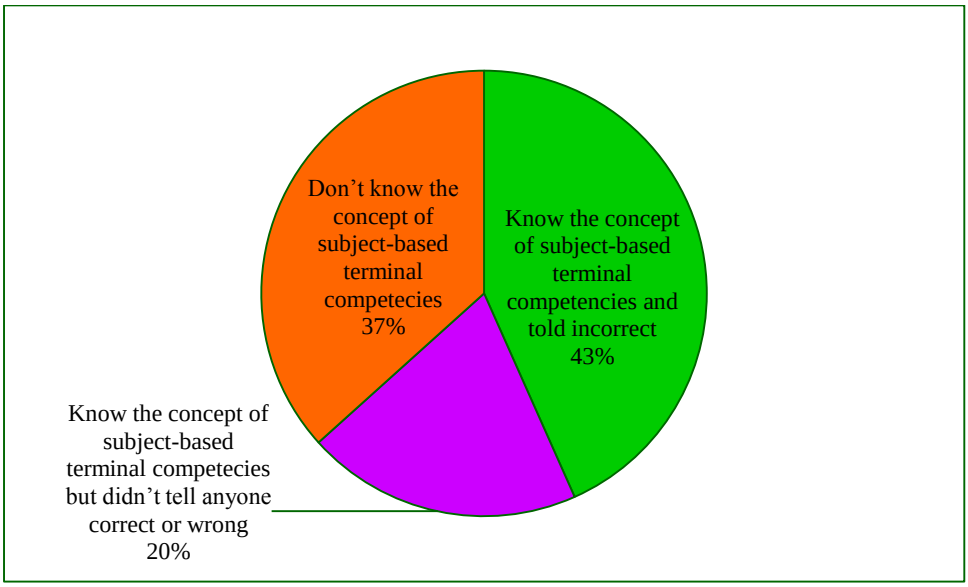

Figure 4.1: Knowing subject-based terminal competencies by the teachers

For instance, one of the respondents tried to tell subject-based terminal competencies related to EE under the lesson of "Primary Science" s/he had taken. S/he stated as follow:

> *"Subject based terminal competencies are the competencies which will be achieved by the students after completion of the subject throughout the years of primary education. Subject-based terminal competencies of 'Primary Science' will be achieved by the students after completion of the grade I-V 'Primary Science' subject. For an example, one of the subject-based terminal competencies can be: students will acquire knowledge through knowing natural formulas."* [InTe$_{03}$]

The above answer was incorrect and close to overall terminal competencies of primary education. Another respondent tried and told subject-based terminal competency as follow. S/he stated:

> *"Yes, there must have subject-based terminal competencies related to this chapter. The competency may be to let the students know about the uses of air of environment."* [InTe$_{01}$]

The above answer was also incorrect and similar to learning outcomes. Moreover, a respondent who took lessons on EE of the subject "Bangladesh and Global Studies", told:

> *"There must have subject-based terminal competencies related to EE of this subject. For an example, students will be able to know about their environment. Another example can be, students will be able to know and tell about the negative effects of weather and climate."* [InTe$_{12}$]

Both the answers of the above respondent were incorrect and one of them was close to overall terminal competencies and another one was close to learning outcomes. Interestingly, some of the respondent teachers did not hear about the term "subject-based terminal competencies". One of the respondents of that type mentioned:

> *"I did not hear the term subject-based terminal competency before……"*
>
> [InTe$_{15}$]

4.2.1.2 Teachers' Knowledge about Grade-wise Achievable Competencies Related to Environmental Education

There were fifteen grade-wise achievable competencies related to EE under the observed lessons of "Bangladesh and Global Studies" and "Primary Science". It was found from the interview with the subject teachers, all the respondents told that there must be grade-wise achievable competencies related to EE of the lessons they took. Only 70% of the respondents had idea about the grade-wise achievable competencies but 7% respondents told two competencies and only 3% told one competency correct where 43% respondents' answers were wrong. On the other hand, 17% respondents did not tell anything correct or wrong though they had idea about the grade-wise achievable competencies. *Figure 4.2* below shows percentage of teachers knowing grade-wise achievable competencies.

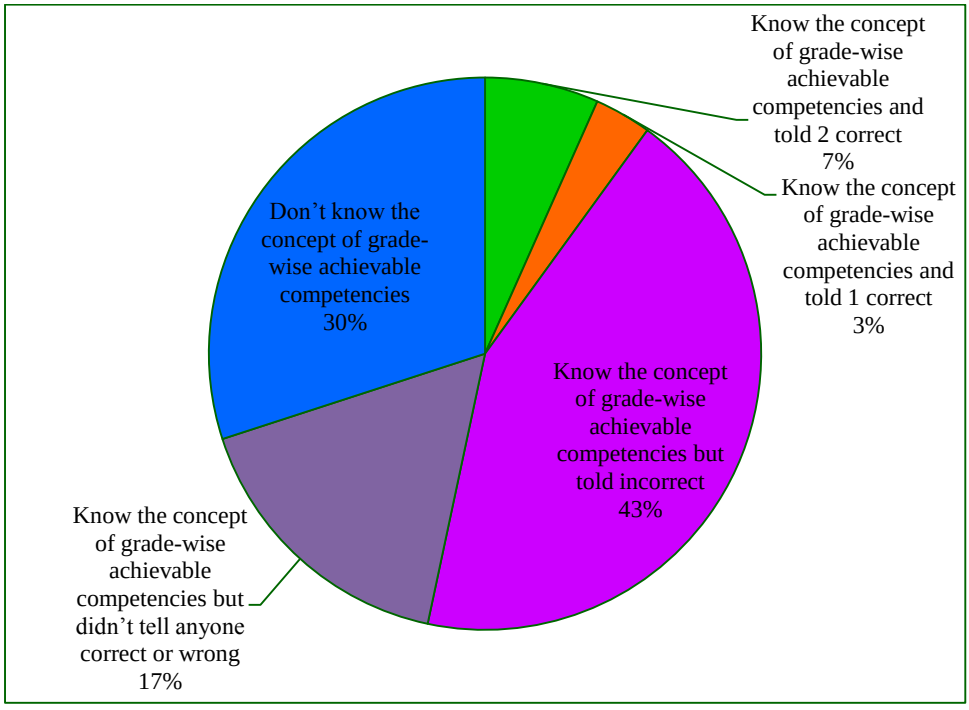

Figure 4.2: Knowing grade-wise achievable competencies by the teachers

One respondent who conducted third chapter of the grade V "Primary Science" textbook told two grade-wise achievable competencies correct related to EE. S/he told as follows:

> *"Grade-wise achievable competencies of a specific subject are the competencies that will be achieved by the students through the subject during the grade year. And, there must be grade-wise achievable competencies related to EE for this lesson. For an example, first grade-wise achievable competency is, students will know about the water cycle. The second competency is, students will know about the importance of water for plants and animals life. The third competency is, students will be able to use water correctly. And, the fourth competency is, students will be able to protect water be polluted."* [InTe$_{13}$]

Above mentioned teacher answered the first two competencies correct. But the last two competencies were incorrect. However, another teacher took classes on chapter six of "Bangladesh and Global Studies" and told:

> *"……. the grade-wise achievable competencies related to EE of this chapter are, students will know about disasters. And, then students will also know about their responsibilities to prevent disasters. Moreover, students will know about the drought."* [InTe$_{22}$]

First grade-wise achievable competency told by the above mentioned teacher was correct but others were not. However, one of the teachers who did not tell anything about grade-wise achievable competencies stated:

> *"Hmm…, definitely there are grade-wise achievable competencies related to EE but I have no clear idea about it. That is why I cannot tell any grade-wise achievable competency……."* [InTe$_{24}$]

4.2.1.3 Teachers' Knowledge about Learning Outcomes Related to Environmental Education

There were thirty nine learning outcomes related to EE under the lessons taken by the respondent teachers. 90% of the respondent teachers knew about learning outcomes where rest of the respondent (10%) had no idea about the learning outcomes. One of the respondents who had idea about the learning outcomes told:

> *"Learning outcomes are kind of targets which should be achieved by the students after attending specific lesson. Each lesson contains specific learning outcomes. Learning outcomes describe what students will learn through this lesson."* [InTe$_{19}$]

On the other hand, in response of telling learning outcomes, 37% respondent teachers tried and told two correctly. A teacher who answered two learning outcomes correctly told:

> *"The learning outcomes for the chapter six of 'Bangladesh and Global Studies' are – students will be able to explain reasons behind the changes of weather and climate and students will be able to tell the disastrous effect of weather and climate."* [InTe$_{28}$]

Similarly, 33% respondents also tried and told one correctly. Moreover, 7% respondents tried but could not tell correctly. One respondent teacher told as follows:

> *"Actually I have no idea about learning outcomes."* [InTe$_{30}$]

In addition, 13% respondents could not tell anything correct or wrong. Interestingly, 33% respondents told that they developed learning outcomes by own because they learned the process of developing learning outcomes from different trainings. One of the respondents who made learning outcomes by own told:

> *"The learning outcome of the second chapter of the grade V 'Primary Science' textbook is students will know about environmental pollution. I made the learning outcome based on the training I received before."* [InTe$_{23}$]

Though the above mentioned teacher made the learning outcome by own, but it was not correct. Another teacher of that type made learning outcome by own and it was correct. The teacher told:

"The learning outcome for chapter three of the grade V 'Primary Science' textbook is students will be able to know how water is polluted. I made the learning outcome by own because I learned how to make it from the trainings I received. Moreover, I studied textbook which helped me to make learning outcomes." [InTe$_{05}$]

Figure 4.3 below shows percentage of teachers knowing learning outcomes.

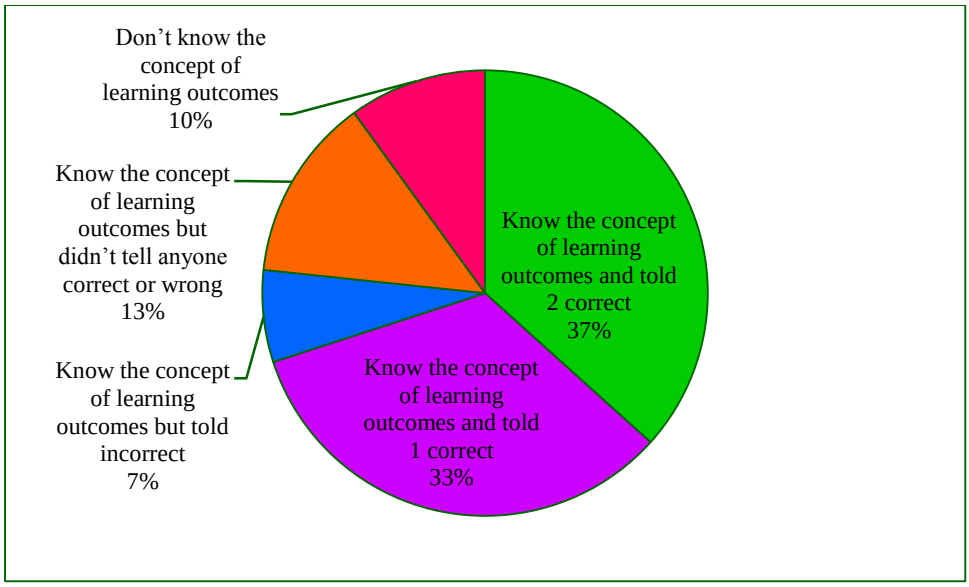

Figure 4.3: Knowing learning outcomes by the teachers

4.2.1.3.1 Teachers' Knowledge about Learning Outcomes according to Sub-Domain

From the thirty nine learning outcomes related to EE of the observed chapters of the selected subjects, thirty three learning outcomes were related to cognitive domain. On the other hand, three learning outcomes were related to psychomotor, two were related to both psychomotor and affective and one was related to both cognitive and psychomotor domains.

The teachers those who knew about the learning outcomes and told a few were basically mentioned the learning outcomes related to cognitive domain. No teacher was found who mentioned learning outcomes other than the cognitive domain. *Table 4.1* below shows domain-wise learning outcomes and number of teachers knowing that learning outcomes.

Table 4.1: *Domain based learning outcomes*

Domain	BGS	PS	Total	Teachers answers
Cognitive	6	27	33	All the teachers mentioned learning outcomes related to cognitive domain
Psychomotor	1	2	3	No teacher mentioned learning outcomes related to these domains
Affective	0	0	0	
Cognitive + Psychomotor	0	1	1	
Cognitive + Affective	0	0	0	
Affective + Psychomotor	0	2	2	
Cognitive + Affective + Psychomotor	0	0	0	
Total	7	32	39	

4.2.1.4 Teachers' Knowledge about Contents Related to Environmental Education

According to the learning outcomes and contents of the curriculum and textbook, sixty two concepts related to EE would be presented under the observed lessons. All the respondent teachers knew about the contents found in textbooks what they were going to present. One of the respondents who took lessons on chapter four of "Primary Science" mentioned the contents as follows:

> *"I will read this chapter of textbook thoroughly and I will present the contents sequentially stated in the textbook. I will present about air flow, uses of air flow, how to use air flow, air pollution, causes of air pollution, effect of air pollution, how to prevent air pollution, etc. which are described in the textbook."* [$InTe_{01}$]

Interestingly, teachers who took lessons on chapter one and two of "Primary Science" and chapter six of "Bangladesh and Global Studies" could not tell even few of the contents. One of the respondents who took lessons on chapter six of "Bangladesh and Global Studies" told:

> *"…… will present the concepts of weather, climate, causes and effects of climate change, disasters, effects of disasters, disaster prone areas, preparation for facing disasters, necessary skills to face disasters, tasks which causes for destroying environmental balance, etc. I took preparation by studying the content from textbook."* [InTe$_{20}$]

The above mentioned teacher stated almost all the concepts except two "causes of weather change" and "effect of weather change".

4.2.1.5 Teachers' Knowledge about Teaching-learning Process Related to Environmental Education

It was found that respondent teachers mentioned different teaching-learning process for lessons conduction. 73% of the teachers mentioned that they would conduct lessons through demonstrating concepts using teaching aids such as poster, chart or picture and textbook reading by teacher and students. One of the respondent teachers told as follows:

> *"I will conduct lessons on chapter three of 'Primary Science'. That chapter basically discusses on water pollution. I will show few pictures on water pollution to students and then present the contents through discussing with the students. After that I will read the contents from textbook and tell students to read the textbook in group……"* [InTe$_{05}$]

On the other hand, 17% of the respondent teachers wanted to conduct lessons only by reading. They had no concrete plan actually. One of the teachers described as follows:

> *"……. I will present the contents through reading textbook. Then I will ask students to read textbook. Finally I will ask questions to the students on the contents what they will read."* [InTe$_{30}$]

However, 10% respondent teachers told that they would conduct lessons by applying lecture, discussion and question-answer method. One of the teachers was going to take lessons from chapter three of "Primary Science" and told:

> *"……. I will deliver lecture on necessity of water, water cycle, water pollution, etc. Then I will discuss with the students on these topics. I will try to explore students' thoughts and ideas. Meanwhile I will try question-answer method also."* [$InTe_{07}$]

4.2.1.6 Teachers' Knowledge about Learning Activities Related Environmental Education

According to the curriculum and textbook, forty learning activities related to EE would be done by the teacher-students through the selected chapters of "Primary Science" and "Bangladesh and Global Studies". Teachers had idea about the learning activities related to EE but could not tell about specific learning activities. Most of the teachers thought that learning activities were focused on observing the environment. One of the respondent teachers who took lessons of "Primary Science" told:

> *"There are many learning activities to make students learn environment education through 'Primary Science'. We can teach students through experimenting elements of environment such as plants and animals. But it is difficult for us because we have no laboratory. On the other hand, we can also teach students through observation of environment and its situation such as how environment are being polluted, etc."* [$InTe_{05}$]

A teacher who took lessons of "Bangladesh and Global Studies" told as follows:

> *"I think that there are many learning activities to teach students EE. Observation can be one of the key learning activities for teaching EE. We can take students outside the classroom to observe environment though it is difficult for us due to time shortage and big class size."* [$InTe_{02}$]

4.2.1.7 Teachers' Knowledge about Evaluation Strategies Related to Environmental Education

Almost all the teachers had ideas about evaluating students' knowledge related to EE. Most of them mentioned written and verbal evaluation process to assess students' performance. They also mentioned that they usually use question-answer method for verbal evaluation and question-answer, fill in the gaps, multiple choice questions, true-false, etc. for written evaluation. One of the teachers told as follows:

> *"……. I usually evaluate students through asking them questions. I also ask them to write answers of the question in their notebook."* [$InTe_{10}$]

4.2.2 Practice of 2012 Primary Curriculum Related to Environmental Education by Teachers at Primary Schools

To get answer of the second objective, teachers' practice of 2012 primary curriculum related to EE was observed during the data collection. For this purpose, thirty teachers' lessons activities were observed through a five point scales (0-4) observation checklist. After collecting data, teachers' individual performance scores were calculated and divided into five equal levels from lowest to highest: not practised at all, poorly practised, moderately practised, highly practised, and completely practised. *Table 4.2* below shows the categories of teachers' performance in lesson presentation.

Table 4.2: *Criteria for categorizing teacher's performance in lesson presentation*

Score Ranges	Performance Categories
0.00 – 0.80	Not practised at all
0.81 – 1.60	Poorly practiced
1.61 – 2.40	Moderately practiced
2.41 – 3.20	Highly practiced
3.21 – 4.00	Completely practiced

However, teachers' practice of 2012 primary curriculum was analyzed by following sub categories:

4.2.2.1 Presentation of the Contents Related to Environmental Education by Teachers at Primary Schools

According to the learning outcomes, contents of the curriculum and textbook, sixty two concepts related to EE would be presented under the observed lessons. 63% respondent teachers presented all concepts where 7% respondent teachers presented 93% concepts. Moreover, 23% respondents presented 86% of the concepts and 3% respondents presented 80% of concepts. In addition, 4% teachers presented 71% concepts. *Figure 4.4* below shows percentage of teachers presenting concepts.

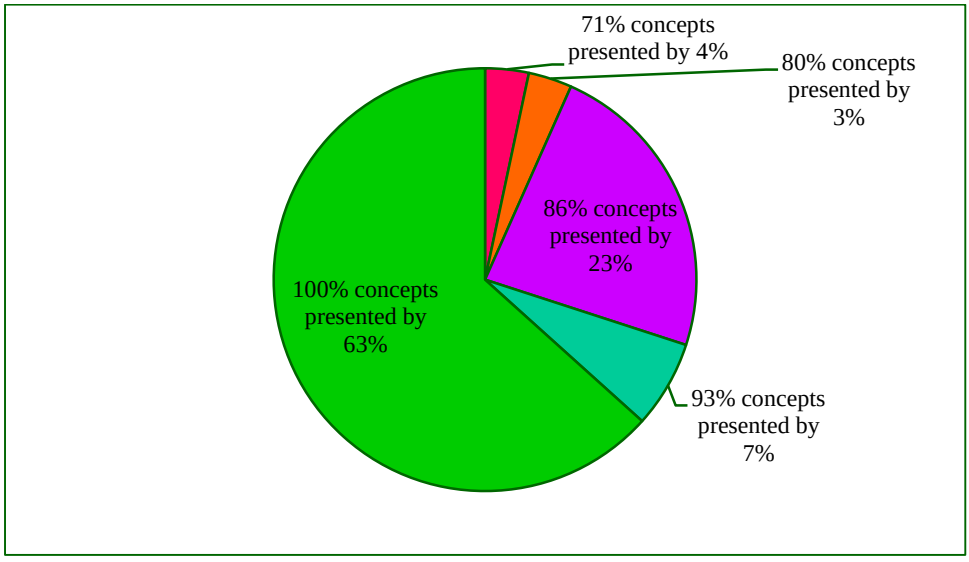

Figure 4.4: Concepts presented by teachers

However, the mean score of teachers' performance in presenting concepts related to EE of "Bangladesh and Global Studies" and "Primary Science" was **2.20**, which indicates that the teachers presented the concepts moderately. On the other hand, standard deviation

of scores of the teachers' performance was calculated at **0.58**, which shows teachers' performances were almost similar in presenting concepts.

4.2.2.2 Use of Teaching-learning Process in Environmental Education Lessons by Teachers at Primary Schools

It was found that teachers followed different processes during their lesson conduction. 73% of the teachers conducted lessons using teaching aids such as poster, chart or picture, textbook reading by teacher and textbook reading by students in group. On the other hand, 17% of the teachers conducted lessons only by reading. They started lessons with greetings and then asked students to read textbook. They had no concrete plan actually. However, 7% respondent teachers conducted lessons through discussion and question answer methods. And rest of the 3% respondents conducted lessons by lecture, question-answer and discussion methods. *Table 4.3* below shows percentage of teachers using different teaching learning processes.

Table 4.3: *Observed teaching-learning processes*

Observed teaching-learning processes	
73% teachers practised	**7% teachers practiced**
- Presenting concepts using teaching aids such as poster, chart or picture - Reading by teacher - Reading by students in group	- Question-answer - Discussion
3% teachers practised	**17% teachers practiced**
- Lecture - Question-answer - Discussion	- No planning - Just reading

4.2.2.3 Use of Learning Activities in Environmental Education Lessons by Teachers at Primary Schools

According to the curriculum and textbook, forty activities for EE would be done by the teacher-students for the observed lessons. It was found in the observations that 67% of the teachers did not do any of these activities with the students. 10% respondents did only 14% activities, 4% respondents did only 17% activities, 3% did only 20% activities, 3% did only 25% activities, 10% did only 29% activities and only 3% teachers did only 57% of the activities. *Figure 4.5* below shows percentage of teachers and percentage of activities done during EE lessons.

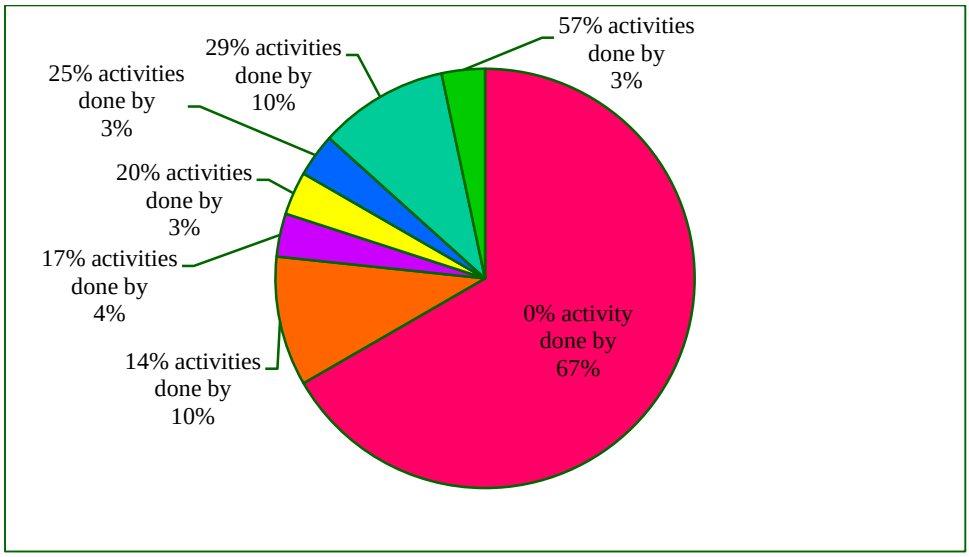

Figure 4.5: Activities done by teacher-students

However, mean score of the activities done by the teachers was **0.20**, which indicates the activities were not done at all. It was found in the observation that most of the activities required demonstration, role play and reporting, and majority of the teachers avoided that. On the other hand, standard deviation of the scores of the teachers' performance in

presenting activities was calculated also **0.33**, which shows that all the teachers performed almost same.

4.2.2.4 Use of Evaluation Strategies in Environmental Education Lessons by Teachers at Primary Schools

Most of the teachers evaluated students' performance through question answer method. They asked students verbally and students also answered verbally. Some of the teachers wrote down questions in the board and asked students to write answers in their notebook. After evaluating students' performance most of the teachers provided feedback but feedbacks were not constructive in majority cases.

4.2.3 Comparing Teachers' Practice to 2012 Primary Curriculum Related to Environmental Education

To get the answer of the third objective, this section compared teachers' performance with 2012 primary curriculum by discussing gaps, pedagogical aspects, factors and explanations along with the data from students and headmasters. Findings of this section are presented through the following sub-sections:

4.2.3.1 Subject-based Terminal Competencies

It was found that no subject teacher told or wrote any subject-based terminal competencies related to EE of their conducted lessons accurately though 63% of the respondents had idea about it.

In the case of not knowing the subject-based terminal competencies, 73% respondents told that they did not get any curriculum at schools. One of the respondent teachers told it as follows:

> *"Yes, I heard about the subject-based terminal competencies and the new curriculum but I cannot tell any competencies. Because I did not find the present primary curriculum in my school. If I could get the new curriculum, definitely I would read it."* [InTe$_{10}$]

On the other hand, 47% of the respondents excused that they forgot the competencies. One of them told:

> *"I saw the subject-based terminal competencies in different trainings such as sub-cluster trainings but now I cannot remember any competencies exactly."* [InTe$_{19}$]

Moreover, 17% of the respondents told that they could not manage time for knowing it. One of the respondents told:

> *"……. Actually I cannot manage time for studying the present primary curriculum as well as competencies."* [InTe$_{18}$]

Interestingly, 3% respondents told that they did not understand the needs of reading curriculum and competencies. One of them told:

> *"……. I did not know about the curriculum. I think I had lack of understanding about the necessity of reading curriculum and studying its components."* [InTe$_{23}$]

4.2.3.2 Grade-wise Achievable Competencies

It was found from the observations that only 7% respondents told two grade-wise achievable competencies and only 3% told one grade-wise achievable competency related to EE correctly though 70% had idea about it. As reason of not knowing the grade-wise achievable competencies, 47% respondents mentioned that they did not get the 2012 primary curriculum at schools. One of the respondent teachers told:

> *"……. I know about the grade-wise achievable competencies because I saw the previous primary curriculum. But I cannot tell the new grade-wise achievable competencies of present curriculum because I did not get the present curriculum in my school……."* [InTe$_{08}$]

On the other hand, 47% respondents told that they forgot competencies. One of them told:

> *"……. I learnt about the grade-wise achievable competencies in various trainings I received from PTI, URC and UEOs, but these competencies were based on previous primary curriculum. Though I did not receive any training on new curriculum but I also forget the grade-wise competencies related to previous curriculum also."* [InTe$_{20}$]

Interestingly 43% respondents argued that they could not manage any time to know about the grade-wise achievable competencies. One of the teachers argued:

> *"I need to conduct lots of lessons in every day. It is very difficult for me to take preparation for these lessons. In this situation how can I study the primary curriculum? I do not get enough time to study about the grade-wise achievable competencies and curriculum."* [InTe$_{18}$]

4.2.3.3 Learning Outcomes

It was found that 37% respondent teachers told two learning outcomes and 33% told one learning outcome related to EE under the lessons they took though 90% of the respondent teachers had good idea about learning outcomes. Most of the teachers stated that they knew about the learning outcomes from different training such as sub-cluster training, C-in-Ed course, training provided by PTI, URC, etc. One of the respondent teachers told:

> *"……. After joining as an Assistant Teacher at Primary Schools, I enrolled in the C-in-Ed course where I learnt lots of issues related to teaching-learning process. I learnt about curriculum, terminal competencies, learning outcomes, teaching-learning methods, evaluation techniques during this course. Then, I received various trainings from UEOs, URCs, PTIs and different projects regularly. From these trainings I learnt about the learning outcomes. But I would like to say that these trainings were focused on the previous curriculum. That is why I cannot say every learning outcomes of present curriculum exactly……."* [InTe$_{13}$]

4.2.3.4 Contents Presentation

It was found in the observation that all the teachers tried to present contents but few of them did not present around five contents of different chapters of the mentioned subjects. Four teachers of "Primary Science" did not present one to five contents. On the other hand, five teachers of "Bangladesh and Global Studies" did not present two contents. *Table 4.4* below shows number of teachers and number of contents were not presented.

Table 4.4: *Presenting contents by teachers*

Subject	Chapter	Number of Contents	Not Presented by Teachers
Primary Science	Chapter One	7	2 teachers did not present (1+2) concepts
	Chapter Two	25	2 teachers did not present (5+5) concepts
	Chapter Three	8	All presented all
	Chapter Four	7	All presented all
Bangladesh and Global Studies	Chapter Six	15	5 teachers did not present (2+2+2+2+2) concepts
Total		62	9

Interestingly, it was seen that teachers usually did not present the contents which were not described in the textbook. Though teachers followed textbook, sometimes few of the contents which were mentioned in 2012 curriculum but not in the textbook were avoided by the teachers. One of the student groups also supported these data. They told:

> *"Yes, our teachers teach us by following textbook. And they never skip any contents from the textbook."* [$F_{08}St_{02}$]

However, one of the student groups mentioned that their teachers follow guidebook also and teach them using it. They told:

> *"Our teachers follow textbook but sometimes they teach us by primary completion guidebook also."* [$F_{15}St_{09}$]

4.2.3.5 Teaching-learning Process

All the teachers followed almost similar teaching-learning process. Though 2012 primary curriculum stated that teaching-learning process should be participatory, teachers followed the direction of trainings they received from PTIs, URCs and UEOs based on the previous curriculum. They usually started their lessons by creating emotions of students, presenting contents by reading, question-answer with students, etc. One of the teachers mentioned:

> *"I got training from PTI and I followed their instruction. In addition, in every two months we received sub-cluster training where the trainers also told us to maintain the instruction. Usually I present contents through demonstrating teaching aids such as poster, chart, picture, etc. Moreover, I present contents through reading textbook and also discussion method."* [$InTe_{01}$]

Headmasters also mentioned the same teaching-learning process conducted by the teachers. One of the headmasters mentioned:

> *"……. teachers usually conducted lessons through creating emotions of students, creating motivation of students, presenting contents through teaching aids such as poster, chart, picture, contents presentations by reading, discussion with students and using question-answer method……. They learnt the process from different trainings."* [$InHm_{09}$]

Almost all the students told that their teachers usually take their lessons following same process. 93% of the students also told that their teachers did not take them outside the classroom for learning purpose. Significantly, 20% of the students mentioned that their teachers usually conduct lessons by reading and writing textbooks. Interestingly 3% students stated that their teachers conduct lessons through following guidebooks. *Figure 4.6* below shows students' opinion about teachers' lesson conduction.

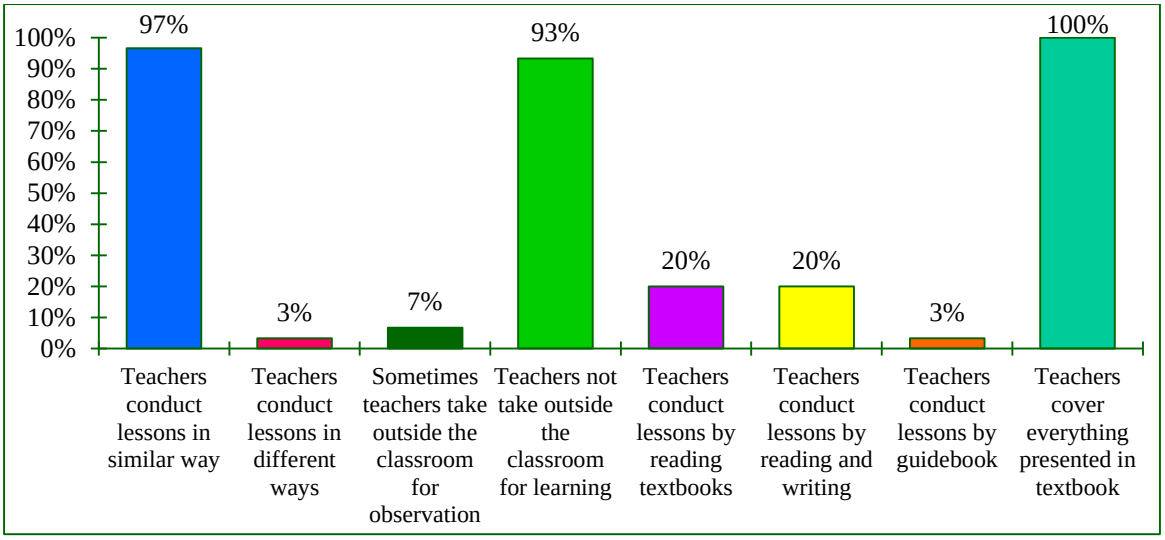

Figure 4.6: Students' opinion about teachers' lesson conduction

One of the students stated:

> *"…… sometimes our teachers take classes by reading textbooks, sometimes they take classes using pictures or other materials……"* [$F_{06}St_{04}$]

4.2.3.6 Learning Activities

It was found in the observation that most of the teachers did not do any learning activities with the students. In the question of why they did not do any learning activities, teachers argued that they did not receive any training on 2012 curriculum. Moreover, they did not get any copy of 2012 curriculum also in their schools. That is why they actually did not know how to do these learning activities. One of the respondent teachers mentioned:

> *"We did not receive the new primary curriculum in our schools. Even, we did not receive any training on that also. That is why we are following previous instruction which we got from previous trainings and teacher's guide."* [$InTe_{26}$]

On the other hand, some of the teachers argued that their class size was so big that they were not able to conduct these learning activities. One of them mentioned:

> *"……. Actually we have many students. Our class size is big. So, how can we do these learning activities which require observation, experiment with the students? Moreover, most of the students are not enough brilliant to do that."* [$InTe_{11}$]

Some of the teachers questioned about the facilities required for the activities. They told that they have no facilities as well as scope to do such learning activities with the students. One of them told:

> *"……. In addition, we have no laboratory or that type of facilities in our school. So, how can we do these experiment activities in schools? Moreover, schools which are situated in the city or urban or semi urban area, how can they do observation activities by the students?"* [$InTe_{21}$]

Headmasters also told that their teachers follow the instruction got from various trainings. But the trainings were based on the previous curriculum. That is why they did not know how to conduct the learning activities stated in the curriculum. One of the headmasters mentioned:

> *"……. I do not know actually how to conduct learning activities of the lessons but I can tell you that teachers must follow the instructions of the trainings they received. The trainings were based on the previous curriculum. May be for this reason, teachers cannot able to conduct the learning activities properly."* [$InHm_{04}$]

4.2.3.7 Evaluation

It was found that almost all the teachers evaluated students' performance through question-answer method in verbal or written way. Students also supported it. One of the student groups told:

> *"Yes, our teachers ask us questions and we tried to answer. Sometimes, they asked to write answers the questions in our notebook."* [$F_{03}St_{07}$]

Teachers argued that they had few other ideas to evaluate students' performance. But they could not manage enough time to arrange interesting evaluation. One of the respondent teachers mentioned as follows:

> *"Our class time is only 30-35 minutes. Almost all the time is needed for presenting contents. After presenting contents, we do not get enough time to evaluate students' performance in interesting way. That is why we just follow the question-answer method which is easy to conduct and require minimum time."* [$InTe_{03}$]

Teachers also told that their class size was big. That is why they are not able to design participatory evaluation. One of them stated:

> *"We have to conduct classes with minimum 40-50 students. That is why it is very difficult for us to evaluate everyone's performance. Though we want to evaluate their performance, but we cannot design participatory evaluation."* [$InTe_{27}$]

Interestingly, headmasters mentioned that teachers had not enough motivation to do the participatory evaluation with the students. They also mentioned that teachers had lack of interest and knowledge to make an interactive evaluation. One of the headmasters told:

> *"……. I think teachers have lack of knowledge also. Most of the teachers are not qualified well. That is why they cannot make interactive evaluation in the classroom. Moreover, they have lack of interest also. I believe, if they have enough interest for taking lessons, then definitely they can study and make good evaluation. Unfortunately our teachers have not that level of motivation."* [$InHm_{08}$]

4.3 Chapter Summary

This chapter has presented detail findings of the study according to study objectives and research questions. Teachers' knowledge about EE related parts of 2012 primary curriculum has been presented detail in separate criteria such as knowledge on subject-based terminal competencies, grade-wise achievable competencies, learning outcomes, contents, teaching learning processes, etc. to meet the first objective of the study. The chapter has also illustrated teachers' practice to answer second objective. Finally, the chapter has analyzed the gaps and factors behind teachers' knowledge and practice of EE to meet third objective of the study. However, next chapter presents detail discussion on the findings, implications of the study, and recommendations for better implementation of EE in Bangladesh primary schools as per 2012 curriculum.

CHAPTER FIVE
DISCUSSION, IMPLICATIONS, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

This chapter discusses detail on study findings to explore scholastic view towards the results of the study. This chapter also presents few implications of the study and formulates recommendations based on the findings of the research. The recommendations may help the policy makers, educationists, teachers, trainers, education administrators and development workers to think about the situation of EE in primary education of Bangladesh. It is not necessary to consider the recommendations and act accordingly but it will be worth if the stakeholders will start to explore the situation more and in-depth range.

5.2 Discussion

Findings have been presented in three themes: Teachers' Knowledge about 2012 Primary Curriculum Related to Environmental Education, Practice of 2012 Primary Curriculum Related to Environmental Education by Teachers at Primary Schools, and Comparing Teachers' Practice to 2012 Primary Curriculum Related to Environmental Education in the previous chapter of this report to get answer of the research questions of the study. It is found in the first theme of the study findings that most of the teachers have very little know-how about 2012 primary curriculum related to EE. Teachers have some idea about the subject-based terminal competencies, grade-wise achievable competencies and learning outcomes though majority of them did not tell or write these correctly. Moreover, they have not appropriate idea about the instructions of curriculum related to teaching learning process, materials need to use and evaluation strategy. They know about typical teaching learning strategies.

A similar study related to English curriculum implementation at rural primary schools in Bangladesh conducted by Salahuddin (2013) also revealed that 97.5% rural teachers have no idea about the English curriculum as a result they are not able to apply the prescribed teaching-learning process and instructions of English curriculum. Those who have idea about the curriculum, they try to follow the instructions but fail due to large class size and worst learning environment.

On the other hand, it is found from the findings under the second theme of the study that teachers do not present contents which are not described in the textbooks but mentioned in the curriculum. They only present contents which are described in the textbooks. Moreover, teachers use almost similar teaching-learning processes. Though the 2012 primary curriculum states that the teaching-learning process should be participatory, teachers follow the direction of trainings they received from PTIs, URCs and UEOs based on the previous curriculum. Most of the teachers apply typical teaching learning strategies in the classroom.

However, the salient features of the 2012 primary curriculum related to EE are learning activities, experiments and demonstrations. There are many exciting and participatory learning activities, experiments and demonstrations instructed in the curriculum such as observing environment and environment elements, drawing poster in groups, displaying and presenting group works, role playing, doing assignments and projects, writing reports, preparing charts, collecting news, doing debate, etc. It is stated in the preface of 2012 primary curriculum (NCTB, 2012) that these learning activities have been included to attract students into lessons with lots of enjoyment, enthusiasm, participation, and exploration so that students would be adaptive, creative, participatory and become a

global citizen. But, it is found that teachers do not apply any learning activities with the students instructed in the 2012 primary curriculum.

UNICEF (2008) also referred similar experience about the teaching learning process of Bangladesh primary education. They also found that teaching learning processes are traditional, dominant and focusing on memorizing facts. On the other hand, Brac primary schools are following outcome based and lively teaching learning processes. Teachers and children do lots of interactive activities (Brac, 2014).

However, based on the findings under the third theme of the study, there are several challenges found for not implementing EE related parts of 2012 primary curriculum well in the schools. It is found that teachers did not receive any training on 2012 primary curriculum which is one of the big challenges considered by the teachers. Interestingly, not getting new curriculum in the schools is found as another reason by the teachers for not knowing the latest subject based terminal competencies, grade-wise achievable competencies, learning outcomes and how to do learning activities though the curriculum is available in online. On the other hand, some other challenges mentioned by the teachers are big class size, lack of adequate facilities and scopes in the schools. Teachers argued that it is difficult for them to manage large class and do participatory learning activities without laboratory and other facilities according to the new curriculum. They also mentioned that they cannot manage time to know, learn the curriculum and arrange interesting activities due to their tight schedule in the schools. Thus it can be concluded that teachers have lack of knowledge, resource, training and motivation to know about new curriculum and design participatory learning activities accordingly.

5.3 Implications

The study explored the situation of practice of EE at primary schools in compare to 2012 primary curriculum. It was a mixed method study and findings were presented under few themes aligned with the study objectives and research questions. It is expected that the study might be effective to provide important insights to the educationists, curriculum experts, subject specialists, policy makers, teachers, trainers and development practitioners to make attention on EE at school level as well as its' further development and quality implementation. The study may also help researchers to find interest in this field and explore further. Thus, the researcher thinks the study is quite significant in the area of EE and has few implications constructed from the findings which are presented below.

Implication 1: Many studies show that teachers' understanding about the curriculum they are implementing is really important to perform better and help students to achieve competencies. The curriculum of Bangladesh is centralized, thus it is necessary to make teachers confident about the curriculum they are implementing. It is found in this study that teachers' understanding of 2012 primary curriculum is poor, thus they cannot implement the learning activities properly and in many cases they completely cannot do it. The study significantly explored the issue and made it noticeable to the curriculum experts, education experts, trainers, education officers and other relevant stakeholders. Education experts and officials should think how they can disseminate proper understanding of 2012 primary curriculum to the teachers.

Implication 2: It is found in this study that teachers are implementing textbooks rather than the curriculum. They are helping students to memorize contents of the textbooks to

pass examination. Thus, most of the learning activities prescribed in the curriculum are missing during teaching learning. Most of the teachers argued that they did not know about the curriculum and learning activities. Later they came to know about the learning activities and commented that it is very difficult for them to apply the learning activities in the current setup. It is found in Walsh (2016) that lack of strategic focus on implementation aligned with the social and educational context is usually seen during curriculum development and revision. As a result, proper implementation of the curriculum change cannot happen.

It is found that almost similar situation exists in Bangladesh and EE is not implemented well due to gap between contents of the curriculum and textbook. Current study explored the situation and might be helpful for the curriculum experts, textbook specialists and education experts to know about it and dig into down to explore further for other subjects also. Thus the study has implication for addressing the situation about curriculum and textbooks related to EE.

Implication 3: Competencies described in the curriculum are comprised of three learning domains: cognitive, psychomotor and affective. Though teachers do not practise learning activities prescribed in the curriculum, achieving competencies by the students is questionable. On the other hand, students' achievement is also depended on teachers' quality and performance. It is stated in the National Commission on Teaching and America's Future (1996) that every child of America has birthright to get effective, responsible and quality teaching learning in schools. It states that quality of the teachers significantly affect students' learning.

Thus, it might be possible that primary schools teachers are not ready to implement new curriculum and their performance in teaching is not up to the mark. And, it might be significantly affecting students' performance and achievement. Curriculum experts, education experts and education researchers should take initiative to dig more down from this research to explore what percentage of the competencies are achieved by the students. Policy makers and curriculum experts may focus on developing the teachers and school capacity and plan how to implement curriculum best. In this point, the study has implication to explore this issue and may put attention to the policy makers, education experts and related stakeholders.

Besides the above implications, the study may also significant for the education and curriculum researchers including environmental educationists. Researchers may find interests to design more study on EE contents, teaching learning process, students' knowledge and achievement related to EE, EE trainings for teachers, etc. They may also be interested to work in wider range to explore broad scenery of the EE. However, similar study can be designed for other subjects such as science, mathematics, etc. and for other grades also.

5.4 Recommendations

The overall purpose of the study was to explore the current practice of EE at primary schools in compare to 2012 curriculum. To meet the purpose, the study set three research objectives and research questions which revealed few areas of EE practices as well as challenges to follow curriculum by the teachers at primary schools. Some interesting findings came out from the study such as most of the teachers did not see and read the 2012 primary curriculum though it was available in the internet. As a result most of the

teachers did not know the terminal competencies, grade-wise achievable competencies, learning outcomes and instructions of the curriculum to present the contents of EE. All teachers avoided the most interactive part of the teaching learning processes "learning activities" which is the latest addition of the curriculum. The findings clearly show that there is scope to improve EE at school level and key focus should be given on its practice at schools with proper teacher training and monitoring. To improve the practice of EE at schools, following suggestions might be considered:

- It is found that most of the teachers have very little idea about the new curriculum. Significantly, many of them do not know that the curriculum has been revised and available on online. Headmasters and school authorities should also be aware about this and let the curriculum available to the teachers. Headmasters should download the curriculum from the internet and print required copies of curriculum for the teachers.
- Moreover, headmasters should arrange and provide training to the teachers on latest primary curriculum and its implementation. They can get support from URC in this regard. URC can help them to arrange training on this and provide them learning materials on curriculum.
- In addition, headmasters should communicate with other schools about training on curriculum and discuss with the UEO to arrange sub-cluster training in their schools. Through these actions, school teachers can get opportunities to know about the curriculum and its implementation process.
- Furthermore, school authorities may bring external experts on curriculum in their schools to train the teachers. External expert may be a teacher from other school or an instructor from PTI, URC or a renowned expert from any other organization who received training and skilled on curriculum implementation. School

authorities should bear the cost in this regard. This initiative not only increase teachers' know-how about the curriculum but also developed teachers' teaching skills.

- However, training authorities should also be concerned about their training programmes for the primary school teachers especially for the "Primary Science" and "Bangladesh and Global Studies" subjects. As per the 2012 primary curriculum, these subjects require many learning activities which are not practicing in primary schools. So, trainings should be designed and developed on the teaching-learning activities for the primary school teachers aligned with the new curriculum.
- Refresher training should also be designed for the teachers and should be provided regularly. Without refresher training, teachers cannot update themselves and maintain quality teaching-learning process. Refresher training can be provided with other trainings such as sub-cluster training, training by URCs, etc.
- On the other hand, school authorities may introduce some incentive for the teachers to increase their motivation for implementing curriculum and interactive teaching learning process. School authorities may introduce best teacher award based on their performance. They can engage students, parents and communities in the process. School authorities can source fund for this award from the communities such as philanthropist, community leader, rich people or any other enthusiastic people.
- Moreover, school authorities can involve community peoples to establish a laboratory in the school. School authority can raise fund from the rich and enthusiastic people of the community in this regard which will help teachers for designing better teaching learning process for EE.

- Monitoring is very important for ensuring proper implementation of any activity. That is why proper monitoring guideline focusing on the learning activities related to EE should be developed and implemented by the education officials at field level. School authorities may engage parents and community people in the monitoring process.
- Mentoring is another key issue for teacher development. Sometimes, training cannot ensure teachers' capacity to some extent. In this point, proper mentoring can help teachers to unleash their full potential and implement curriculum effectively. So, mentoring should be introduced at the field level and it can be implemented by the instructors of URCs.
- EE requires many interesting and participatory learning activities as well as observation of the environment. It was found that most of teachers did not do that. It is not only teachers' fault; sometimes they are not well aware of EE and related teaching learning processes. That is why, concept of EE, its' importance, teaching learning process, etc. should be introduced to the teachers through training so that they can understand and implement it effectively.
- It is found that no school have teacher's guide based on 2012 curriculum. So, it is urgent to develop teacher's guide based on the new curriculum and new learning activities, and must be disseminated to primary teachers immediately with proper training.

5.5 Conclusion

EE is very crucial for students to become environmentally sensitive and positive citizen. Like some other countries, Bangladesh already started to provide EE. Now it is time to ensure its full implementation with quality to get its full potential and fruits. For this

purpose, practice of EE at school level is important. The study revealed various issues of practicing EE at primary schools in compare to 2012 primary curriculum related to EE. The findings of the study explored the real practice of EE at primary schools as well as the factors affecting the practice. Through analyzing the findings it can be concluded that the utmost action should be familiarizing latest primary curriculum to the primary school teachers so that they can understand the features of curriculum and importance of following its instructions. Then the other actions such as teacher training, improving school infrastructure, monitoring, etc. will be fruitful. Otherwise, the whole effort will be wastage. However, curriculum is available in online and school authorities should be careful about it so that teachers can download and study on it. In conclusion, teachers should get, read and understand the full features of curriculum first to practise it in real field - primary schools.

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APPENDIXES

Appendix 1: Curriculum Matrix of Environmental Education of Grade V "Bangladesh and Global Studies"

In the curriculum of "Bangladesh and Global Studies", there are sixteen terminal competencies for students. Among them, five competencies (1, 5, 10, 11 and 12) are closely related to environmental issues. But, from these five terminal competencies, only one terminal competency (competency no. 10) is left for achieving at grade V. For this terminal competency, few grade-wise competencies, learning outcomes, and then contents and teaching learning processes are listed. The curriculum analysis matrix of "Bangladesh and Global Studies" based on EE is given below:

For grade V, the terminal competencies, grade-wise competencies, learning outcomes, contents and teaching learning processes related to EE are listed below:

Subject based Terminal Competencies	Grade-wise Achievable Competencies	Learning Outcomes	Contents	Teaching Learning Processes	Textbook Chapter
10. Know about disaster and being skilled to face disaster	10.1. Know about disasters caused by weather and climate change and social effects of Bangladesh and achieve necessary knowledge and skill to protect these.	10.1.1. Able to describe about the weather	***Climate and Natural disasters*** - Weather and climate. - Disasters caused by climate change. - Effect of climate change on individuals, family, and society. - Preparation and skill to face disasters. - Disaster areas of Bangladesh and problem.	- Group work - Assignment - Project - Demonstration - Role play	Chapter 6: Climate and Disaster, Page 56-64
		10.1.2. Able to tell about climate			
		10.1.3. Able to explain the reason behind the weather and climate change			
		10.1.4. Able to tell about disasters caused by weather and climate change			
		10.1.5. Able to describe about the effect of weather and climate change on individual, family, society and environment.			
		10.1.6. Able to tell about the disaster area of Bangladesh and the problems occur there			
	10.2. Abstain from the activities which occurs natural disasters.	10.2.1. Abstain from the activities which damages environmental balance	Abstain from the activities which damages environmental balance.		

Appendix 2: Curriculum Matrix of Environmental Education of Grade V "Primary Science"

In the curriculum of "Primary Science", there are eighteen terminal competencies for students. Among them, eleven competencies (1, 2, 3, 4, 5, 6, 12, 13, 14, 17 and 18) are closely related to environmental issues. But, from these eleven terminal competencies, only nine terminal competencies (competency no. 1, 3, 5, 6, 12, 13, 14, 17, 18) are left for achieving at grade V. For these terminal competencies, few grade-wise competencies, learning outcomes, and then contents and teaching learning processes are listed. The curriculum analysis matrix of "Primary Science" based on EE is given below:

For grade V, the terminal competencies, grade-wise competencies, learning outcomes, contents and teaching learning processes are listed below:

Subject based Terminal Competencies	Grade-wise Achievable Competencies	Learning Outcomes	Contents	Teaching Learning Processes	Textbook Chapter
1. To be alert to preserve environment knowing environment, components of environment, environmental change and environmental pollution.	1.1. Understand about the relation and dependency of different components of environment	1.1.1. Able to describe about the dependency of living and non-living things.	- Dependency of living things on environment - Inter dependency of plants and animals - Food chain and food net	- Observation and report writing on the dependency of plants and animals - Drawing on the dependency of plants and animals (food chain and food net) - Listing of the effects of environmental pollutions through environment observation - Group work - Prepare charts - Demonstration - Discussion - Report - Group discussion	Chapter 1: Life and Our Environment, Page 1-5 & Chapter 2: Environmental Pollution, Page 6-10
		1.1.2. Able to explain about the dependency of plants and animals.			
		1.1.3. Able to explain the importance of physical components of environment to survive plants and animals.			
		1.1.4. Able to tell about food chain and food net.			
		1.1.5. Able to describe about the way of transferring solar energy to living things through food chain.			
	1.2. Know about the causes and effects of environmental pollution.	1.2.1. Able to tell about environment pollution.	- Environmental pollution - Sources and causes of environmental pollution - Effect of soil, water and air pollution		
		1.2.2. Able to mention the causes of environment pollution.			
		1.2.3. Able to identify the sources of pollution.			
		1.2.4. Able to tell about the ways			

Subject based Terminal Competencies	Grade-wise Achievable Competencies	Learning Outcomes	Contents	Teaching Learning Processes	Textbook Chapter
		of soil, water, and air pollution.	- Sound pollution and its effect		
		1.2.5. Able to explain the effect of soil pollution on human and environment.			
		1.2.6. Able to explain about the harmful effects of air pollution.			
		1.2.7. Know about sound pollution and able to identify the sources of sound pollution.			
		1.2.8. Able to describe the reasons and harmful effects of sound pollution.			
		1.2.9. Able to participate to prevent sound pollution.			
	1.3. Alert to preserve environment realizing its importance.	1.3.1. Able to tell about environment reservation.	- Environmental reservation, importance of reservation, and way of reservation.		
		1.3.2. Able to explain about the necessity of environmental reservation for human and other living things.			
		1.3.3. Motivate others to reserve environment and participate actively.			

Subject based Terminal Competencies	Grade-wise Achievable Competencies	Learning Outcomes	Contents	Teaching Learning Processes	Textbook Chapter
	1.4. Will be able to conscious for creating favorable environment for plants and animals.	1.4.1. Will be able to explain the importance of plants and animals reservation.	- Importance of plants and animals		
3. To use and reserve water effectively knowing about importance of water as component of environment.	3.1. Able to describe the necessity of water for plants and animals.	3.1.1. Able to explain about the necessity of water for plants and animals.	- Necessity of water in plants and animals life	Drawing on the water cycle Observation on how water polluted Discussion Debate	Chapter 3: Water for Life, Page 11-17
	3.2. Able to achieve the concept of water cycle.	3.2.1. Able to explain and narrate water cycle.	- Water cycle		
		3.2.2. Able to explain the reason of storing water drops on the glass bottle of cold water or ice.			
	3.3. Able to discuss about the result or effect of water pollution on human life.	3.3.1. Able to explain about the result or effect of water pollution on human life.	- Negative effect of water pollution in human life		
	3.4. Able to know the reasons behind water pollution and the ways of prevent it.	3.4.1. Able to tell about the reasons behind water pollutions.	- Reasons behind water pollution		
		3.4.2. Able to identify the necessary ways to prevent water pollution.	- Prevention of water pollution		
	3.5. Able to know the	3.5.1. Able to purify water.	- Water purification		

Subject based Terminal Competencies	Grade-wise Achievable Competencies	Learning Outcomes	Contents	Teaching Learning Processes	Textbook Chapter
	techniques of water purification.				
5. To use the components of air effectively knowing about importance of air and then stop air pollution.	5.1. Able to know about the uses of air flow.	5.1.1. Able to list uses of air in daily activities.	- Different uses of air	- Group discussion - List preparation - News collection on air pollution	Chapter 4: Air, Page 18-26
		5.1.2. Able to tell the uses of air flows.	- Uses of the flow of air		
	5.2. Able to know about the reason behind the air pollution.	5.2.1. Able to provide example about air pollutions.	- Air pollution, causes and prevention ways of air pollution		
		5.2.2. Able to tell the reasons behind air pollutions.			
	5.3. Able to know about the bad effects of polluted air for health.	5.3.1. Able to explain how the polluted air is bad for health.			
	5.4. Able to know about the dos of preventing air pollution.	5.4.1. Able to explain about the necessity of oxygen, carbon di oxide, and nitrogen for keeping environmental balance.			
		5.4.2. Able to determine about the responsibilities for preventing air pollution.			
6. To know scientific	6.1. Will know about the scientific	6.1.1. Will explain about the reasons behind air pollutions.	- Air Flow	- Experiment - Demonstration	Chapter 4: Air, Page 18-26,

Subject based Terminal Competencies	Grade-wise Achievable Competencies	Learning Outcomes	Contents	Teaching Learning Processes	Textbook Chapter
explanation cause-effect of familiar natural phenomena	explanation of air flows.			- Drawing	Chapter 8: The universe, Page 51-58 Chapter 12: Climate Change, Page 81-86
	6.2. Will know about the scientific explanation of storm.	6.2.1. Will explain the reason of storm.	- Storm		
	6.3. Will be understood the explanation of day-night, new moon-full moon, and season changes.	6.3.1. Will show the process of happening day-night through the earth model.	- Day-night, new moon, full moon, diurnal motion, annual motion, season change		
		6.3.2. Will be able to show new moon – full moon through experiment.			
		6.3.3. Will be able to explain the scientific reasons of season changes.			
12. To know the characteristics and the interrelations of different elements of the universe	12.1. Will realize the vastness of the universe	12.1.1. Can describe the vastness of the universe	- Vastness of the universe	- Observation - Experiment - Demonstration using multimedia	Chapter 8: The universe, Page 51-58
		12.1.2. Can tell about the types of earth motion	- Motion of the earth: diurnal motion and annual motion		
	12.2. Will understand the scientific explanation of day-	12.2.1. Can describe about how day night occurs through an experiment	- Day night		

Subject based Terminal Competencies	Grade-wise Achievable Competencies	Learning Outcomes	Contents	Teaching Learning Processes	Textbook Chapter
	night				
	12.3. Will know about the reasons behind season change	12.3.1. Can explain the reason of season change	- Causes of season change		
	12.4. Will understand how new moon and full moon happen	12.4.1. Can show the new moon and full moon through drawing different sizes of moon	- New moon and full moon		
13. To know about weather and climate and their interrelations and cause-effect.	13.1. Will understand the relationship and difference between weather and climate.	13.1.1. Can explain the relationship between weather and climate.	- Relationship between weather and climate.	- Presentation - Calculation - Picture Presentation	Chapter 11: Weather and climate, Page 74-80
		13.1.2. Can differentiate between weather and climate.	- Difference between weather and climate.		
	13.2. Will know about the factors of weather and climate.	13.2.1. Can tell the name of the factors of weather.	- Factors of weather.		
		13.2.2. Can explain the effect of the factors in changing weather.	- Effect of the factors of weather in changing weather.		
	13.3. Will know about the reasons of natural disasters and adverse weather like storm, flood, tornedo, thunderbolts, cyclone,	13.3.1. Can describe about high and low air pressure.	- High air pressure, low air pressure		
		13.3.2. Can explain the reason of nor-wester.	- Adverse weather like storm, cyclone, tornedo, flood, etc.		
		13.3.3. Can explain the reason of cyclone.			

Subject based Terminal Competencies	Grade-wise Achievable Competencies	Learning Outcomes	Contents	Teaching Learning Processes	Textbook Chapter
	etc.				
14. To know about the problem of climate change and other disasters and be skilled and self-confident to face these problems.	14.1. Will be able to select techniques of adaptation knowing cause-effect of climate change.	14.1.1. Will be able to explain the concept of climate change.	- Climate change and its cause	- Model development by students - Demonstration	Chapter 12: Climate change, Page 81-86
		14.1.2. Will be able to explain the relationship between climate change and human activities.	- Effect of climate change on Bangladeshi people		
		14.1.3. Will be able to describe the effect of climate change on Bangladeshi peoples.			
		14.1.4. Will be able to select techniques to adapt in new and adverse situation created by climate change.	- Techniques of adaptation to climate changes		
17. To be aware about effective uses and preservation of the natural resources of Bangladesh.	17.1. Will understand about the planned uses of resources and know these ways.	17.1.1. Will be able to describe about the importance and limitations of natural and artificial resources.	- Our natural resources Use of solar and air energy - Limitations of resources and planned uses	- Picture presentation	Chapter 13: Natural resources, Page 87-92
		17.1.2. Will be able to describe about the planned uses of natural resources.			
18. To know about basic human needs, effect of	18.1. Will realize the effect of population growth on natural	18.1.1. Will be able to describe about the interrelationship of overpopulation and its negative	- Natural resources and the effect of population on	- Discussion - Drawing - Explanation	Chapter 14: Population and natural

Subject based Terminal Competencies	Grade-wise Achievable Competencies	Learning Outcomes	Contents	Teaching Learning Processes	Textbook Chapter
population on environment, and importance of population.	resources and environment.	effects on natural resources and environment.	environment	- Presentation	environment, Page 93-99
		18.1.2. Will be able to describe about the relationship between human basic needs and population.			
		18.1.3. Will be able to explain the effect of population growth.			
	18.2. Will know about the role of science for building human resources.	18.2.1. Will be able to describe the role of science for building human resources from population.	- Role of science to build human resource from population, human basic needs, and effect of population increasing		

Appendix 3: Request Letter

Date:

To

_____

_____

_____

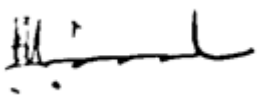
Subject: Request for providing support to MPhil researcher.

Dear Sir

It is my pleasure to introduce one of my MPhil researchers S M Kamruddin Ropum, Roll: 21, session 2010-11 to you. He has undertaken a research entitled "Curriculum and Practice of Environmental Education at Primary Schools in Bangladesh" for fulfillment of the requirement of the MPhil Programme. He needs cooperation, guidance and assistance from you in collecting data and information for his study. Collected data will be used only for the research and all information related to respondent will not be disclosed anywhere. Moreover, researcher will maintain standard research ethics and Bangladesh children act 2013 during his research.

I am requesting you to help him in this regard.

Sincerely yours



Dr. Mohammad Ali Zinnah
Professor of Education and Chairman
Department of Social Science Education
Institute of Education and Research
University of Dhaka

Appendix 4: Consent Letter of the Respondents

Date: _____

Consent Letter

S M Kamruddin Ropum, an MPhil Researcher of the Institute of Education and Research (IER), University of Dhaka (Registration No: 21, Session: 2010-11) has requested me that he wants to observe my teaching-learning process related to environmental education and take an interview with me. Besides this, he wants to conduct a focus group discussion (FGD) with the students those who will attend in my class. He assured me that the data which will be come out from the teaching-learning observation, interview schedule and focus group discussion (FGD) will be used for the purpose of his MPhil research. All type of data will be used only for research purpose. In addition, researcher will keep all information secret related to personal, social and institutional entity which will be provided by me and other respondents.

To become fully convinced by the researcher and using my best knowledge and belief, I am giving him affirmation to conduct the classroom observation, interview and focus group discussion (FGD) with me and respective respondents.

_____

Signature of Teacher

Appendix 5: Pre Observation Interview Schedule for the Teachers

General Information

Name of Teacher:			**Gender:** ☐ Male ☐ Female	
School's Name:				
Upazila:			**District:**	
Subject:	☐ Primary Science ☐ Bangladesh and Global Studies			
Chapter:		**Chapter Title:**		
Contents:				
Total Students:			Boys:	Girls:
Presented Students:			Boys:	Girls:
Duration:	_____ minutes		Interviewer Name:	
School's type: ☐ Government ☐ Registered ☐ Non-registered ☐ Others				

Try to know the detail answer of each questions. Ask supplementary question if necessary:

S/N	Comments
01	What types of preparations have you taken to present this chapter? Please explain. Did you take help from any resources for taking preparations? If so, what were those resources?
02	Which contents of this chapter are you going to present? Did you take help from any resources to select these contents? If so, what were those resources?

S/N	Comments
03	How would you present (teaching-learning process) this chapter? Please explain your strategy? Did you take help from any resources to make this strategy? If so, what were those resources?
04	Would you use any teaching aids to present this chapter? If yes, what are the teaching aids? Did you take help from any resources to select the teaching aids? If yes, what were those resources? Would you take help from any resources in using the teaching aids? If yes, what are those resources?
05	Would you evaluate the students' learning of this chapter? If yes, how would you evaluate? Did you take help from any resources to plan the evaluation strategies? If yes, what were those resources?
06	Did you read the latest primary curriculum (2012)? If yes, where did you read from? And if not, then why?

S/N	Comments
07	(If you have read the curriculum) is there any relationship between the primary curriculum and the teaching learning process of this chapter? If yes, what is the relationship? Please explain.
08	Is there any subject-based terminal competencies related to the chapter of EE that you are going to present? If yes, please tell one or two. Where did you learn the competencies?
09	Is there any grade-wise terminal competencies related to the chapter of EE that you are going to present? If yes, please tell one or two. Where did you learn the competencies?
10	Is there any learning outcomes related to the chapter of EE that you are going to present? If yes, please tell the learning outcomes? where did you learn the learning outcomes?

S/N	Comments
11	Can you follow the instructions of primary curriculum in the EE lessons? If yes, how? Please explain. If not, why? Please explain.

Signature of the Interviewer: _____

Appendix 6: Lesson Observation Checklist for "Primary Science"

General Information

Name of Teacher:			**Gender:** ☐ Male ☐ Female	
School's Name:				
Upazila:			**District:**	
Subject:	☐ Primary Science ☐ Bangladesh and Global Studies			
Chapter:		**Chapter Title:**		
Contents:				
Total Students:			Boys:	Girls:
Presented Students:			Boys:	Girls:
Duration:	_____ minutes		Interviewer Name:	
School's type: ☐ Government ☐ Registered ☐ Non-registered ☐ Others				

Subject: Primary Science

Chapter One: Life and Our Environment

Put tick mark (√) on the cells against each of the statement based on the lesson observation

Statement	Completely	Mostly	Moderately	Partially	Not at all	Comments
	4	3	2	1	0	
A. Contents related						
Teacher-						
(1) presented about the dependancy of life on environment						
(2) presented about the interdependency between plants and animals						
(3) presented about the importance of different elements (i.e. soil, air, water) of the physical environment for the survival of plants and animals						
(4) presented about the food chain						
(5) presented about the implantation of solar power into life through foodchain						
(6) presented about the food web						
(7) presented about the importance of conserving plants and animals						

Statement	Completely	Mostly	Moderately	Partially	Not at all	Comments
	4	3	2	1	0	
B. Learning Activities/Experiment/Demonstration						
Teacher-						
(1) made an observation on the plants and animals around the school environment by the students						
(2) engaged students to make a list of their observed plants and animals in their note book by themselves						
(3) made an observation on the essential factors that are needed for the survival of plants and animals by the students						
(4) made the sudents note down their observation in the notebook						
(5) made the students discussing on the essential factors that are helping plants and animals to survive						
(6) made an observation by the students around the school environment to make them understand how plants and animals are interdependant						
(7) made the students drawing a group poster on the interdependancy of plants and animals based on their observation						
(8) displayed the groups work of the students in the class by them						
(9) made an observation by the students around the school to						

Statement	Completely	Mostly	Moderately	Partially	Not at all	Comments
	4	3	2	1	0	
identify food chain						
(10) made the students drawing their identified food chains by themselves in a poster paper or in the backside of old calender						
(11) showed the groups' work by the students in the class						
(12) made the students discussing on their groups' work in the class						
(13) Made the students discussing with their classmates that if a plant or animal extinct from their observed food chain what will be the consequences						
(14) made the students drawing a poster of food web on their observed food chains						
(15) demonstrated the picture of foodchain in the class drawn by the students						
Overall Observation:						

Signature of the observer**:** _____

Subject: Primary Science

Chapter Two: Environmental Pollution

Put tick mark (√) on the cells against each of the statement based on the lesson observation

Statement	Completely	Mostly	Moderately	Partially	Not at all	Comments
	4	3	2	1	0	
A. Contents related						
Teacher-						
(1) presented about the environmental pollution						
(2) presented about the source of environmental pollution						
(3) presented about the causes of environmental pollution						
(4) presented about the air pollution						
(5) presented about the source of air pollution						
(6) presented about the causes of air pollution						
(7) presented about the impact of air pollution						
(8) presented about the water pollution						
(9) presented about the source of water pollution						
(10) presented about the causes of water pollution						
(11) presented about the impact of water pollution						
(12) presented about the soil pollution?						

Statement	Completely	Mostly	Moderately	Partially	Not at all	Comments
	4	3	2	1	0	
(13) presented about the source of soil pollution						
(14) presented about the causes of soil pollution						
(15) presented about the impact of soil pollution						
(16) presented about the sound pollution						
(17) presented about the source of sound pollution						
(18) presented about the causes of sound pollution						
(19) presented about the impact of sound pollution						
(20) presented about the ways of preventing sound pollution						
(21) presented about the necessary steps that can be taken to prevent sound pollution						
(22) presented about the environmental conservation						
(23) presented about the importance of environmental conservation						
(24) presented about the ways of environmental conservation						
(25) presented about the necessary ways of environmental conservation						
B. Learning Activities/Experiment/Demonstration						
Teacher-						
(1) made an observation by the students around the local area to understand how the environment is being polluted						

Statement	Completely	Mostly	Moderately	Partially	Not at all	Comments
	4	3	2	1	0	
(2) asked students to jot down the name of the sources of environmental pollution (soil, water, air) that they have seen during their observation						
(3) asked students to fill up the poster paper in group following the chart of their textbook about various causes and impact of different pollutions						
(4) asked students for demonstrating poster papers in the class prepared by the students in their group						
(5) made the students note down the identified sources of sound pollution of their own area's according to the given table of the textbook						
(6) made the students note down the identified ways of preventing sound pollution according to the given chart of the textbook						
(7) made the students discussing about the sources of sound pollution in classroom						
(8) made the students discussing about the ways of preventing sound pollution in classroom						
(9) made the students discussing in group on how to aware local people about environmental pollution (ways of prevention and develop awareness) in classroom						

Statement	Completely	Mostly	Moderately	Partially	Not at all	Comments
	4	3	2	1	0	
(10) made the srudents observing local environment in groups to explore the causes and ways of preventing environmental pollution						
(11) made the students discussing and preparing posters in groups on the causes and ways of preventing environmental pollution based on their observation						
(12) made the students demonstrating their posters in the classroom						
Overall Observation:						

Signature of the observer**:** _____

Subject: Primary Science

Chapter Three: Water for Life

Put tick mark (√) on the cells against each of the statement based on the lesson observation

Statement	Completely	Mostly	Moderately	Partially	Not at all	Comments
	4	3	2	1	0	
A. Contents related						
Teacher-						
(1) presented about the importance of water for plants and animals						
(2) presented about water cycle						
(3) presented about the reason of turning water vapours into water drops on the outside surface of the glass or bottle containing ice cube or cold water						
(4) presented about polluted water						
(5) presented about the causes of water pollution						
(6) presented about the harmful effect of water pollution on human being						
(7) presented about the prevention of water pollution						
(8) presented about water purification						

Statement	Completely	Mostly	Moderately	Partially	Not at all	Comments
	4	3	2	1	0	
B. Learning Activities/Experiment/Demonstration						
Teacher-						
(1) made the students drawing the picture of water cycle						
(2) asked the students to explain water cycle						
(3) made the students observing environment around the school to know how water is being polluted						
(4) made the students discussing on their observation of "How water is being polluted" in classroom						
(5) made the students observing environment around the school to know how the polluted water is being used						
(6) made the students discussing on "how the polluted water is being used" in classroom based on their observation						
(7) arranged debate in classroom for the students on the effective ways of preventing water pollution						
Overall Observation:						

Signature of the observer**:** _____

Subject: Primary Science

Chapter Four: Air

Put tick mark (√) on the cells against each of the statement based on the lesson observation

Statement	Completely	Mostly	Moderately	Partially	Not at all	Comments
	4	3	2	1	0	
A. Contents related						
Teacher-						
(1) presented about different uses of air						
(2) presented about different uses of air flow						
(3) presented about air pollution						
(4) presented about the causes of air pollution						
(5) presented about the effects/consequences of air pollution						
(6) presented about the importance of oxygen, carbon di oxide and nitrogen to keep environmental balance						
(7) presented about the prevention of air pollution						
B. Learning Activities/Experiment/Demonstration						
Teacher-						
(1) presented use of air through experimenting of football by the students						

Statement	Completely	Mostly	Moderately	Partially	Not at all	Comments
	4	3	2	1	0	
(2) presented uses of air flow thorugh making spinning wheel by the students						
Overall Observation:						

Signature of the observer**:** _____

Appendix 7: Lesson Observation Checklist for "Bangladesh and Global Studies"

General Information

Name of Teacher:			**Gender:** ☐ Male ☐ Female	
School's Name:				
Upazila:			**District:**	
Subject:	☐ Primary Science ☐ Bangladesh and Global Studies			
Chapter:		**Chapter Title:**		
Contents:				
Total Students:			Boys:	Girls:
Presented Students:			Boys:	Girls:
Duration:	_____ minutes		Interviewer Name:	
School's type: ☐ Government ☐ Registered ☐ Non-registered ☐ Others				

Subject: Bangladesh and Global Studies

Chapter Six: Climate and Disaster

Put tick mark (√) on the cells against each of the statement based on the lesson observation

Statement	Completely	Mostly	Moderately	Partially	Not at all	Comments
	4	3	2	1	0	
A. Contents related						
Teacher-						
(1) presented about the weather						
(2) presented about the climate						
(3) presented about the causes of weather changes						
(4) presented about the causes of climate changes						
(5) presented about the effect of weather changes in Bangladesh						
(6) presented about the effect of climate changes in Bangladesh						
(7) presented about disaster						
(8) presented about the effect of disasters on individual, family,						

Statement	Completely	Mostly	Moderately	Partially	Not at all	Comments
	4	3	2	1	0	
society and environment						
(9) presented about the disaster prone areas of Bangladesh						
(10) presented about the disasters of disaster prone areas of Bangladesh						
(11) presented about the effect of disasters in the disaster prone areas of Bangladesh						
(12) presented about the necessary preparation for facing disaster						
(13) presented about required skills that are necessary to face disaster						
(14) presented about the activities that destroy the natural balance						
(15) presented about put away oneself from destroying activities that emerges natural imbalance						

Statement	Completely	Mostly	Moderately	Partially	Not at all	Comments
	4	3	2	1	0	
B. Learning Activities/Experiment/Demonstration						
Teacher-						
(1) made the students presenting report (maximum one page) in groups on a disaster that already occured in their own area						
(2) made the students collecting different informations and pictures on disaster						
(3) made the students showing their collected picture and information on disasters in the class						
(4) made the students drilling to be skilled of fighting disaster						
Overall Observation:						

Signature of the observer**:** _____

Appendix 8: Post Observation Interview Schedule for the Teachers

General Information

Name of Teacher:			**Gender:** ☐ Male ☐ Female	
School's Name:				
Upazila:			**District:**	
Subject:	☐ Primary Science ☐ Bangladesh and Global Studies			
Chapter:		**Chapter Title:**		
Contents:				
Total Students:			Boys:	Girls:
Presented Students:			Boys:	Girls:
Duration:	_____ minutes		Interviewer Name:	
School's type: ☐ Government ☐ Registered ☐ Non-registered ☐ Others				

Try to know the detail answer of each questions. Ask supplementary question if necessary:

S/N	Comments
01	What types of preparations did you take to present this chapter? Please explain. Did you take help from any resources for taking preparations? If so, what were those resources?
02	Which contents of this chapter have you presented? Did you take help from any resources to select these contents? If so, what were those resources?

S/N	Comments
03	How did you present (teaching-learning process) this chapter? Please explain your strategy? Did you take help from any resources to make this strategy? If so, what were those resources?
04	Did you use any teaching aids to present this chapter? If yes, what were the teaching aids? Did you take help from any resources to select the teaching aids? If yes, what were those resources? Did you take help from any resources in using the teaching aids? If yes, what were those resources?
05	Did you evaluate the students' learning of this chapter? If yes, how did you evaluate? Did you take help from any resources to plan the evaluation strategies? If yes, what were those resources?
06	Did you read the latest primary curriculum (2012)? If yes, where did you read from? And if not, then why?

S/N	Comments
07	(If you have read the curriculum) is there any relationship between the primary curriculum and the teaching learning process of this chapter? If yes, what is the relationship? Please explain.
08	Is there any subject-based terminal competencies related to the chapter of EE that you have presented? If yes, please tell one or two. Where did you learn the competencies?
09	Is there any grade-wise terminal competencies related to the chapter of EE that you have presented? If yes, please tell one or two. Where did you learn the competencies?
10	Is there any learning outcomes related to the chapter of EE that you have presented? If yes, please tell the learning outcomes? where did you learn the learning outcomes?

S/N	Comments
11	Can you follow the instructions of primary curriculum in the EE lessons? If yes, how? Please explain. If not, why? Please explain.

Signature of the Interviewer: _____

Appendix 9: Focus Group Discussion Guideline for the Students

General Information

Students' Name	Gender	Section	Roll
(1)			
(2)			
(3)			
(4)			
(5)			
(6)			
(7)			
(8)			
(9)			
(10)			

Try to record the discussion in detail. To keep the discussion relevant, ask supplementary questions:

FGD Guideline	**Discussions**
(1) Did you understand the contents that your teacher taught you in this chapter? (2) What are the things you liked most during the teaching learning process? (3) What are the things you disliked most during the teaching learning process? (4) How does your teacher teach in another time? (5) Does your teacher engage you in the activities like visiting outside the schools during teaching learning process in another day?	

(6) Does your teacher involve you in drawing pictures, collecting pictures and making posters? (7) Does your teacher engage you in discussion or presentation? (8) Does your teacher teach everything of the textbook during teaching learning process in another time?	

Signature of the Facilitators of FGD: _____

Appendix 10: Interview Schedule for the Headmasters

General Information

Name of Headmaster:	**Gender:** ☐ Male ☐ Female
School's Name:	
Upazila:	**District:**
School's type: ☐ Government ☐ Registered ☐ Non-registered ☐ Others	

Try to know the detail answer of each questions. Ask supplementary question if necessary:

S/N	Comments
01	Did you read the latest primary curriculum (2012)? If yes, where did you read from and if not, then why?
02	Did your teacher read the latest primary curriculum (2012) who teaches "Primary Science" at grade V in your school? If yes, where did s/he read from and if not, then why?
03	Did your teacher read the latest primary curriculum (2012) who teaches "Bangladesh and Global Studies" at grade V in your school? If yes, where did s/he read from and if not, then why?

S/N	Comments
04	Is there any relationship between the latest primary curriculum (2012) and teaching learning process? If yes, what are those relations?
05	Does the teacher of your school follow the instructions of the latest primary curriculum (2012) while conducting "Primary Science" lessons at grade V? If yes, how do they follow? If not, then why?
06	How does the teacher of your school conduct "Primary Science" lessons at grade V usually?
07	Does the teacher of your school follow the instructions of the latest primary curriculum (2012) while conducting lessons of "Bangladesh and Global Studies" at grade V? If yes, how does s/he follow? If not, then why?

S/N	Comments
08	How does the teacher of your school usually conduct lessons of grade V "Bangladesh and Global Studies"?

Signature of the interviewer: _____

Appendix 11: Sample Primary Schools

S/N	Name of the School	Upazila	District
01	44 No. Kalipur Govt. Primary School	Bashkhali	Chittagong
02	Mohamuni Govt. Primary School	Raozan	
03	Abu Taher Dakhil Madrasha	Shibchar	Madaripur
04	Baragandiya Govt. Primary School	Doulatpur	Kustia
05	Satarpara Govt. Primary School		
06	Amla Govt. Primary School	Mirpur	
07	Kamalapur Govt. Primary School	Kustia Sadar	
08	Badartuni Govt. Primary School	Hizla	Barisal
09	Bibi Ismatunnisa Women Dakhil Madrasha	Matlab	Chandpur
10	Uddipan Badar Shamsu Bidya Niketon	Bagerhat Sadar	Bagerhat
11	Chagaldhora Givt. Primary School	Sariakandi	Bogra
12	13 No. Poirangkul Govt. Primary School	Debiddar	Comilla
13	Babrijhar Govt. Primary School	Nilphamari Sadar	Nilphamari
14	Jamalgonj Govt. Primary School	Akkelpur	Joypurhat
15	Suapur Govt. Primary School	Dhamrai	Dhaka