IMPACT OF ROHINGYA INFLUX ON WILDLIFE AND SOCIETY IN TEKNAF PENINSULA IN COX'S BAZAR OF BANGLADESH

A dissertation
Submitted to the University of Dhaka for the degree of
Doctor of Philosophy in Zoology (Wildlife Biology)

By
Shital Kumar Nath
Registration No. 63
Session: 2020 – 2021

November 2023

Department of Zoology
University of Dhaka
Dhaka 1000, Bangladesh

SUPERVISORS' RECOMMENDATION

We, hereby, declare that the dissertation entitled, "Impact of Rohingya Influx on Wildlife and Society in Teknaf Peninsula in Cox's Bazar of Bangladesh" submitted for the degree of Doctor of Philosophy (Ph.D.) in Zoology (Wildlife Biology), University of Dhaka, Dhaka is based on self-investigation carried out under our continuous supervision.

We also declare that this work or any part of it has not been submitted for any other degree anywhere.

Dr. Md. Farid Ahsan
Co-Supervisor
Supernumerary Professor
Department of Zoology
University of Chittagong
Chattogram - 4331, Bangladesh
Mobile: +88 01712 847356
E-mail: faridahsan55@yahoo.com

Dr. Mohammad Firoj Jaman
Supervisor
Professor
Department of Zoology
University of Dhaka
Dhaka - 1000, Bangladesh
Mobile: +88 01733263320
E-mail: mfjaman4@gmail.com

PRESENTATION CERTIFICATION OF THE DEPARTMENT OF ZOOLOGY, UNIVERSITY OF DHAKA

প্রাণিবিদ্যা বিভাগ
ঢাকা বিশ্ববিদ্যালয়
ঢাকা ১০০০, বাংলাদেশ

দূরালাপনি ঃ ৮৮ ০২ ৯৬৬১৯০০ এক্স ঃ ৭৫৮০, ৭৫৮১
ফ্যাক্স ঃ ৮৮ ০২ ৯৬৬৭২২২ (উপাচার্যের অফিস)
ইমেইল ঃ zoology@du.ac.bd

Department of Zoology
University of Dhaka
Dhaka 1000, Bangladesh

Telephone : 88 02 9661900 Extn.7580, 7581
Fax : 88 02 9667222 (Office of the Vice-Chancellor)
E-mail : zoology@du.ac.bd

পত্র নং জ/৬৮৫০/২০২৩

ভাদ্র ২, ১৪৩০ বঙ্গাব্দ
আগস্ট ১৭, ২০২৩ খ্রিস্টাব্দ

পরীক্ষা নিয়ন্ত্রক
ঢাকা বিশ্ববিদ্যালয়
ঢাকা ১০০০

প্রিয় মহোদয়,

ঢাকা বিশ্ববিদ্যালয় প্রাণিবিদ্যা বিভাগের পিএইচ.ডি. গবেষক শীতল কুমার নাথ (Shital Kumar Nath), রেজিস্ট্রেশন নম্বর ৬৩/২০২০-২০২১ "Impact of Rohingya Influx on Wildlife and Society in Teknaf Peninsula in Cox's Bazar of Bangladesh" শীর্ষক শিরোনামে তাঁর গবেষণার ফলাফল গত ০৫.০৩.২০২৩ এবং ১৯.০৬.২০২৩ তারিখে অনুষ্ঠিত দু'টি সেমিনার বিভাগের শিক্ষক ও ছাত্র-ছাত্রীদের সম্মুখে উপস্থাপন করেন। ২৩.০৭.২০২৩ তারিখে অনুষ্ঠিত বিভাগীয় একাডেমিক কমিটির সিদ্ধান্ত অনুযায়ী তাঁর পিএইচ.ডি. থিসিস জমা নেওয়ার জন্য সুপারিশ করা হয়।

ধন্যবাদান্তে,

আপনার আস্থাভাজন

Begum
17.8.23

ড. শেফালী বেগম
প্রফেসর ও চেয়ারম্যান

DECLARATION

I do hereby declare that the work presented in this thesis entitled, "Impact of Rohingya Influx on Wildlife and Society in Teknaf Peninsula in Cox's Bazar of Bangladesh" is the result of my investigation. I further declare that I have written this thesis. I collected all primary data used in this thesis directly from the field; no part of this thesis has been submitted anywhere for any academic degree.

Shital Kumar Nath
Ph.D. Candidate

DEDICATION

I dedicate this thesis to my parents (Late Suresh Chandra Nath and Late Padmabati Davi), who always dreamt of seeing me in my current position.

ACKNOWLEDGEMENT

First and foremost, thank you, Almighty God, for keeping me together in this long battle of study, and you kept me with endless strength to complete this research for the degree of Ph.D. as well as accomplish this thesis.

I gratefully acknowledge my honourable Supervisor, Professor Dr. Mohammad Firoj Jaman, Department of Zoology, University of Dhaka, Dhaka, and honourable Co-supervisor Supernumerary Professor Dr. Md. Farid Ahsan, Department of Zoology, University of Chittagong, Chattogram for their persistent support, valuable suggestions and guidance throughout the study period. They have made the most strenuous efforts during my fieldwork, data sheet preparation, data collection, reading of this dissertation and have made critical comments to enrich it. With their insightful discussions, I found the passion and courage to do this research.

While completing my research, I have received much support from personnel, institutions and departments. I want to take the opportunity to thank them for making this journey possible.

I am much indebted to the Department of Zoology, the University of Dhaka, Dhaka, for permitting me to take the Ph.D. course, including conducting this research and providing all facilities during this study.

I am very much grateful to Mr. Humayun Reza Khan, Professor & Former Chairman, Department of Zoology, University of Dhaka, Dhaka, for supporting me in various ways during my M.Phil. course.

I am grateful to Dr. Niamul Naser, Professor and former Chairman, and Dr. Shefali Begum, Professor, and Chairman, Department of Zoology, University of Dhaka, Dhaka, for supporting me in various ways during my Ph.D. course.

I am grateful to Dr. Abdul Gofur Khan, Supernumerary Professor (Retd.), Department of Zoology, University of Chittagong, Chattogram and Dr. Md. Anwarul Islam, Professor (Retd.) and Former Chairman, Department of Zoology, University of Dhaka, Dhaka, for their role as a mentor during my educational life and inspired me to complete this study.

I express my sincere thanks to the Bangladesh Forest Department, the Government of the People's Republic of Bangladesh, especially to the Honorable CCF, CF Wildlife, CF

Chattogram Circle, DFO Office of Cox's Bazar South Forest Division including ACF, RO, BO and all related staff of this division for permitting me to conduct Ph.D. research work in their jurisdiction and as well as provide several relevant documents. Similarly, I am grateful to the Department of Environment (DoE) of Cox's Bazar.

This work would not be possible without the permission and cooperation of the Office of the Refugee, Relief and Repatriation Commissioner (RRRC), Cox's Bazar and its related Camp In-Charge (CiC) offices of the Rohingya Camps of Ukhiya and Teknaf, Cox's Bazar. Without their support, I could not fetch the inside information.

I am also grateful to the Upazila Administration of Ukhiya and Teknaf for their cooperation during this research.

I deeply owe the Community Development Centre (CODEC) for permission to use their facilities of Ukhiya and Teknaf as well as Rohingya Camps for interviewing purposes. Similarly, I am grateful to CODEC's staff for their cordial support.

I am deeply thankful to national and international NGO and research organization officials for supporting this journey.

I am grateful to the chairpersons, members and councillors of all related unions and pouroshovas of Ukhiya and Teknaf surrounding the Rohingya Camps for their support in selecting the respondents for this research work.

I am thankful to Dr. Mohammed Kamal Hossain, Professor (Retd.); Dr. Mohammad Mosharraf Hossain, Professor; Mohammad Akhtar Hossain, Assistant Professor; and Mr. Kazi Nazrul Islam, Assistant Professor, Institute of Forestry and Environmental Sciences, University of Chittagong, Chittagong, to support me in various ways, especially collecting different reports, articles, books, features, etc.

I am also grateful to Mr. Md. Omar Faruk (Masum), Research Assistant, who supported me in collecting many fields data collection, photography, data entry, etc.

I am grateful to Professor Dr. Farid Uddin Ahamed, Former Dean of the Faculty of Social Sciences, University of Chittagong, Chittagong, for checking the questionnaire for this research work.

I am grateful to Late Mr. Ruhul Mohaiman Chowdhury (who worked at Protibesh Project), Dr. Paul Thompson, Md. Bablu Zzaman (works at RIMS Unit, BFD, Agargaon, Dhaka), Omar Shahadat (Wildlife Biologist), Dr. Suprio Chakma (Chairman, Department of Forestry and Environmental Science, Rangamati Science & Technology University), Nargis Sultana (Rupa) (Wildlife Inspector, Wildlife Crime Control Unit, Wildlife Circle, BFD), Mr. Sudipta Sen Gupta and Mr. Md. Moktader Moula (both are students of IFESCU), Mr. Arnob Saha (a student of Department of Zoology, University of Dhaka), Dr. Prantosh Chandra Roy (ACF, Cox's Bazar North Forest Division), Mr. Md. Mahbubur Rahman and Mr. Kamrul Islam (works at AF), Mr. Md. Nazmul Abedin Faisal (works at RIC), Mr. Md. Ekhlas Uddin (works as Director, Alliance Hospital Limited, Mohammadpur, Dhaka), Mr. Motiur Rahman (works as Councilor cum Administrator, 50 Beds Sadar Hospital, Cox's Bazar), Engineer Sheikh Mofazzal Hossain Pial (works as Project Engineer, NABOLOK), Mr. Abdur Rouf Khan (works at Brac, Cox's Bazar), Mr. Syed Tanveer Mahmood Akash (works at American Red Cross, Dhaka), and others for their cordial support.

I express my sincere gratitude to Late Mr. Mohammad Zamir Uddin, Mr. Morshed Siddiqui, Mr. Nasir Uddin, Mr. Ziaul Hoque, Mr. Md. Rezaul Islam, Mr. Paritosh Chakrabartty, Mr. Rupom Barua, Dr. Mamun Rashid, Mr. Amir Khasru Parvez, Mr. Ashim Barua, Mr. Shawkat Osman, Mr. Nazrul Islam Chowdhury, Mr. Liakat Ali, Mr. Reaz Hossain, Mr. Md. Iqram Uddin Al Arman, Mr. Tabarek Hossain, Mr. Abdullah Al Adnan, Mr. Minhazur Rahman Rezvi, Mr. ASM Golam Faisal or so on from the CODEC.

I owe all officers and staff for administrative support in the Department of Zoology and Register Office, University of Dhaka.

I would also like to thank all my friends who always encouraged me to complete this research work.

Lastly, I express my gratitude to my wife, Ms. Nity Rani Daby, and my daughter, Mrittika Devi (Mati), for their sacrifice and all sorts of support that I needed during this strenuous time.

Shital Kumar Nath
November 2023

ACRONYMS AND ABBREVIATIONS

ACF	Action Against Hunger / Action Contre La Faim
ACF	Assistant Conservator of Forest
ACLAB	Alliance for Co-operation & Legal Aid in Bangladesh
ADC Facilitator	Adolescent Club Facilitator
AF	Arannayk Foundation
AIDS	Acquired Immuno Deficiency Syndrome
AMAN	Association for Muslim Advancement Network
AOSED	An Organization for Socio-Economic Development
APAB	Alacrity for Poverty Alleviation in Bangladesh
APBN	Armed Police Battalion
ARIs	Acute respiratory infections
ARO	Advance Reverse Osmosis
ARSA	Arakan Rohingya Salvation Army
ART	Anti-Retroviral Therapy Centre
ASD	Action for Social Development
ASEAB	Association for Socio-Economic Advancements of Bangladesh
ASK	Ain O Salish Kendra
BAPA	Bangladesh Poribesh Andolon
BASD	Bangladesh Association for Sustainable Development
BBS	Bangladesh Bureau of Statistics
BCM	Bengal Creative Media
BDRCS	Bangladesh Red Crescent Society
BDT	Bangladesh Taka
BEZA	Bangladesh Economic Zones Authority
BFD	Bangladesh Forest Department

BFRI	Bangladesh Forest Research Institute
BFSCD	Bangladesh Fire Service and Civil Defene
BGB	Border Guards Bangladesh
BGS	Bangla- German Sampreeti
BITA	Bangladesh Institute of Theatre Arts
BLAST	Bangladesh Legal Aid & Services Trust
BLI	Burmese Language Instructor
BM	Bangladesh Military
BNFI	Bangladesh National Forest Inventory
BNM	Bangladesh Nezzarine Mission
BNNRC	Bangladesh NGOs Network for Radio and Communication
BNS	Balukhali Nabarun Sangstha
BNWLA	Bangladesh National Woman Lawyers' Association
BO	Beat Officer
BP	Bangladesh Police
BPRM	Bureau of Population, Refugees, and Migration
Brac	Building Resources Across Communities
BRIT	Bangladesh Resource Improvement Trust
BTF	Bamboo Treatment Facility
BTP	Bamboo Treatment Program
CART	Classification and Regression Trees
CBO	Community-Based Organization
CCCI	Cox's Bazar Chamber of Commerce & Industry
CCDB	Christian Commission for Development in Bangladesh
CCF	Chief Conservator of Forest
CDC	Centers for Disease Control and Prevention
CDD	Center for Disability in Development

CF	Conservator of Forest
CHRDF	Cox's Bazar Human Resource Development Foundation
CHT	Chittagong Hill Tract
CiC	Camp In-Charge
CIS	Community Initiative Society
CITES	Convention on International Trade in Endangered Species
CMC	Co-Management Council or Co-Management Committee
CMGC	Co-Management General Committee
CMO	Community Managed Organization
CNRS	Centre for Natural Resource Studies
CODEC	Community Development Centre
COR	Compound Offence Report
CPG	Community Patrol Group
CPI	Community Partners International
CRD	Centre for Rights and Development
CRDS	Centre for Research and Development Studies
CRP	Centre for the Rehabilitation of the Paralysed
CTA	Community Technology Access
CZM	Center for Zakat Management
DAE	Department of Agricultural Extension
DAM	Dhaka Ahsania Mission
DCA	DanChurchAid
DDA	Daily Distribution Assistant
df	Degrees of Freedom
DFO	Divisional Forest Officer
DoE	Department of Environment
DRC	Danish Refugee Camp

DRC	Danish Refugee Council
DSK	Dushtha Shasthya Kendra
ECA	Environment Conservation Act or Ecologically Critical Area
ECHO	European Commission
EDAS	Education Development and Service
educo	Education and Development Foundation
EETWG	Energy & Environment Technical Working Group
ERT	Elephant Response Team
ESDO	Eco-Social development Organisation
EWARS	Early Warning, Alert and Response System
FAO	Food and Agriculture Organization of the United Nations
FDMN	Forcibly Displaced Myanmar National
FENTC	Forestry Extension and Nursery Training Centre
FGRs	Forest genetic resources
FHA	Food for the Hungry Association
FIDB	Festival International de la Bande Dessinée
FIVDB	Friends In Village Development Bangladesh
FRC	Free Residual Chlorine
GDP	Gross Domestic Product
GFA	General Food Assistance
GK	Gonoshasthaya Kendra
GMT	Greenwich Mean Time
GoB	Government of Bangladesh
GREEN LIFE	Greening Environment through Livelihood Improvement and Forest Enrichment (GREEN LIFE) Project
GUK	Gana Unnayan Kendra
ha	Hectare

HAEFA	Health and Education For All
HBC Group	Humanitarian Benchmark Consulting Group
HCV	Hepatitis C Virus
HE	High Exposure
HEED Bangladesh	Health Education and Economic Development Bangladesh
HH	Households
HIV	Human Immunodeficiency Virus
HNP	Himchari National Park
HRF	Human Relief Foundation
HTC	HIV Testing Centre
HYSAWA	Hygiene, Sanitation & Water Supply
ICRC	International Committee of the Red Cross
IDA	International Development Association
ideSHi	Institute for Developing Science and Health Initiatives
IFESCU	Institute of Forestry and Environmental Sciences, Chittagong University
INGO	International Non-Government Organization
IOM	International Organization for Migration
IRC	International Rescue Committee
IRG	International Resources Group
IRO	International Refugee Organization
ISCG	Inter Sector Coordination Group
ISDE Bangladesh	Integrated Social Development Effort Bangladesh
IUCN	International Union for Conservation of Nature
IUFRO	International Union of Forest Research Organizations
IUSS	International Union Soil Science / Immediate-Use Steam Sterilization
JCF	Jagorani Chakra Foundation
JRP	Joint Response Plan

KII	Key Informant Interview
KPRC	Kutupalong Rohingya Camp
KTP RC	Kutupalong Registered Camp
KTP TC	Kutupalong Transit Camp
LE	Low Exposure
LFPR	Labour force participation rate
LFS	Labor Force Survey
LPG	Liquefied Petroleum Gas
LST	Land Surface Temperature
Max Entropy	Maximum Entropy
MoEFCC	Ministry of Environment, Forest and Forest and Climate Change
MoHA	Ministry of Home Affairs
M.Phil.	Master of Philosophy
MPWC	Multi-Purpose Women's Center
MRC	Master Registration Card
MSF	Medecins Sans Frontieres
NAF	Nomijan-Aftabi Foundation
Nature and Life	Nature conservation through livelihoods improvements (Nature and Life) project – Teknaf, Cox's Bazar, Bangladesh
NCA	Norwegian Church Aid
NFI	Non-food Item
NGO	Non-Government Organization
NGOAB	Non-Governmental Organization Affairs Bureau
NGOF	NGO Forum
NID	National Identity Card
NP	National Park
NPRC	Noyapara Rohingya Camp

NRC	Norwegian Refugee Council
NSP	Nishorgo Support Project
NTFPs	Non-Timber Forest Products
NUSRA	Network For Universal Services And Rural Advancement
NYP RC	Nayapara Registered Camp
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
OIC	Organization of the Islamic Cooperation
OKUP	Ovibashi Karmi Unnayan Programme
OPCA	Organization for the poor Community Advancement
PA	Protected Area
PARC	Prostitutes And Rootless Children
PDB	Power Development Board
PDC	Para Development Committee
PDF	Peoples' Defence Force
PF	Peoples' Forum
Ph.D.	Doctor of Philosophy
PLHIV	People who lived with HIV
POR	Prosecution Offence Report
POS	Point of Sale Terminal
PSEA	Protection from sexual exploitation and abuse
PSI	Pound Square Inch
PSTC	Population Services And Training Center
PTI	Press Trust of India
PUI	Premiere Urgence Internationale
PWD	Public Works Department
RDRS	Rangpur Dinajpur Rural Services
REB	Rural Electrification Board

Retd.	Retired
RF	Reserve Forest
RIB	Research Initiatives Bangladesh
RIC	Resource Integration Centre
RMP	Rural Medical Practitioner
RO	Range Officer, Reverse Osmosis
RPN	Reaching People in Need
RRRC	Refugee, Relief and Repatriation Commissioner
RTM International	Research, Training and Management International
SAFE	Safe Access to Fuel and Energy
SARPV	Social Assistance and Rehabilitation for the Physically Vulnerable
SAWAB	Social Agency for Welfare And Advancement in Bangladesh
SBSKS	Sahra Bohumokhi Samaz Kallan Samity
SDC	Swiss Agency for Development and Cooperation
SDI	Self Development Initiative
SDP	Skilled Development Program
SEG	Strategic Executive Group
SERAA	Socio-Economic and Rural Advancement Association
SGBV	Sexual and Gender-Based Violence
SHED	Society for Health Extension and Development
SIM	Subscriber Identity Module or Subscriber Identification Module
SJINP	Sheikh Jamal Inani National Park
SKUS	Samaj Kalyan O Unnayan Sangstha
SMKK	Sheba Manab Kallyan Kendra
SN	Serial Number
SOP	Standared Operating Protocol
SPACE	Society for People’s Action in Change and Equity

SPM	Single Point Mooring
SRP	Self-Resilient Project
SSKUS	Safollomoy Samaj Kallyan Unnayan Sangstha
SSS	Society for Social Service
SSTS	Society for Social & Technological Support
STDs	Sexually Transmitted Diseases
SUFAL	Sustainable Forests and Livelihoods (SUFAL) Project
SURA	Society for Urban & Rural Advancement
SVM	Support Vector Machine
SWADESH	Social Work for Awareness Development Environment and Social Health
TAI	Technical Assistance Incorporation
TB	Tuberculosis (TB) Bacterial infection
TDH	Terre des hommes
TDK	Tie-down kits
TGR	Teknaf Game Reserve
TIKA	Turkish Cooperation and Coordination Agency
TWS	Teknaf Wildlife Sanctuary
UDOR	Undetected Offence Report
UN	The United Nations
UNDP	United Nations Development Programme
UNHCR	United Nations High Commissioner for Refugees
UN WOMEN	United Nations Entity for Gender Equity and the Empowerment of Women
UNO	Upazila Nirbahi Officer
UNWFP	United Nations World Food Programme
UP	Union Parishad
UPPO	Underprivileged People's Development Organization

Upz	Upazila
UTSA	Unite Theatre for Social Action
VCF	Village Conservation Forum
VERC	Village Education Resource Center
VSO	Voluntary Services Overseas
WCCU	Wildlife Crime Control Unit
WCS	Wildlife Conservation Society
WDDF	Women with Disabilities Development Foundation
WFS	Women-Friendly Space
WHO	World Health Organization
WS	Wildlife Sanctuary
YPSA	Young Power in Social Action

GLOSSARY

Bamar	The Bamar or Burman are a Southeast Asian Sino-Tibetan ethnic group native to Myanmar (formerly Burma). The Bamar live primarily in the Irrawaddy River basin and speak the Burmese language, which is the sole official language of Myanmar at a national level. Bamar customs and identity are closely intertwined with the broader Burmese culture.
Bondhu Chula	Literally "friendly stove". A cooking stove made of concrete and cement by IDCOL and distributed among the UMNs and host communities. In other words, it is known as ICS (Improved Cooking Stoves).
Borkha	Borkha means veil in English. A burqa or a burkha, also known as a "chadaree" in Afghanistan or a "paranja" in Central Asia, is an enveloping outer garment coverings the body and face worn by women in some Islamic traditions. The Arab version of the burqa is called the "boshiya" and is usually black.
Chittagonian Language	The local dialect / language spoken by the people of coastal districts adjacent to the Bay of Bengal. It is estimated that 13 million Bangladeshi speak Chittagonian.
Displaced Households	The displaced households considered under this assessment are the overall Myanmar nationals who are registered and unregistered.
Fuelwood	Unprocessed wood, sticks or logs are used as a source of energy.
Gali	Slang word(s) of a language.
Harakah al-Yaqin	The Arakan Rohingya Salvation Army (ARSA), formerly known as Harakah al-Yaqin (lit. "faith movement" in English), is a Rohingya insurgent group active in northern Rakhine State, Myanmar.
Hasil	A charges buyers to pay for the purchase of products from local market / bazar / hut in the greater Chittagong region and many parts of Bangladesh.
Hijab	In modern usage, hijab refers to head coverings worn by some Muslim women. While such head coverings can come in many forms, hijab often specifically refers to a cloth wrapped around the head, neck and chest, covering the hair but leaving the face visible.

Host community	Local populations who are Bangladeshi citizens residing before and after the Rohingya influx are considered as host communities, especially in the areas of Teknaf and Ukhiya, where the assessment was conducted.
Iftar	During Ramadan, Muslims eat their evening meal after sunset. Muslims do not eat or drink during the day in the ninth month of the Muslim year.
Khas land	Khas land is government-owned fallow land where no property rights exist. Essentially, it refers to land that is deemed to be government property and is available for allocation based on government priorities. A "Khas Land" or "Land in Khas Possession" includes any land that is let out, together with any buildings that stand on it and their necessary adjuncts. [S. 2(15) of the State Acquisition and Tenancy Act, 1950 (E. B. Act XXII of 1951)]
Makeshift Settlement	Makeshift settlements are characterized as settlements where displaced people are forced to live in temporary construction shelters aside from the host community village.
Max Entropy	Max Entropy is a kind of supervised classification algorithm.
Mixed Settlement	Mixed settlements are settlements where the displaced people live in the same location along with the host community.
Para Teacher	A teacher whom the school management committee appoints, the school fund provides the monthly salary. He/she is not listed in the government's teacher lists.
Polythene	Polythene is a non-biodegradable, organic compound found in common products such as polythene bags, plastic furniture, and kitchen materials.
Ramadan	Ramadan is the ninth month of the Islamic calendar, observed by Muslims worldwide as a month of fasting (sawm), prayer, reflection, and community.
Rohingya Language	A specific type of language that has a mix of Rakhine and Chittagonian local dialects and is spoken by the Rohingya people.
Rohingya	Rohingya, a term commonly used to refer to a community of Muslims generally concentrated in Rakhine (Arakan) state in Myanmar (Burma), although they can also be found in other

	parts of the country as well as in refugee camps in neighbouring Bangladesh and other countries.
Satellite imagery	Very high-resolution imagery Satellite (usually optical) imagery with a resolution higher than 5m on the ground.
Tatmadaw	The Tatmadaw is the official name of the armed forces of Myanmar. The Ministry of Defence administers it and comprises the Army, the Navy and the Air Force. Auxiliary services include the Myanmar Police Force, the Border Guard Forces and the People's Militia Units.
Thana	Thana was a subdistrict in the administrative geography of Bangladesh. The Local Government Ordinance 1982 was amended a year later, redesigning and upgrading the existing thanas as upazilas. Later, in 1999, geographic regions under the administration of thanas were converted into upazilas.
Union Parishad	The Union Parishad is located under the sub-district. Usually, more than one Union Parishad is located under each sub-district.
Ward	Each Union Parishad is divided into nine wards. Under each ward, one or more villages are located. The displaced people in the makeshift settlement live in settlements next to the villages of the host community but under the same ward. In the mixed settlement, the displaced and host communities live in the same village under the same ward.
Wood fuel	Wood fuel is a fuel, such as firewood, charcoal, chips, sheets, pellets, and sawdust.

ABSTRACT

The impacts of the Rohingya influx in 2017 on wildlife and their habitats and the local society in Teknaf Peninsula of Cox's Bazar District in Bangladesh were studied from January 2019 to June 2022. The historical background of the Rohingya immigration from the Arakan State of Burma in the present land territory of Bangladesh (earlier British India, then East Pakistan) has been traced out from the literature that was first recorded in 1785 when 35,000 people took shelter in Chittagong Region. Four times immigration of Rohingya happened since the emergence of Bangladesh in 1971, and these occurred in 1978, 1990, 2012 and 2017, when 200,000, 250,000, 200,000, and 750,000 people became immigrants to Bangladesh, respectively and of which the last one is severely hampered forests, lands, biodiversity, and social culture of the area.

This study covered Teknaf and Ukhiya Upazilas, including two protected areas (TWS- Teknaf Wildlife Sanctuary and SJINP- Sheikh Jamal Inani National Park) of the Upazilas in Cox's Bazar District, Bangladesh, as the Rohingya influx highly impacts these areas.

Up to December 2022, a total of 952,309 Rohingya refugees, consisting of 48% males and 52% females, are living in 197,156 households in 33 camps, including 28,951 people from 7,322 households who have recently been shifted to Bashanchar, Hatia, Noakhali. Most of these camps are fully or partially located in the gazette reserve forests and protected forests of Cox's Bazar South Forest Division. According to the present growth rate, the size of Rohingya populaiton will be 1.5 times larger than that of Teknaf, and Ukhiya upazila in 2023, and in 2040 it will 3 times larger.

Rohingya refugees have occupied about 2,494.48 ha (6,164 acres) of land, including 1,674.18 ha (4,137 acres) of natural (reserved and protected) forests and 820.28 ha (2,027 acres) of planted forests of Cox's Bazar South Forest Division. However, the government of Bangladesh allocated 3,237.49 ha (8,000 acres) of land, including the said forested areas in Teknaf and Ukhiya Upazilas, for the Rohingya.

The study area is also an essential habitat for the Critically Endangered flagship species, the Asian Elephants (*Elephas maximus*). The Teknaf Peninsula is rich with flora and fauna because of its location and physical environment, as it supports subtropical rainforests and mangrove patches along brackish water rivers and the sea (the Bay of Bengal). Similarly, the SJINP is rich with flora and fauna because of its location and physical environment, as it supports

subtropical rainforests and the sea (the Bay of Bengal). Rohingya refugees have severely affected these protected areas (TWS and SJINP) since 1978, mostly in 2017.

The questionnaire surveys were done in Rohingya camps (Rohingya general people, Rohingya KII (Key Informant Interview), and local people of the adjacent areas (local general people, local KII (Key Informant Interview). The total respondents were 814, of which 230 (28%) were from Rohingyas, including 23 KII, and 584 (72%) people from locals, including 179 KII. Wildlife, particularly mammals, birds, reptiles, and amphibians, were observed in the TWS and SJINP through field observations and trail surveys. Indicator bird species were surveyed in 6 trails (2 at SJINP and 4 at TWS) for 4 times each year from 2019 to 2022, with other birds and animals also recorded.

The impact of the Rohingya influx on wildlife and their habitats were assessed by interviewing both stakeholders (local and Rohingya). Rohingya who have been staying in Bangladesh since 1990 saw the number of wildlife species, and those who are staying after the influx of 2017 were analyzed. Similarly, the locals also provided similar information before and after the Rohingya influx. The local respondents saw 440 species of wildlife species during their lifetime; of these species, 337 (76.59%) were observed by Rohingyas who came to Bangladesh after 1990, while 241 (54.77%) were witnessed by Rohingyas who arrived during and after 2017, whereas 332 (75.45%) were observed during this study period.

The presence of 16 indicatory bird species is considered for the richness of the forest health of Bangladesh, but not all these species are found in any protected area. So, depending on the forest structure, the number of bird species from those 16 species has been selected as the richness of forest health for a particular forest, especially the protected areas. In this consideration, TWS got 10 species, and SJINP 11 got species for the richness of forest health, and these two protected areas complete the criteria. In the case of TWS, the findings indicate a noteworthy decrease in the density of indicator birds across all three strata in recent years, suggesting a gradual decline in forest conditions. Moreover, the percentage of decline for all three strata has witnessed a further increase in the recent four years (2019 - 2022), which points to a severe deterioration of forest habitats in the TWS. Notably, the upper strata birds have experienced the most significant decline in density during the last four years, indicating the continued depletion of large trees. In the case of SJINP, the density of these bird species in the mid-and-upper strata has exhibited a persistent decline, which suggests a loss of habitats, including medium and large trees. This decline further highlights the deterioration of forest

conditions. However, a positive trend has been observed in the density of birds in the lower stratum, which has experienced a substantial increase. This increase may be attributed to the regeneration of bushy areas through restoration efforts and effective management plans.

According to the perception of general host communities on nature and environmental impact of Rohingya influx, 95.81% stated that caused by deforestation, 86.45% said groundwater depletion, 55.17% opined water crisis, 54.93% agreed on poor solid waste management, 54.87% thought disturbance of the ecosystem, 46.55% agreed on the impact on the environment, 38.18% told habitat loss of wildlife, 35.47% believed water pollution, 34.73% said hill cutting, 28.82% opined increasing of temperature, 24.63% thought drinking water scarcity, 21.43% agreed on flash flood and water-logging, and 8.37% expressed elephant corridor has been blocked.

From the point of view of general host respondents for the mitigation measures of nature and environment of the Rohingya influx, 97.29% suggested repatriation, 50.49% recommended reforestation, and 22.66% talked about integrated management of the camp area, 14.29% also recommended solving the water crisis, 14.04% suggested ensuring drinking water, preservation of natural water and the creation of water reservoirs, 7.64% advocated preserving natural and rain water by creating water reservoirs, 7.14% proposed waste management, 6.65% suggested to establish deep tube well, 5.42% of respondents recommended arranging an awareness program for local people to conserve wildlife and 2.71% suggested improving the drainage system.

Nearly cent percent (96.52%) of Rohingyas said they have no conflict with the locals; on the other hand, nearly fifty percent (47.09%) of locals have disputed with Rohingyas. Drug smuggling by Rohingya remains the same (95.65%) since the influx in 2017, whereas the locals (82.53%) opined that it is increasing day by day and influencing drug and smuggling to locals-said by 52.4% of respondents and 12.67% opined that the rape incidents has increased. More than half (51.37%) of locals believe that criminal activities are decreasing among Rohingya children day by day due to their engagement in education and social awareness activities done by different sectors, although Rohingya (97.83%) have denied such drug and smuggling activities done by their children. Rohingya (97.39%) respondents said there is no land conflict between them and the locals, but the locals (33.73%) opined the opposite.

This study finds causes of social anarchy according to the general host respondents. More than one-third of the local people (35.96%) believed that drug availability induced by Rohingya people is the cause of social anarchy. According to general host respondents, the other causes of social anarchy are common gathering space (29.56%), Rohingya peoples' involvement in crime and unethical works (17.24%), available low-cost Rohingya labours (8.87%), high commodity price (7.88%), eve teasing (6.90%), unethical mixing of males and females (6.65%), difficulties to manage government certification (5.67%), narrow movement routes (5.42%), need to show NID card for movement (5.42%), loses of farming scopes at government land (5.17%), local young marry Rohingya boys and girls (4.93%), lost social forestry (2.96%), some Rohingya females are prostitute (2.46%), some local practice polygamy specifically to marry Rohingya females (1.97%), quarrelsome habitat of Rohingya people (1.72%), poor waste management in and around the Rohingya camp (1.48%), face problem in agriculture (1.23%), and lost the control over the *Khas* / BFD land (0.74%) by the Rohingya influx in 2017.

According to the general host community respondents, the solution to the social anarchies are repatriation (74.88%), surveillance of the law enforcement agencies (45.32%), actions of concerned authorities (36.95%), ensuring jobs for the local worker (32.76%), mass awareness on different issues (as drug use, polygamy, unethical activities, and not to mix with Rohingya (28.33%), AIGA for local poor people (3.45%) and ensure strong fencing around the Rohingya camps and control their movement (2.46%).

Two police stations reported that the registered criminal cases before the Rohingya influx were 1,130 in 2015 and 1,060 in 2016, whereas these were, respectively, 1,386, 1,163, 1,766, 1,752, 2,316 and 2,048 in 2017, 2018, 2019, 2020, 2021 and 2022- indicating the increasing trends of criminal activities after the influx.

Cox's Bazar refugee camps have an average population density of 15 m^2/person. It denotes that Rohingya people are already overcrowded by international standards of 30–45 m^2/person. This also resulted in insufficient space for the mandatory infrastructure, such as water and waste treatment facilities. So, a shortage of standard living space is the leading cause of transmitting diseases, mainly in the Rohingya community and hosts living within the camp areas.

Although the majority of the Rohingya respondents (74.88%) deny the fact of increasing disease transmissions, the majority of general locals (55.06%) and KII locals (58.27%) agree with the transmissions. According to Cox's Bazar 250 General Hospital, the number of HIV

patients in the Rohingya refugees was only 01 in 2015 and 10 in 2016 compared to 13 and 10 locals, which has increased to 175 in 2021 in the Rohingya community compared to 14 locals. The total number of HIV-positive patients currently under treatment in the same hospital is 1,004, of which 806 (80.28%) are Rohingyas and the rest 198 (19.72%) are locals.

Cultural adulteration is occurring due to co-existence, as said by Rohingya (54.78%) the locals (62.5%), using some dresses like '*Hijjab'* instead of *'Borkha'* by the females and trousers instead of tucked '*Lungi'* by the males. Rohingyas have induced some abusive words ('*Gali'*) to the local children, and teenagers show aggressiveness without respecting elders. The tendency towards polygamy, child marriage, the divorce rate, etc., have increased among the locals after the influx.

The overall education receiving rate of the locals decreased by about 15.7% after the Rohingya influx in 2017; 79.3% of the respondents opined that the higher education (HSC and above) rate is decreasing. After completing SSC, HSC, and degrees, people get jobs in NGOs and other minor works for livelihood, mentioned as a reason.

The coexistence of the Rohingya and the host communities leads to several mental health problems. A major portion (98.7%) of the host community faces much mental stress due to the coexistence, whereas only 26.09% of the Rohingya community faces this mental stress.

Besides the regular food support from the WFP (World Food Programme), about 258 UN Organizations, GoB, INGOs, and NGOs are working on the Rohingya and host issues. Some recommendations have been suggested to overcome the problems holistically. Further future research in this respect is needed to dig into the impact and mitigation measures of the Rohingya crisis on every component of the Environment.

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CHAPTER 1: INTRODUCTION

1.1 Background

Rohingyas are the persecuted Muslim minority in the northern Rakhine State of Myanmar (Lee 2014). The Rohingya crisis in Myanmar dates back to 1942 (Human Rights Watch 2000), resulting in the Rohingya influx in its neighbouring countries, including British India, later East Pakistan (now Bangladesh since 1971), and India. Being denied citizenship and under ethnic cleansing (including the burning of the house, mass murder and rape), Rohingya people entered Bangladesh at different times starting in 1978 and became a refuge in different locations of its Cox's Bazar District (Frontieres-Holland 2002). The significant Rohingya influx (618,000 Rohingya) in Bangladesh has been recorded between 25 August 2017 and 21 November 2017 (IOM 2017). Recent studies, up to December 2022, showed a total of 952,309 Rohingya people, consisting of 48% male and 52% female, are now living in 197,156 households in 33 camps including 28,951 people from 7,322 households in Bashanchar (UNHCR 2023a), earlier they lived in 48 temporary camps which are located either within the reserve forests or in proximity to forested lands (UNDP and UN WOMEN 2018). Bangladesh currently hosts 4.7% of the world's total refugee population (Ullah et al. 2021). However, the size of Rohingya populaiton was already larger than that of Teknaf, and Ukhiya Upazilas (Joint GoB - UNHCR 2022b).

The government of Bangladesh declared Cox's Bazar–Teknaf peninsula as an ecologically critical area (ECA) (DoE 2015), considering its importance and existing critical situation. The recent Rohingya influx poses a significant threat to the ECA and its associated environment (Hassan et al. 2018, Rahman 2018). The scarce remnant natural resources (i.e., lands, forests, other natural resources, etc.) and the existing physical infrastructure in the south of the Cox's Bazar south district of Bangladesh are under tremendous pressure (Rahman 2010, UNDP and UN WOMEN 2018). Several studies (e.g., Mahmud 2017, Imtiaz 2018, Hassan et al. 2018, Ahmed et al. 2019, Rashid et al. 2021) showed a drastic decline in forest cover in and around the refugee camp areas based on the analysis of satellite images. Ahmed et al. (2019) reported that about 4,000 ha of forest land was razed due to the recent influx of Rohingya in late 2017. The critical situation that arose due to the Rohingya influx also has implications for local and regional security (Bashar 2018, Rahman 2010). For establishing many Rohingya refugee settlements, 2,494.49 ha (6,164.02 acres) of land (ha) had been destroyed. These lands included 820.59 ha (2,027.50 acres) of social forestry and 1,673.99 ha (4,136.52 acres) of natural forests

and other biodiversity-related forestry resources. The combined loss of forestry resources, as well as biodiversity, is Bangladesh Taka / currency (BDT) 18,655,657,835.79 (US$ 192,326,369.4, 1 US$ = BDT 97) (Cox's Bazar South Forest Division 2022a). Polythene sheets, synthetic ropes, and nails are commonly used to construct emergency refugee camps. Several other elements, such as plastic and polythene bags used to package relief items, plastic bottles, used torch batteries, and so on, contribute to soil pollution in these areas.

Previous studies prove that very high population density usually severely impacts the surrounding environment, such as deforestation, land degradation, water supply disruption, sewage management, etc., directly and indirectly affecting the host community (Black 1994). The sudden and massive influx initiated a competition between the host community and newly settled refugees over natural resources collection, rapidly leading to forest cover loss (Chambers 1986). This eventually reduces the ecosystem's ability to function appropriately, accelerating climate change in that region over time (Malhi et al. 2002).

The Bangladeshi people living in Teknaf and Ukhiya Upazilas of Cox's Bazar District are poor. A recent study shows that approximately 38% of the population lives below the poverty line (Moslehuddin et al. 2018). These areas' people primarily depend on forest and forest resources for their lives and livelihoods. The Teknaf landscape area has been experiencing a loss of vegetation cover since the 1980s due to the Rohingyas' fuelwood collection and forest encroachment activities. This trend has continued as the families have few livelihood options (Tani and Rahman 2018). Having no alternatives except relief from different agencies, the Rohingyas are also virtually dependent on forest resources like fuelwood, valuable timber-yielding trees, sun grass, etc. (Uddin and Khan 2007). Consequently, land cover fragmentation becomes widespread (UNDP and UN WOMEN 2018), causing deterioration of ecosystem functions and services, such as depletion of biomass stock (IOM and FAO 2017) due to this influx. Thus, both local people and Rohingya refugees have been creating excessive pressure on forest resources as well as the whole environment of the Teknaf Peninsula.

1.2 Rationale of the Study

The Rohingya camps have been built in the reserve forests or protected areas (PAs) (Khan et al. 2012). Two PAs (Teknaf Wildlife Sanctuary and Inani Sheikh Jamal National Park) and the adjacent Ukhiya reserve forest are in vulnerable condition due to the excessive pressure by the Rohingya refugees. A considerable number of refugees are creating many social as well as environmental problems (Labib et al. 2018, Mukul et al. 2019). Asian elephant (*Elephas*

maximus) is considered a flagship species for the evergreen and semi-evergreen forests of Bangladesh (Kamruzzaman 2008), and it is one of the Critically Endangered species of the country (Khan 2015). The natural forests of the Ukhiya and Teknaf areas are suitable habitats for Asian elephants. Maintaining a safe route and corridor for elephants is becoming a big challenge for the Bangladesh Forest Department (BFD) due to the severe fragmentation of the habitats attributed to biotic interference. Teknaf and Ukhiya Upazilas have two important corridors for elephants (IUCN Bangladesh 2016). However, Rohingya camps have already occupied these corridors, resulting in frequent human-elephant conflicts in the two upazilas. Rahman (2019) reported that 13 refugees were killed, and nearly 50 people were injured inside the camp areas due to human-elephant conflicts. In addition, the natural forests of Ukhiya and Teknaf support diverse wild fauna (Hasan and Feeroz 2014, Ahsan and Haidar 2017, Haidar and Ahsan 2018). Massive deforestation for the settlement of the Rohingya people is very likely to accelerate the disappearance of different wildlife from these areas.

The consequences of the massive Rohingya influx to the natural resources of the study site, especially wildlife diversity, ecology and biology of the species that have conservation importance, have not yet been addressed in any study so far. Thus, there is a research gap that needs to be explored. This study will help to unveil the potential threats and impacts to the wildlife population, biology, movement, forest habitats, environment, and human society attributed to the Rohingya influx. This study will also help to understand the impact of the Rohingya influx from a socio-economic perspective, along with how the demography of the local area will change if the situation contiue as it now. It will also help the policymakers understand the overall condition of the wildlife and undertake measures to conserve and sustainably manage the biodiversity, especially the wildlife of the study area.

1.3 Hypothesis of the Study / Research Question

The Rohingya influx impacts wildlife and their habitats, including other natural resources and overall, on the environment, local society and culture.

1.4 Objectives of the Study

The specific objectives of this study were to:

1) collect the baseline data on ecologically important wildlife species in the Rohingya influx areas;
2) demographical status of the Rohingya and local communities;

3) identify how factors such as the Rohingya refugee influx have impacted wildlife population, species diversity, breeding biology, etc., of ecologically important species along with the forest resources in the Teknaf Peninsula; and

4) identify the social impacts of Rohingya refugees' influx on the ecosystems.

CHAPTER 2: LITERATURE REVIEW

2.1 The brief history of Rohingya

The Rohingya ethnic people are historically concentrated in Arakan, an old coastal territory in Southeast Asia. The original settlers of Arakan couldn't be traced clearly. Arakan was the centre of maritime trade between Burma and other parts of the world. Later, it also became a cultural exchange centre because of the arrival and settlements of merchants from different countries through its coastline with the Bay of Bengal (British Academy 2003). The Rohingya ethnic group traces its history to the period of Arab merchants coming in contact with Arakan. Historians and scholars have different opinions about the time of Arab merchants' first arrival in Arakan (Islam 2009).

The term Rohingya was documented before the period of the British Raj. Buchanan (1799) wrote "Mohammedans" as a native group of Arakan who called themselves "Roohinga", or natives of Arakan. However, "Rooinga" was identified as one of the languages spoken in the "Burmah Empire" by the Classical Journal of 1811. Johann Severin Vater listed "Ruinga" as an ethnic group in a compendium of languages in 1815 and published it in German (Ibrahim 2016). Ware and Laoutides (2018) suggested that a pre-Arakan population that existed for three thousand years are the ancestors of Rohingya, and the waves of migrated Muslims who intermingled with those pre-Arakan populations resulted in the modern Rohingya. The population and race of Rohingya were at the pace of growth during the Mughal period.

2.2 The Rohingya crisis

The history of the Rohingya crisis dates back to the Burmese conquest of Arakan in 1785, when about 35,000 people from the Rakhine state fled to the neighbouring Chittagong region and thousands faced execution by the Bamar (Chan 2005). This left Arakan a scarcely populated area. The migration of people to Arakan was encouraged by the British after they occupied Burma. Due to the higher migration rate of people from then-British India, the population, especially the Indian Muslims, rose sharply in different cities of Burma. This led to the rise of grass-root Burmese nationalism and riots against Indian Muslims in 1938 (Christie 1998). During the British regime, Arakan State (where Rohingya people live) was included in the Bengali administration, indicating the migration of many Bengalis to Arakan and many Arakanese to Chittagong, a Division of Bangladesh (Rahman 2015).

In 1942, Rohingya people were not recognised as Myanmar citizens (the new name of Burma) because they could not provide documents that their progenitors settled in Burma before 1923 (Mahmood et al. 2017). During World War II, the Rohingya sided with British forces, whereas the other Arakanese, including Buddhists, were with the Imperial Japanese Army, which invaded British-controlled Burma (Slim 2009, Habib et al. 2018). It triggered severe inter-communal violence between Rohingya Muslims and Rakhine Buddhists in different parts of Burma, especially Arakan (Christie 1998, Rahman 2015). During the Pakistan movement, the Rohingyas were apprehensive of a future government dominated by Buddhists in Burma. They organized a separatist movement to merge with the then East Pakistan (Yegar 2002). The Rohingyas also expected the British to help them form a Muslim National Area in Maungdaw. However, their movements never materialized (Yegar 1972).

After the independence of Burma, the then Prime Minister U Nu, while addressing the nation in 1954, mentioned the loyalty of Rohingya Muslims to Buddhist Burma. His administration recognized the Muslims living inside the border of Burma as Rohingya ethnic (Salim 2019). However, in 1962, after Burma's military junta took control over the country, the Rohingya were systematically deprived of their political rights and faced several large-scale violent attacks (Salim 2019). The "Operation King Dragon," led by the Burmese junta in 1978, resulted in an estimated 200,000 Rohingyas taking refuge in Cox's Bazar of Bangladesh. However, most of those were later repatriated to Burma under a repatriation agreement, and some merged with Bangladeshi people.

The citizenship law, enacted in 1982, made the Rohingyas stateless by not recognizing them as a national race of Burma and considering them aliens in the country. The law divided citizens into four groups where Rohingya failed to qualify for citizenship according to the criteria (Motaher 2019). In brief, The Pink is for those who are full citizens, the Blue is for those who are associate citizens, the Green is for those who are naturalized citizens, and the White is for foreigners. However, Rohingyas were not considered under any of these groups (Kader and Choudhury 2019). Later, it appeared that the law indirectly justified all forms of execution, violence, restrictions, and crimes against this ethnic group (Salim 2019).

In 1990, Arakan Province was renamed Rakhine State, showing a bias toward the Rakhine community. The Burmese military intensified the operations from 1990 to 1992 against the Rohingyas that including forced labour, rape, confiscating properties, banning religious activities, destructing mosques, and harassing religious priests in Northern Arakan following

the 1990 election (DeRouen and Heo 2007). This state-led systematic operation resulted in an estimated 250,000 refugees entering Bangladesh during that period; most of those were later repatriated in 2000 under a negotiated repatriation agreement (Thompson 2005), and the rest are still in Bangladesh.

In 2012, the riots in the Rakhine state between Rohingyas and Rakhines caused considerable losses to both communities, including the displacement of 200,000 Rohingya people to Bangladesh (Zarni and Cowley 2014). In the same year, the Rohingya minority group was not included in the census of the Burmese Government; instead, they have been classified as stateless Muslims from Bangladesh since 1982. The persecution of Rohingya communities led by the Burmese government and Rakhine communities continued and intensified the never-ending Rohingya crisis, resulting in a severe challenge for Bangladesh.

2.3 The significant influx of Rohingya in Bangladesh

Currently, the total population of 54 million in Myanmar consists of 135 ethnic groups (Myanmar Population Live 2020), among which almost 88% represent the Buddhist community (Mustary 2020). During the end of the Cold War, forced migration was raised significantly, which affected social metamorphosis and political interpretation (Castles 2003). Now, Bangladesh is one of the significant countries experiencing those phenomena as well; due to the massive influx of forced Rohingya refugees from Myanmar since 1978 when General Ne Win introduced ‘Operation Dragon’ (Zarni and Cowley 2014) against the Rohingya people, most of them are Muslim minorities where the rests are Hindus and Christians (Gabaudan and Teff 2014). This persecution continued over decades, for instance, 1990, 1991-92, 2012, 2015, and 2016 (Martin 2017), which was conducted by the Tatmadaw, Myanmar Military, and the massive exodus happened on the 26th of August 2017 (Yasmin and Akter 2019). The major influxes of Rohingya people to flee the systematic operations led by Myanmar's governments are shown in Table 2.1.

Table 0.1: Major Rohingya influxes into Bangladesh due to persecution in Myanmar at different times*

Serial No.	The volume of influx (Approx. no. of people)	Year	Major reasons for the influx
1	200,000	1978	Military government's "Operation King Dragon".
2	250,000	1990	State-run systematic operation after the 8888 uprisings for democracy and the 1990 election.
3	200,000	2012	The communal riots in Rakhine state between Rohingya and Government-backed Rakhine Buddhists.
5	740,000	2017	Alleged "ethnic cleansing" and "genocide" by the Myanmar government after the militant attack on military outposts by Arakan Rohingya Salvation Army.

* Source: Martin 2017

The military crackdown after the militant attacks of the Arakan Rohingya Salvation Army (ARSA) on border outposts caused significant loss of lives and properties of civilians. The crackdown, allegedly ethnic cleansing or genocide, targeted the Rohingya communities, resulting in the massive influx of about 740,000 new Rohingya refugees into several upazilas of Cox's Bazar and Bandarban Districts of Bangladesh. This massive influx that largely took place between late 2016 and the 21st of November 2017 (Tallis et al. 2019a) imposed considerable losses to the forests, wildlife, environment, local culture and socio-economics condition of host communities. The Rohingya issues also shape diplomatic negotiations, international politics, and domestic political situations (Kader and Choudhury 2019). The Bangladesh Government refers to the Rohingya as "Forcibly Displaced Myanmar National (FDMN)", while the UN system refers to them as Rohingya refugees (Mustary 2020).

Presently, about 833,584 Rohingya refugees are housed in the makeshifts of 34 camps (including the extensions) located in the Ukhiya and Teknaf Upazilas of Cox's Bazar District (Ullah et al. 2021, MoEFCC et al. 2018). Some of the Rohingya camps are located in and around the protected areas of Teknaf Wildlife Sanctuary (TWS), Sheikh Jamal Inani National Park (SJINP) and the Himchari National Park (HNP).

2.4 Response of Bangladesh and international communities to Rohingya refugees

The immediate response supported the host communities from the Government of Bangladesh (GoB) to the force that displaced Rohingya refugees was lauded by international communities across the world. In addition to the local and national measures, the massive influx seized global attention. The international organizations responded with a Level 3 emergency response to mobilise the logistics and resources for humanitarian support to the refugees (Bowden 2018). With the soaring demands for resources to support the refugees, the government of Bangladesh formed a joint response force involving the international communities, including UNHCR, IOM, WHO, and other national and international organizations. The Refugee, Relief and Repatriation Commissioner (RRRC), from the GoB was mandated to coordinate with relevant national and international organizations. Besides, a strategic executive group (SEG) was formed by international organizations, which representatives from the UN, UNHCR, and IOM co-chaired. The RRRC and SEG along with other organizations, developed a joint response plan (JRP) (ISCG 2019b). There are 117 partners, including 61 national NGOs, 48 international NGOs, and 8 UN agencies through which JRP implements the supporting activities for the Rohingya refugees (ISCG 2020a). Through JRP, the refugees receive food assistance and basic living support, including medical treatment, education, and clothing (ISCG 2020b).

2.5 Forests and Biodiversity of Teknaf and Ukhiya

The forest lands of Teknaf and Ukhiya Upazilas are characterized by low to medium hills and are covered by mixed evergreen (evergreen and semi-evergreen forests) (Nishat et al. 2002). *Dipterocarpus* spp. is the dominant tree species among the plants (IUCN Bangladesh 2002). Teknaf Wildlife Sanctuary (11,614.58 ha) and Sheikh Jamal Inani National Park (7,085 ha) constitute a significant part of the forest lands of these two upazilas. However, due to the high forest dependency of the surrounding dense population, the forests have undergone gradual deforestation and degradation. However, these forests are still rich in biodiversity, including the globally Endangered Asian Elephant (*Elephas maximus*). It is the flagship animal of the southern Chattogram and Cox's Bazar region. There were more than 100 individual elephants as reported by Nishorgo Support Project (2006). However, the high density of human settlements and the recently established Rohingya camps severely fragmented the elephant habitat and blocked many of their corridors (Rahman 2019). Feeroz et al. (2012) reported that there is a good number of nocturnal mammals living in the Teknaf Wildlife Sanctuary area.

The forests of this area were also affected by the massive seaborne disasters in 1991, 1994, and 1997 (Feeroz 2013).

Moreover, substantial forest lands, especially the foot-hills, were converted into agricultural fields and human settlements. Nishorgo Support Project (2006) described that there were eight habitats: (i) high forests, (ii) grasslands and bamboo, (iii) plantations, (iv) wetlands, (vi) sandy beaches along the Bay of Bengal, (vii) tidal mudflats, and (viii) mangrove forests, cliffs and steep slopes, homestead forests, etc. harboured rich biodiversity. However, the recent severe anthropogenic pressure has caused the degradation of the more significant portion of these habitats.

Along the Bay of Bengal coast from Cox's Bazar to Teknaf, 124 plant species from different habit forms were reported by Rahman et al. (2001). According to the floristic study of Uddin et al. (2013), there are 538 plant species belonging to the 370 genera and 102 families in the Teknaf Wildlife Sanctuary (TWS), whereas Sheikh Jamal Inani National Park (SJINP) is represented by 443 plant species belonging to 93 families (Feeroz 2016). Feeroz (2016) also reported 124 species of butterflies, 29 amphibian species, 58 reptile species, 253 bird species, and 39 mammals from SJINP. In another study, Haidar and Ahsan (2018) reported 134 species of butterflies belonging to 86 genera and 6 families from TWS. Among the Batna (*Lithocarpus* spp.), Teli garjan (*Dipterocarpus turbinatus*), Dholi garjan (*D. costatus*), Jam (*Syzygium* spp.), Assar (*Grewia nervosa*), Naricha (*Trema orientalis*), Bormala (*Callicarpa arborea*), Goda (*Vitex* spp.), Kestoma (*Aporosa wallichii*), Bohal (*Cordia dichotoma*), Jalpai (*Elaeocarpus floribundus*), Dakrom (*Mitragyna purvifolia*), Sheora (*Sterblus asper*), etc. are some of the commonly occurring tree species in the mixed evergreen (evergreen or semi-evergreen) forests of Cox's Bazar south region (Uddin and Hassan 2019, Hossen and Hossain 2018). MoEFCC et al. (2018) reported that the shrub-dominated areas are increasing in Cox's Bazar south region while the tree-dominated areas are decreasing due to over-exploitation of the trees from the government forests. There are 384 fauna species in TWS, including 12 amphibians, 56 reptiles, 260 birds, and 55 mammals (Feeroz 2013). Asian elephants, deer, wild boar, monkeys, rare Long-tailed Macaque (*Macaca fascicularis*), squirrels, red jungle fowl, different birds and different species of snakes were some of the notable animals from TWS (Nishorgo Support Project 2006). Rahman (2020), identified 16 amphibians, 21 reptilians, 86 avians, and 12 mammalian species in the Madhhur Chhara basin.

2.6 Impact of refugee influx in Teknaf Peninsula

According to Martin's (2005) discussion, cited in Haque (2018) noted that when refugees take shelter in a host country, the host communities may experience at least six significant consequences: (i) natural resource erosion; (ii) immutable impacts on natural resources; (iii) impacts on health; (iv) impacts on social conditions; (v) social impacts on local populations and (vi) economic impacts. Bangladesh will likely face similar consequences due to many Rohingya refugees who have temporarily settled in the Teknaf Peninsula in Cox's Bazar since 2017.

The nearby areas of Rohingya refugee camps in Cox's Bazar already suffered from degradation. The latest influx is likely to result in a significant ecological consequence to the different environmental components, i.e., air quality, acoustic environment, ground-water, surface water, soil and terrain, vegetation, wildlife, aquatic biology, forests, human health, gender-based issues, land-use, etc. (MoEFCC et al. 2018). MoEFCC et al. (2018) also mentioned that in a short period after the massive influx of Rohingya in 2017, the land use of the surrounding areas of Kutopalong and Balukhali changed drastically.

2.6.1 Loss of forest

To cope with the vast population, Bangladesh has to arrange accommodation by building random settlements that cause rough erosion of forestlands. The erosion of random forests and the massive expansion of refugee camps (about 2,283 ha) intervened in the region's wildlife habitats, biodiversity, and overall ecosystems (Hassan et al. 2018). By using four different algorithms (Support Vector Machine, Random Forest, Classification and Regression Tree, and Max entropy), Ahmed et al. (2019) identified the significant forest losses and land cover mutation, for instance (i) dense forest, (ii) sparse, (iii) open area and (iv) settlement from 1988 to 2018. The analysis depicts how alarmingly dense forests declined between 2016 and 2018 (from 8,531 ha in 2014 to 4,498 in 2018), and this deforestation scenario happens when Rohingya people flee to Bangladesh for asylum from Myanmar (settlement growth 271 ha in 2014 to 2,679 ha in 2018). The migrated people need 750,000 kg of fuelwood daily, putting pressure on protected forests and social forestry trees (Hoque et al. 2019).

In 2017, local communities were permitted to sell timber and non-timber forest products to manage the crises, such as settlements for a large number of Rohingya refugees and using biomass for the fire that eluded more than half of the 15 years old Social Forestry Programme,

mostly used (Bandur 2019). The vast rendition of the unhealthy establishment of refugee settlements costs the loss of an estimated 1,876 ha of forest land (Rashid et al. 2021). However, a more recent survey indicated that 12,807 ha of forest cover had been lost from 2017 to 2020, among which 1,337 ha of forests directly disappeared by the Rohingya camps (Dampha et al. 2022). The study also revealed that one-third ($1/3^{rd}$)of the total forest loss that happened within 1 km of the Rohingya camps may be due to the collection of forest resources by the Rohingya people. However, the remaining two-thirds ($2/3^{rd}$)of the total forest loss occurred within 1-5 km from the camps, which is mainly attributed to the settlement of the host communities towards the camps.

2.6.2 Financial loss of forestry resources as well as biodiversity

As per Cox's Bazar South Forest Department report (2022a), after the Rohingya influx of 2017, about 1.1 million FDMN (Forcibly Displaced Myanmar Nationals) entered Bangladesh and got shelter in Bangladesh Forest Department lands of Ukhiya and Teknaf Upazilas. They destroyed forestry resources for making makeshift settlements, collecting fuelwood, and livelihoods. They took shelter in 34 camps, including two old, i.e. registered camps. Of 34 camps, 26 are located at Ukhiya, and 8 at Teknaf. For the set up of the camps, a total of 2,494.49 ha (6,164.02 acres) of Cox's Bazar South Forest Division's lands have been destroyed, including 820.50 ha (2,027.50 acres) of Social Forestry and 1,673.99 ha (4,136.52 acres) of natural forests. The estimated value of loss of 820.50 ha (2,027.50 acres) of Social Forestry is BDT 1,979,691,975.78, and 1,673.99 ha (4,136.52 acres) of natural forests is BDT 2,581,111,664.82. So, the total is BDT. 4,560,803,640.60 (US$ 47,018,594.23, 1 US$ = BDT 97). Besides, the natural forests are rich with different tree species, herbs, shrubs, sunglasses, reeds, bamboo, canes, medicinal plants, etc., and their cost is out of estimation.

After the Rohingya influx of 2017, biodiversity has been lost parallelly with the forestry resources by the different activities of the Rohingya people. An expert team estimated the loss of biodiversity in the affected area by the SPM (Single Point Mooring) method. The team estimated the value of biodiversity loss of 2,494.49 ha (6,164.02 acres) of forest land is BDT 14,094,854,195.19 (US$ 145,307,775.2, 1 US$ = BDT 97).

So the combined loss of forestry resources as well as biodiversity is BDT 18,655,657,835.79 (BDT. 4,560,803,640.60 for total forestry resource loss + BDT 14,094,854,195.19 for biodiversity loss).

2.6.3 Loss of Biodiversity

The mass influx of Rohingya refugees causes emergencies that have amplified the anthropogenic impacts of land salvation and human intrusion, leading to threats to biodiversity and pollution of the environment in TWS. About 1,156 species, including plants and animals, inhabit this area (approximately 1,618.7 ha (4,000 acres) of hilly area), many of which are listed as endangered species, for instance, Asian elephants, deer, Indian wild cats, and wild hogs (Faroque and South 2020).

Khan et al. (2009) reported that 34 plant species used to treat ailments from simple headaches to complex eye and heart diseases in forest areas are becoming endangered due to excessive pressure of settlement of the local people and Rohingya refugees.

2.6.4 Climatic impacts

The substantial loss of vegetation cover from the surrounding forests caused a detrimental change to the LST (land surface temperature) with a maximum of 34^0C that is higher than that before 24 August 2017 (pre-influx Rohingya period) (Rashid et al. 2021). It was estimated that the forest loss in surrounding areas of the Rohingya settlements after the massive influx released about 363.8 Gg of CO_2 that added to the host country's atmosphere (Hoque et al. 2019). Besides, the regular plying of thousands of jeeps, trucks, and cars for the transportation of aid workers, visitors, and food in the camps emit greenhouse gasses that increase the impacts of climate change in Bangladesh (Haque 2018). MoEFCC et al. (2018) reported that indoor air pollution is severe due to smoke from cooking, which has a higher probability of causing risks.

2.6.5 Impacts on Soil

Soil pollution is another crucial issue in these circumstances, and the leading cause is 'Polythene' (Polythene is a non-biodegradable, organic compound found in everyday products such as polythene bags, plastic furniture, and kitchen materials.). Polythene sheets, synthetic ropes, and nails are used to build urgent refugee camps for emergency shelters. Other elements like plastic bags used for packaging relief items, plastic bottles, and used torch batteries are also causing soil pollution (MoEFCC et al. 2018).

2.6.6 Impacts on water

The environment loses irreversible underground surface water resources daily to fulfil the acute water demand of many overcrowded Rohingya people (Haque 2018). The surface level of water

is now running into 1-1.5 m (3-5 feet) daily (OCHA 2018). Contamination of water is a significant problem in the Rohingya refugee camps. The absence of a proper solid waste management system might cause the spread of waterborne and contagious diseases among nearby localities and host communities. Moreover, the human waste of the vast Rohingya population may get mixed with the water of nearby streams and groundwater, which will then cause a severe catastrophe (MoEFCC et al. 2018). Several potential environmental risks associated with the Rohingya influx are furnished in the following Table 2.2.

Table 0.2: Impact of Rohingya refugees on different components of the surrounding environment of the Rohingya camps in Cox's Bazar

Potential Environmental Risks	Impact	Probability of risk	Reversible	Significance
Air Quality				
Impact of cooking on indoor air quality	Severe	Highly Likely	Yes	High
Dust generation from road traffic and wind erosion during the dry season	Moderate	Highly Likely	Yes	Moderate
Air pollution from transport	Minor	Highly Likely	Yes	Moderate
Acoustic Environment				
Noise from road transport	Minor	Highly Likely	Yes	Moderate
Ground-water				
Ground-water depletion due to water extraction for camp needs	Critical	Expected	Note in the short time	High
Ground-water contamination by filtrate from latrines	Critical	Expected	Not in the short time	High
Surface water				
Changes in water hydrology caused by camp activities	Moderate	Moderately likely	Yes	Moderate
Changes in water quality caused by camp activities	Moderate	Moderately likely	Yes	Moderate
Soils and Terrain				
Soil removal and erosion	Severe	Expected	No	High

Potential Environmental Risks	Impact	Probability of risk	Reversible	Significance
Soils diversity	Moderate	Moderately likely	Not in the short time	Moderate
Land capability	Severe	Highly Likely	Not in the short time	High
Changes in terrain that may cause landslides	Severe	Expected	No	High
Sewer sludge management	Critical	Expected	Yes	High
Solid Waste Management	Critical	Expected	Yes	High

Source: MoEFCC et al. 2018

2.6.7 Land Use and Land Cover Change

The lands of the Cox's Bazar south region were historically used for agricultural crop cultivation, betel nut and betel-leaf cultivations, and homestead agroforestry. The illegal cutting of large trees and human settlements has had the most significant impact on the natural reserve forests of this region. Currently, the primary land uses are the construction of hotels and resorts, agriculture, human settlement, urban and tourism facilities, aquaculture and salt farming, fishing and dry fish processing, shrimp hatcheries, etc.

Most of the recently arrived Rohingya people settled in makeshift camps, replacing the existing hill forests (MoFCC et al. 2018). Hassan et al. (2018) analyzed the remotely sensed satellite images before and after the significant Rohingya influx at the end of 2017. The study indicated as much as a 774% expansion (175 ha in 2016 to 1,530 ha in 2017) of the existing three refugee camps between 2016 and 2017. The study also showed that expanding the camps in Kutupalong-Balukhali, Nayapara-Leda, and Unchipang degraded 2,283 ha of surrounding forests. The degradation of forest land by the expansion of Rohingya camps triggered ecological problems by further fragmenting and isolating the wildlife habitats since many resettlements were set up in and or near corridors of the wild Asian elephants, which resulted in human-elephant conflicts and the death of several Rohingyas by elephant trampling (Hassan et al. 2018). Rahman (2020) also assessed the change in land cover due to the massive influx of Rohingya into Bangladesh during the period. The study also applied remote sensing to assess the change before and after the influx of Rohingya refugees. It produced a land-use map for 2016, 2018, and 2020 and showed the change in forest cover in and around the refugee camps. Similar to that of Hassan et al. (2018), this study confirms that the forest cover in and around

the Kutupalang and Nayapara refugee camps drastically changed after August 2017 when Rohingya people entered Bangladesh due to the forest land converted into camp settlements and refugees used fuelwood from the surrounding forests as cooking fuel.

2.6.8 Impacts on Health

Lack of sanitation, medicine, education, and environmental materials is common in the Rohingya camps (Haque 2018). The health situation in both host and refugee communities is under threat. Spread out of forced marriages, especially 'Sham Marriages' (Chaity 2018), prostitution, and trafficking of Rohingya women cause sexually transmitted infections and HIV, AIDS or similar diseases. At the time of the pre-refugee influx period, there were no records of the actual health status of the Rohingya people, which created health concerns for the host communities. According to Karmakar's (2018) report, 378 people are detected as HIV positive, while 258 of them are Rohingyas and the rest are from host communities.

2.6.9 Social impacts

Demographic challenges are one of the major problems seen in the aftermath of the massive Rohingya influx. The refugees now outnumber the locals. The ratio between local and Rohingya people is 1:3, which has created demographic tensions among locals as they feel, at some points, they are minorities in their land (Yasmin and Akter 2019). Approximately one million people have been living unofficially outside the Bangladesh camp for decades. Refugees often disrupt the host country's socio-economic, demographic, political, and environmental systems (Kader and Choudhury 2019). The living condition of Rohingya refugees was under the poverty line, and it was getting worse in refugee camps. The availability of low-cost refugee wagers has resulted in unhealthy competition with host communities' especially daily labourers, causing crimes and social insecurities in this region (Rahman 2019). By examining a cross-sectional study, results show that 148 adult Rohingya refugees (in Kutupalong and Nayapara refugee camps) have dealt with trauma, daily stressors, and mental health (i.e., posttraumatic stress disorder, depression, physical complaints, spirit occupancy concern) problems. Collective violence and statelessness add more daily stressors that gradually convulse the refugees' mental health outcomes, including problems with food, restriction on frequent movement, and safety concerns. A protected humanitarian environment indicates that refugees cannot wander randomly and create psychological stress. These environmental stressors would become an impulsive medium between traumatic exposure and distress among the Rohingya people (Riley et al. 2017).

Law and security issues disturb locals, indicating that the Rohingya people are vulgar and lean toward criminal activities. The increasing involvement in the drug trade and arms smuggling of various refugee terrorist groups threaten local security, the environment, and the complacency of host communities (Myat 2018). The synthetic drug 'Yaba' business, human trafficking, and prostitution have been spread in the region (Hassan et al. 2018).

It is noted that Rohingya women need some hard cash; they often keep it a secret from aid agencies, which they want to spend during an emergency period or during pregnancy to buy additional food. To earn money to meet these demands, they are willingly involved in antisocial activities such as prostitution, forced domestic work, human trafficking, etc. These situations create tensions in the host communities as they suddenly find new sources of income (Haque 2018).

2.6.10 Socio-economic impacts

In Bangladesh, especially in Cox's Bazar District, the host community has faced various consequences, including unlocking different types of tension and difficulties after the entrance of many Rohingya people on the 26th of August 2017. These tensions and difficulties have turned into many unexpected challenges that oppressed and metamorphosed the lives of the locals. Some refugees sell relief accessories at low prices, which has threatened the local market. The standard of living costs has increased above the mark and greatly impacted local people. As a result, house rent goes high and becomes expensive as various national and international NGO activists and offices temporarily settle there during emergencies, and they are carrying forward (Yasmin and Akter 2019). The price of essential components (rice, vegetables, and oils) has increased since the crisis began. The cost of living has become high; the daily wagers fear losing their jobs because the refugees consent to do the same jobs with lower wages (Hassan et al. 2018).

The economic vulnerability has been noticed while international aid and host country's NGOs, along with the Government, experienced a massive shard of the barren refugee population, including local people in sociology. If the young refugee populations are prepared for vocational education programmes, it will be more difficult for host communities to find a job in the competitive labour market (Moses et al. 2018). UNDP and UN-WOMEN (2017) assessed the overall social impact on different Union Parishads of Cox's Bazar due to the Rohingya influx. The study also ranked the unions based on the level of impact using a numeric

scale of 0 (not affected) to 7 (most affected) which has been provided in Table 2.3.

Table 0.3: Level of impact on different unions of Cox's Bazar due to the Rohingya influx

District	Sub-District	Union	Impact Rating	Nearly Camps and Settlements
Cox's Bazar	Ukhiya	Palongkhali	7	Thyangkhali Hakimpara Jamtoli Moynargohna Bagghona / Putibunia
	Ukhiya	Rajapalong	6	Kutupalong RC Kutupalong MS Balukhali Burmapara / Tasnimarkhola
	Ukhiya	Jaliapalong	4	Shamlapur MS
	Ukhiya	Haldiapalong	0	
	Ukhiya	Ratnapalong	0	
	Teknaf	Baharchara	5	Shamlapur MS Chakmarkul settlement
	Teknaf	Hnila	5	Leda MS Nayapara RC Mochoni settlement
	Teknaf	Whykong	5	Unchiprang settlement
	Teknaf	Sabrang	4	
	Teknaf	Teknaf	4	
	Teknaf	Saint Martin's	0	
	Ramu	Kuniapalong	3	
	Ramu	South Mithachori	0	

Source: UNDP and UN-WOMEN 2017

[**In the "Impact Reating" column 0 means not affected and 7 means most affected*]

2.6.11 Impact on Wildlife

2.6.11.1 Impact on Wildlife Habitat

A large number of Rohingya influx in the Cox's Bazar District of Bangladesh damages vegetation for temporary emergency settlements, which creates a problematic situation in wildlife habitats, including endangered species like Asian elephants (*Elephas maximus*). As a result, human-elephant conflicts caused the death of 13 refugees and almost 50 people injured., The Government, Aid Agencies, and NGOs are setting up 56 watchtowers and 30 volunteer teams to encourage people to create awareness (Rahman 2019). The construction of the watch towers have been completed.

The makeshift camps have an indicatory impact on wildlife and food, shrinking habitats and disturbing breeding grounds of nocturnal, metatarsal, crepuscular and diurnal wildlife. Most

mammals are terrestrial, more than 67% of all mammals. Around 63% of them depend on the forests as their beloved habitats (Feeroz et al. 2012). The arboreal species are also in danger due to the unusual degradation of natural forest areas. Lighting for refugee shelters and cooking inside the camp affects the forest environment, negatively impacting wildlife's nesting, roosting, breeding, and feeding grounds (MoEFCC et al. 2018).

In 2017, the massive Rohingya influx in Bangladesh created emergencies such as arrangements of accommodation by building random settlements that caused rough erosion of forests and massive expansion of refugee camps (about 2,283 ha) intervened in wildlife habitats, biodiversity, and overall ecosystems in the region (Hassan et al. 2018) that are now becoming endangered species due to excessive pressure of settlement of the local people and Rohingya refugees (Khan et al. 2009). According to local staff' of the Bangladesh Forest Department, the number and distribution of the essential tree species necessary for wildlife habitats are grossly declining daily due to excessive deforestation and forest degradation in the campsites. Some of those declining tree species are *Albizia* spp., *Alstonia scholaris*, *Artocarpus chaplasha*, *Dipterocarpus* spp., *Hopea odorata*, *Lagerstroemia speciosa*, *Mangifera sylvatica*, *Phyllanthus emblica*, *Tetrameles midiflora*, *Terminalia bellirica*, *Terminalia chebula*, etc. (Rahman 2019).

2.6.11.2 Wildlife population

According to the IUCN Bangladesh (2016) report, there are about 268 (range from 210 to 330) resident wild elephants, 93 (range from 79 to 107) migratory and 96 captive elephants in Bangladesh, including 12 elephant corridors and 57 transboundary elephant crossing points on the border with India and Myanmar among which 39 points are natural, 11 abandoned and seven are viatical crossing points through which elephants pass regularly.

The central elephant distribution area was found in the south-eastern part of Bangladesh. The IUCN Bangladesh (2016) elephant survey shows that the resident elephant population is only present in the Chattogram, Cox's Bazar, Bandarban, and Rangamati districts (7 forest divisions). Non-resident elephant movements were recorded in this region, primarily from Chattogram Hill Tracts North and Chattogram Hill Tracts South Forest Divisions. Identified elephant corridors are also located in this region. Of 12 corridors, 3 are in Cox's Bazar South Forest Division, 5 are in Cox's Bazar North Forest Division, and 4 are in Chittagong South Forest Division (IUCN Bangladesh 2016). Three corridors, namely, Ukhiya –Ghundhum,

Tulabanga –Panerchar, and Naikhogchari-Rajarkul, are located in Cox's Bazar South Forest Division. Corridors play a crucial role in the lives of elephants as they require a large home and day range and follow the same routes year after year. However, the survey conducted by IUCN revealed that the corridors' condition is unsuitable for elephant movement due to different anthropogenic interventions, which created tremendous pressure after the Rohingya influx. If this situation continues, the corridors will already be fully blocked or close to being entirely blocked, resulting in the elephants being pocketed and losing genetic viability, ultimately leading to the extinction of this species.

It is a matter of fact that there were about 500 elephants in Bangladesh's forests during the middle of the century (Choudhury 2007). However, it has become an endangered species because of human-made disasters like the sudden refugee influx executed by the Myanmar Government, which caused vast deforestation (Rahman 2019).

Wildlife and wilderness are becoming hostile in the Teknaf peninsula area due to the makeshift overflow of Rohingya people. They damage the habitats of many wildlife; most significantly, the elephants have also lost their habitats and corridors. There are human-elephant conflicts often happen in these corridors (Kudrat-E-Khuda 2020). It has been mentioned earlier that human-elephant conflicts caused the death of 13 refugees and almost 50 people injured. At least 48 elephants were wandering around the refugee camps during dawn time, and males and children were the prime victims of elephants (Rahman 2019).

2.7 Human-elephant conflict in and around the Rohingya camps

Refugees often turn to the nearby forests to obtain food and shelter. This significantly damages the forest. Within the forests, there are traditional routes and corridors for Asian elephants. During migration, elephants use corridors to move from one forest to another. When elephants encounter any obstacle, they try to break it. This is where the human-elephant conflict starts. Additionally, elephants enter the settlement areas when they do not find enough food in the forest. As of 22 February 2018, 12 refugees and one host community member died due to the human-elephant conflict.

Fleeing rape and murder, the refugees settled in the camps of Cox's Bazar, which happened to be right on eight vital elephant migration corridors. Due to the blockade, the elephants and people both get panicked. Elephants that wanted to pass from one habitat to another ran haphazardly, looking for an exit. People also desperately try to seek cover and avoid being

crushed. Some sought to scare off the elephants by throwing garbage at them, creating even more panic. In total, elephants killed 13 people between September 2017 and February 2018 (Daly 2018).

2.8 Interventions to Improve Wildlife Habitats

The drastic degradation of the environment in and around the refugee camps drew the attention of the national (government and non-government) and international organizations. UNHCR and several international organizations funded and supported programmes to restore environmental amenities, including forest landscape restoration, water purification, reducing the dependency on fuelwood for cooking, etc. UNHCR and other aid agencies distributed Liquefied Petroleum Gas (LPG) to the refugee families for cooking, reducing the pressure on the surrounding forests for fuelwood (Rahman 2020). Bangladesh Forest Department also conducted massive plantations in the degraded areas of Cox's Bazar District under several restoration programmes to restore the forests and elephant habitats (Personal communication with Cox's Bazar South Forest Department in 2020).

Urgent measures to reduce forest degradation and human-elephant conflicts in the adjacent areas of Rohingya camps were taken by IUCN Bangladesh with funding support from UNHCR. As such, IUCN Bangladesh is implementing programmes to minimize human-elephant conflicts in the area, improve the livelihood of refugees and host communities, and contribute to the peaceful co-existence of refugees and host communities (IUCN 2019). However, in a recent initiative, IUCN established some elephant response teams of 550 Rohingya refugees living close to the corridors. Under the same initiative, 98 watchtowers were established around the Rohingya refugee camps (IUCN 2019). The response teams act promptly to deter the elephants from the forest.

2.9 Threats to the Forest Ecosystem Services of Cox's Bazar

The forests of Cox's Bazar provide many tangible and intangible services, including timber, fuelwood, non-timber forest products (NTFPs), nutrient cycling, climate regulation, water regulation, pollution removal, wildlife habitat, biodiversity, recreation, medicinal plants, food security etc. (Augustynczik et al. 2019, Hein 2011, Rodrigues et al. 2019). Clearing the forest through anthropogenic interferences (i.e., land use changes due to refugee crisis, settlements, over-extraction, etc.) is severely detrimental to the integrity of ecosystem health and abundance of biodiversity (Tilman et al. 2017, Jin and Fan 2018).

Moreover, global warming is enhanced through carbon emissions due to forest clearance (Heiskanen et al. 2019, Shi et al. 2019). Fragmentation of the forest cover deteriorates the existing biodiversity (Yu et al. 2020). Therefore, understanding the linkage between forest cover and ecosystem functioning is crucial, which could help achieve sustainable forest management targets (Xiao et al. 2019, Hasan et al. 2020). Before the recent distribution of Liquified Petroleum Gas (LPG) for cooking, Rohingya families collected about 38,500 tonnes of fuelwood each month directly from the adjacent forests. These pose a significant risk of forest degradation and landslides as the terrain of the hills loses its natural setting (MoEFCC et al. 2018). However, a recent study indicated that the LPG distribution programme reduced the demand for fuelwood from 4.72 kg/day to one kg/day among the Rohingya refugees. The programme also reduced host communities' fuelwood demand from 5.38 kg/day to 2.5 kg/day (UNHCR and IUCN 2019). The study also indicated that the total monthly fuelwood collection had been reduced to 3,083 tonnes per month. Deforestation can negatively affect the water balance and composition of the soil, resulting in a higher intensity of soil erosion (Ghimire et al. 2013).

Deforestation and subsequent degradation in the hilly forests of Cox's Bazar may also cause landslides (Sarker et al. 2000). The vegetation losses and forest clearing can pressure nearby protected area management such as Teknaf Wildlife Sanctuary, Himchari National Park, and Sheikh Jamal Inani National Park. The biodiversity of these protected forest lands, including the critical and endangered species, is at high risk (Tani and Rahman 2018, IUCN 2000).

CHAPTER 3: STUDY AREA

3.1 Description of the Study Area

The study was conducted in the two Upazilas, namely, Teknaf and Ukhiya Upazila of Cox's Bazar District, Bangladesh. The Rohingya influx highly impacts these two Upazilas. The massive influx of Rohingya severely altered the physical and social environments of the study area. The study has focused on the Rohingya influx and its impact on wildlife and associated habitats.

3.1.1 Location

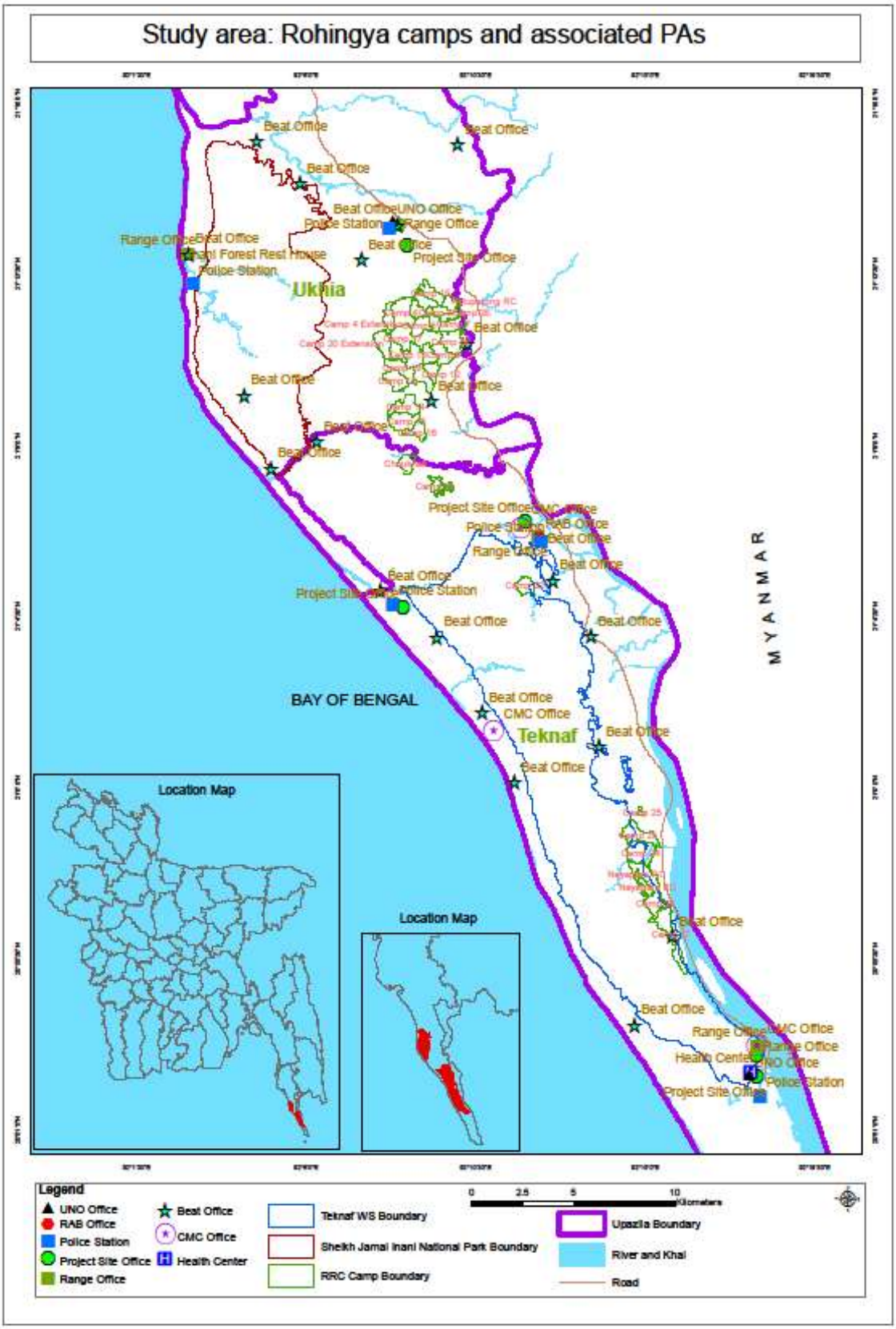
The study area is located in the country's far south-eastern corner, has the Naf River and Myanmar border on the eastern side and the Bay of Bengal and the newly inaugurated 80 km long marine driveway on the western side (Fig. 3.1). Teknaf and Ukhiya Upazilas cover an area of 38,868 ha and 26,180 ha respectively.

3.2 Geography

The Naf River estuary strongly influences the coastal range of the Teknaf coastal area. Teknaf Peninsula is one of the most extended sandy beach ecosystems (80 km) in the world, representing a transitional ground for the fauna, especially for the Asian Elephant (*Elephas maximus*) of the Indo-Himalayan and Indo-Malayan ecological sub-regions. Important geographic features of the study area include mangroves, mudflats, beaches and sand dunes, canals and lagoons, and marine habitats. More than 60% of the land in Cox's Bazar District is either forested or unsuitable for cultivation, compared to a national average of 40%.

3.2.1 Soil and Topography

The study area comprises medium to high hills (up to 700 m altitude), plain agricultural lands, seashores, sea beaches, and salt pans. The hills extended from North to South. The soil is silty to sandy in the hills, loamy in the plain agricultural lands, clayey in the coastal plains and salt pans, and sandy in the sea beaches (Feeroz 2013).



Source: Prepared by the author

Fig. 0.1: Location map of the study sites (all Rohingya camps and PAs)

3.2.2 Demography

About 2.7 million people live in Cox's Bazar District (BBS 2011). Children between 0 and 14 make up 40% of this population (op. cit.). This figure is higher than national demographic statistics, where children in the same age group make up 33% of Bangladesh's total population (op. cit.).

3.2.3 Host community

Ukhiya Upazila has a population of 2,07,379 consisting of 104,567 (50.42%) males, 102,812 (49.58%) females belonging to 37,940 households (BBS 2014) and the male-female ratio is 1:0.98 (Table 3.1). In Teknaf Upazila, the population is 264,389 (male 133,106 (50.34%) and female 131,283 (49.66%)) belonging to 46,328 households (BBS 2014) and the male-female ratio is 1:0.99 (Table 3.1). Female-headed households are 21% in Teknaf Upazila, whereas it is 16% in Ukhiya Upazila (ISCG 2019a). As per BBS (2014), the population density/km^2 of Ukhiya Upazila and Teknaf Upazila is 792 and 680 respectively.

Table 0.1: Union-wise demographic information for Ukhiya and Teknaf Upazilas

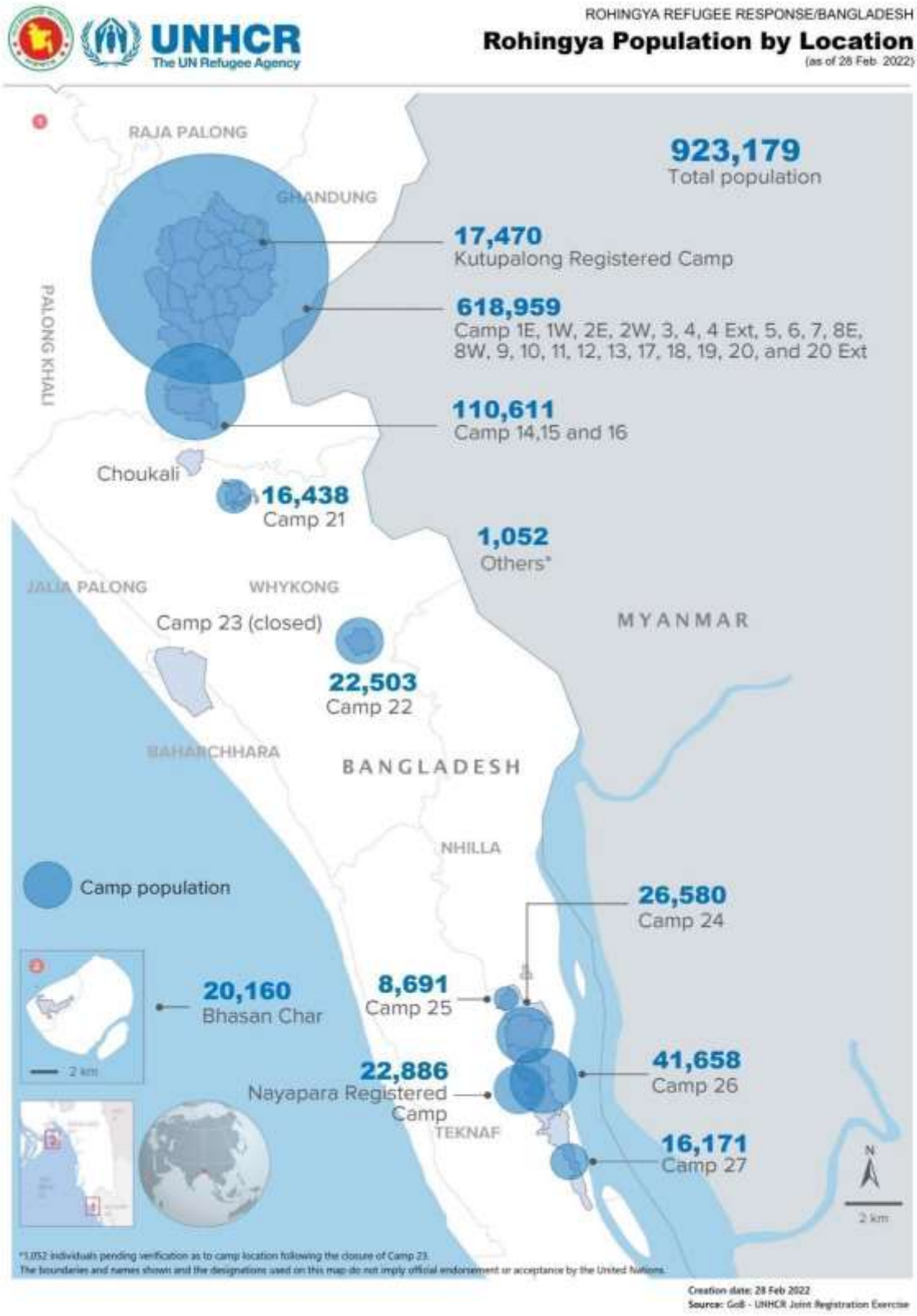
Sl. No.	Unions	Population			No. of HH*
		Male	Female	Total	
Ukhiya Upazila					
1.	Holdia Palong	23,689	23,772	47,461	9,006
2.	Jalia Palong	24,540	23,116	47,656	8,511
3.	Raja Palong	28,663	28,232	56,985	10,596
4.	Ratna Palong	11,167	11,357	22,524	4,238
5.	Palong Khali	16,508	16,335	32,843	5,589
Total		104,567	102,812	207,469	37,940
Teknaf Upazila					
1.	Teknaf Municipality	13,296	11,760	25,056	4,752
2.	Whykong	25,296	25,567	50,863	8,867
3.	Hinla	23,360	23,536	46,896	8,271
4.	Teknaf Sadar	24,076	23,632	47,708	8,467

5.	Sabrang	29,126	29,232	58,358	9,970
6.	Baharchara	14,481	14,324	28,805	4,832
7.	Saint Martin	3,471	3,232	6,703	1,169
	Total	133,106	131,283	264,389	46,328

* HH- House-hold Source: BBS 2014

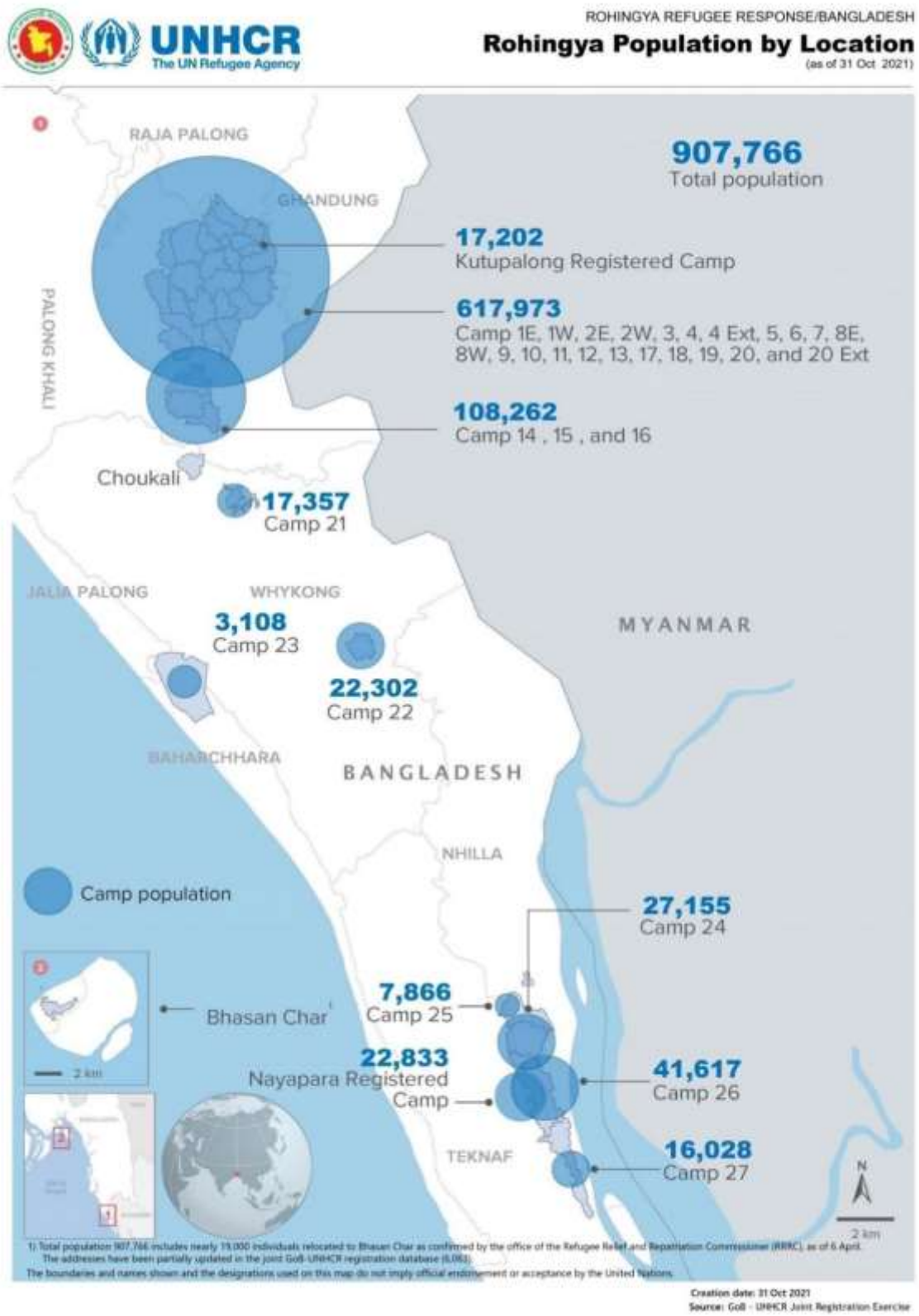
3.2.4 Rohingya

A recent report, upto December 2022, showed a total of 952,309 Rohingya people, consisting of 48% male and 52% female are now living in 197,156 households in 33 camps including 28,951 people from 7,322 households in Bashanchar (UNHCR 2023a, Fig. 3.2), earlier they lived in 34 camps (UNHCR 2021, Fig. 3.3), 48 temporary camps which are located either within the reserve forests or in proximity to forested lands (UNDP and UN-WOMEN 2018, Fig. 3.4, 3.5, 3.6 and 3.7). On behalf of GoB, the Office of the RRRC, issued a letter on December 8, 2021 (Memo no: RRRC / Relocation / Camp-2311-2712021- 5050; Dated: 08 December 2021) to close up a camp (Camp Number 23) from January 2022, by which a total 34 camps became as a total of 33 camps. Office Out of the 33 camps, 26 are in Ukhiya and 7 in Teknaf (Annex 1). Most of these camps are fully or partially located in the gazetted reserve forests of Cox's Bazar South Forest Division. More specifically, the camps located in the forests of Kutupalong, Balukhali, Balukhali Dhala (Moynarghona), Tajnima Khola, Mokkorar Beel (Hakimpara), Jamtali Bagghona, Shafiullah Kata under Ukhiya Upazila and Putibunia, Unchiprang, Alikhali, Leda, Jadimura, Noyapara Salbon, Shamlapur and Kenontali under Teknaf Upazila. In addition to the destruction of the forests, the Rohingya people living in the camps are involved in different anti-social activities that have created unrest in the area. A few influential miscreants are using Rohingya people in different unlawful activities related to forest destruction. Inhabitation of the huge Rohingya influx occupied about 2,494.48 ha (6,164 acres) of land, including 1,674.18 ha (4,137 acres) of natural forests and 820.28 ha (2,027 acres) of planted forests of Cox's Bazar South Forest Division (Personal communication with BFD 2021). However, the government of Bangladesh allocated 3,237.49 ha (8,000 acres) of land in Teknaf and Ukhiya Upazilas for the Rohingyas (op. cit.). So far, 212,607 makeshift, 9,437 tube-wells, 58,030 latrines, 16,957 bathrooms, 20 km of electric lines, and 35 km of connecting roads have been constructed inside the Rohingya camps. The national and international organizations involved in the humanitarian support for the Rohingya are, sometimes cutting down the nearby hills to construct these infrastructures.



Source: ISCG 2022

Fig. 0.2: Location map of the 33 Rohingya camps in Cox's Bazar South Forest Division with the Rohingya population

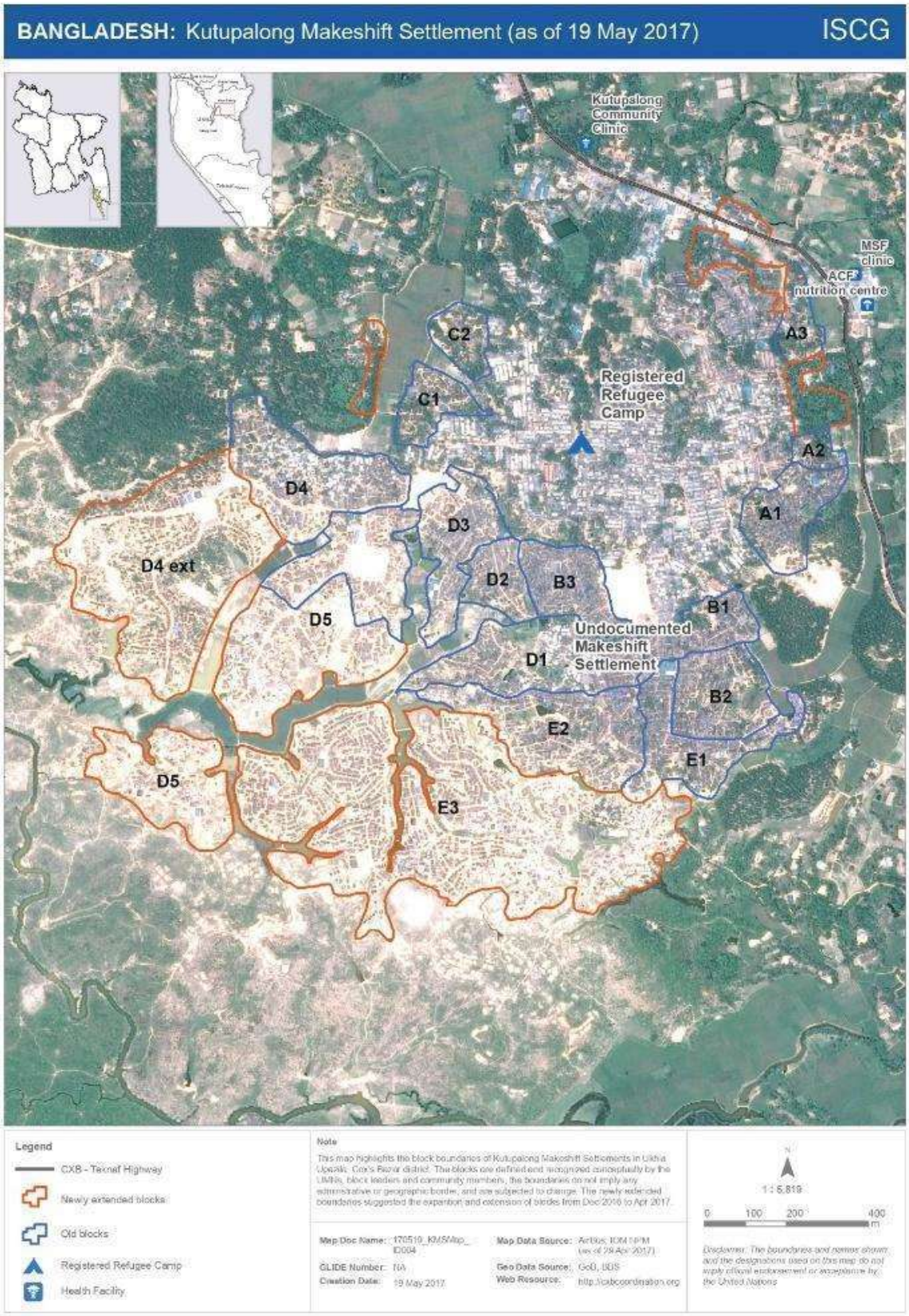


Source: UNHCR 2021

Fig. 0.3: Location map of the 34 Rohingya camps in Cox's Bazar South Forest Division with the Rohingya population

Source: ISCG 2017

Fig. 0.4: Location map of the 48 Rohingya camps in Cox's Bazar South Forest Division with the Rohingya population (segregated into Kutupalong, Balukhali and Leda, from left to right)



Source: ISCG 2017

Fig. 0.5: Location map of the Kutupalong Rohingya camps in Cox's Bazar South Forest Division with the Rohingya population

Source: ISCG 2017

Fig. 0.6: Location map of the Balukhali Rohingya camps in Cox's Bazar South Forest Division with the Rohingya population

Source: ISCG 2017

Fig. 0.7: Location map of the Leda Rohingya camps in Cox's Bazar South Forest Division with the Rohingya population

3.2.5 Literacy

Cox's Bazar lagged behind most of the other Districts of Bangladesh in terms of literacy. The adult literacy rate in Cox's Bazar is 58%, whereas the national average is 69%. The literacy rate in Teknaf and Ukhiya is much lower than in Cox's Bazar. The Labor Force Survey (LFS) 2017 data shows that literacy rates in these two Upazilas are 45.4% and 36.9%, respectively (BBS 2018).

3.2.6 Occupation

The labour force participation rate (LFPR) in Cox's Bazar is about 54.8%, whereas the national average is 58.2%. In Teknaf and Ukhiya, it is about 60%, whereas, for females, LFPR is 20% in Teknaf and 35% in Ukhiya (UNDP 2018). Limited livelihood opportunities might be driving a lower participation rate. As a coping strategy, about 10 % of households in Cox's Bazar are reported to have at least one family member who works as a migrant worker. Agri-farming, wage-earning, salt cultivation, extraction of forest resources, aquaculture, diving, small business, working abroad, carpentry, tourism-based entrepreneurship, etc. are the major occupations of the local people. Agriculture dominates the local economy in Cox's Bazar, 45% of total economic activity. Slow industrial development in this district adds to the high share of agriculture work. Rice is the main crop. Other major agro-production activities in Cox's Bazar District include betel nut, betel leaf, coconut, and salt. Dependence on agriculture is higher in Teknaf and Ukhiya, the two Upazilas worst hit by the Rohingya influx. In Teknaf, it is a staggering 81 %, while the corresponding figure for Ukhiya is 63 %. However, soil salinity and scarcity of surface/groundwater resources for irrigation are responsible for the region's low cropping intensity. In Cox's Bazar, many people are engaged as wage labourers in fishing and salt production. About 55,000 farmers cultivate salt on 26,304.57 ha (65,000 acres) of land. Workers in these sectors are likely to be paid higher wages than those who work in agriculture. On average, male agricultural wage labourers earn BDT 435 per day (BDT 85 = US$ 1), including food, whereas female labourers receive BDT 350 for the same work. As per World Bank data, the per capita GDP (Gross Domestic Product) of US$ 534 in Cox's Bazar is close to the national district-level average after excluding the top four districts. The headcount poverty incidence in Cox's Bazar is 16.6%, whereas 24.3% of Bangladesh's population lives in poverty. The headcount poverty rates in Teknaf and Ukhiya are 4.2% and 4.8%, respectively. It is striking to find that Ukhiya has such a low incidence of poverty. This is because the labourers of Teknaf Upazila get opportunities to work in the port, border transaction-related economic works, and more fishing opportunities at the Bay of Bengal and the Naf River.

3.2.7 Physical infrastructure

Only two-thirds of households in Cox's Bazar and Bandarban have access to electricity from the national grid compared to 82.5% nationally. The transportation system in Cox's Bazar and Bandarban is poor. Apart from Chakaria, all sub-districts in Cox's Bazar have earthen roads. However, this is changing day by day. For example, the new 80-km-long Marine Drive Road along the Bay of Bengal now connects Ukhiya and Teknaf to Cox's Bazar.

3.2.8 Climate

The monthly average temperature ranges from 15° to 33°C (Moslehuddin et al. 2018), the average annual rainfall is 3,819 mm, and the humidity ranges from 27 to 99% (BBS 2011; Feeroz 2013; BBS 2015). The 1991 to 2020 weather data from Cox's Bazar and Teknaf stations show that the monthly average maximum humidity in Cox's Bazar ranges from 90 - 96%, whereas in Teknaf Upazila it is 91 - 97% (Tables 3.2 and 3.3). The weather data indicate a comparatively higher variation of monthly average minimum humidity in both Cox's Bazar (45 - 79%) and Teknaf (44 - 80%). In Cox's Bazar, the monthly average maximum temperature varies between 27 - 33□, whereas the minimum temperature varies from 15□ to 26□. Teknaf's monthly average temperature resembles Cox's Bazar's (Tables 3.2 and 3.3).

Table 0.2: Average humidity, temperature and rainfall data of Cox's Bazar (1991 to 2020)

Parameters	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly average maximum humidity (%)	91	90	92	92	92	95	96	96	96	96	93	92
Monthly average minimum humidity (%)	45	45	53	61	67	76	79	77	74	66	55	49
Monthly average maximum temperature (Degree C)	27	30	32	33	33	32	31	31	32	32	31	28
Monthly average minimum temperature (Degree C)	15	18	22	24	25	26	25	25	25	25	21	17
Monthly average total rainfall (mm)	6	15	38	85	346	823	987	707	420	255	54	12

Table 0.3: Average humidity, temperature and rainfall data of Teknaf (1991 to 2020)

Parameters	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Monthly average maximum humidity (%)	93	91	92	94	94	96	97	97	96	96	95	93
Monthly average minimum humidity (%)	44	45	52	61	68	78	82	80	76	69	56	79
Monthly average maximum temperature (Degree C)	27	29	31	32	32	31	30	30	31	32	30	28
Monthly average minimum temperature (Degree C)	15	17	21	24	26	26	25	25	25	25	21	17
Monthly average total rainfall (mm)	6	11	21	55	321	970	1215	932	496	289	54	12

The study area receives the highest rainfall from May to September, ranging from 346 mm to 987 mm, as indicated by the monthly average rainfall from Cox's Bazar station (Table 3.2). In the remaining parts of the year, the monthly average rainfall is minimal, varying from 6 mm in January to 255 mm in October. The data from the Teknaf weather station indicated that the average annual rainfall is 4,382 mm, which is the lowest in January (6 mm) and the highest in July (1,215 mm) (Table 3.3).

3.3 Forests and Protected Areas

The forests of Cox's Bazar District comprise two Forest Divisions, i.e., Cox's Bazar North Forest Division and Cox's Bazar South Forest Division; however, refugee camps are primarily built in the South Division. Irrespective of administrative boundaries, as defined by BFD and Bangladesh Bureau of Statistics (BBS), environmentally, the forests located in the study area (i.e., Teknaf and Ukhiya Upazilas (Table 3.4)) are a very sensitive ecosystem. It includes the Teknaf Wildlife Sanctuary (TWS) (BFD 2022), formerly known as the Teknaf Game Reserve (TGR) (Nishorgo Support Project 2006). Besides, it has Sheikh Jamal Inani National Park (SJINP), and a notable area as a reserve forest. The area of the TWS is 11,615 ha (BFD 2022), covering 29% of the study area, and situated close to Rohingya camps (Fig. 3.8). SJINP is 7,085 ha, covering 11% of the study area and most of the Rohingya camps are located here (Fig. 3.9). TWS covers 18% land area of the study area. Mangrove forest occurs in the Teknaf peninsula both as a natural forest with planted stands and is mostly distributed in the intertidal

zone. Teknaf reserved forest is one of the oldest reserved forests in Bangladesh. The reserve and protected forests comprise 36,138 ha, covering 56% of the study area (Personal communication with Cox's Bazar South Forest Department 2021). The rest (44%) is not forested land, occupied by human settlements, agricultural lands, salt pans, coastal aquaculture, ponds, and other infrastructures.

Table 0.4: Distribution of the forest areas under the two Upazilas (Teknaf and Ukhiya)

SN	Upazila	Total area (ha)	Forest area (ha)	PA area (ha)	Coastal Forest (ha)
1	Teknaf	38,868	16,991.45	11,615.00	1,955.64
2	Ukhiya	26,180	17,022.84	7,085.16	168.22
	Total	**65,048**	**34,014.29**	**18,700.16**	**2,123.86**

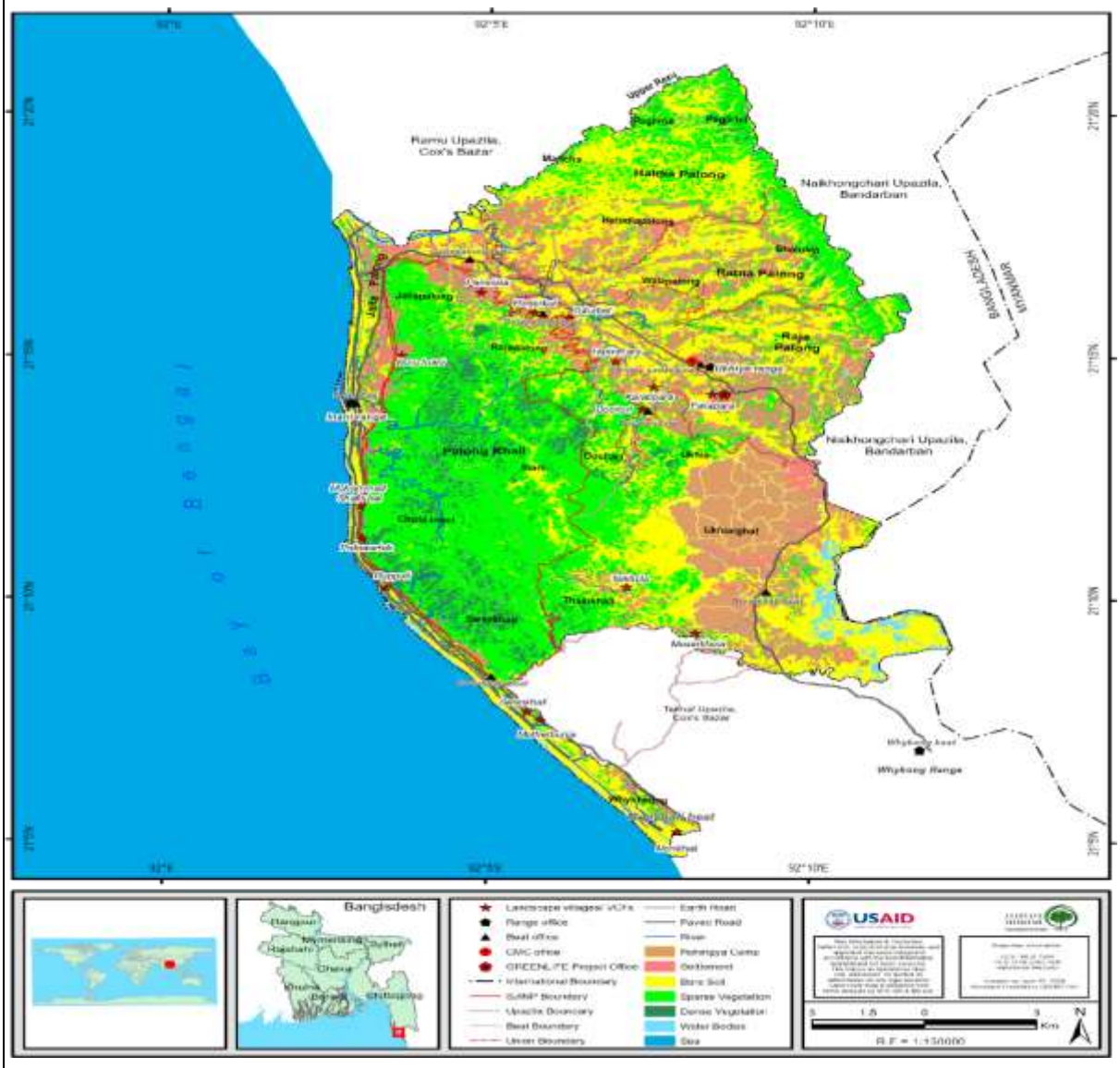
Source: TWS Gazette 2010, SJINP Gazette 2019, and personal communication with Cox's Bazar South Forest Department in 2021

Source: Personal Communication with CODEC in July 2023

Fig. 0.8: Location and detailed map of Teknaf Wildlife Sanctuary

USAID's GREEN LIFE Project Area Map

Land Use of Sheikh Jamal Inani National Park, Ukhiya, Cox's Bazar



Source: Personal Communication with Arannayk Foundation 2021

Fig. 0.9: Location and detailed map of Sheikh Jamal Inani National Park

3.4 Biodiversity

As a subtropical mixed evergreen forest, the area is home to various flora and fauna (Nishorgo Support Project 2006, Khan 2008). The area also serves as a key habitat for the critically endangered flagship species of Asian Elephants (*Elephas maximus*) (Khan 2014, Feeroz 2013). The Teknaf Peninsula is rich with flora and fauna because it supports subtropical rainforests and mangrove patches along brackish water rivers and the sea because of its location and physical environment. It supports about 161 species of fish (Chowdhury et al. 2010). Only the Teknaf Wildlife Sanctuary supports 536 plants, including 105 species of medicinal plants, 198 species of invertebrates (which will increase if it works more), 48 species of fishes, 27 species of amphibians, 54 species of reptiles, 243 species of birds (183 resident and 60 migratory) and 43 species of mammals (Feeroz 2013). On the other hand, SJINP safeguards 443 species of plants, 124 species of butterflies, 29 species of amphibians, 58 species of reptiles, 253 species of birds (195 resident and 58 migratory), and 39 species of mammals (Feeroz 2016). Haidar and Ahsan (2018) reported 134 butterflies from Teknaf Wildlife Sanctuary and 125 butterflies from Inani Reserve Forest, now called Sheikh Jamal Inani National Park, which has also been affected by refugees since 1993.

CHAPTER 4: MATERIALS AND METHODS

4.1 Reconnaissance survey

A reconnaissance survey was conducted to understand the study area before determining the study design. The reconnaissance survey visited the Rohingya camps and the surrounding villages of the host communities. Preliminary conversations were made with the Rohingya and Host community representatives to understand the demographic and physical features of the study area. The method of this study was designed to achieve the study objectives based on the observations from the reconnaissance survey and a review of the existing literature.

4.2 Sampling Period and Procedure

All the fieldwork and interviews were conducted from January 2019 to June 2022. The study was conducted through data collection in three phases, i.e., Key Informant Interview (KII), field observations of the wildlife and wildlife habitats, and interviews of the local communities. The interviews of the local communities included households from both Rohingya and host communities.

4.3 Questionnaire design

Semi-structured questionnaires were designed to interview the respondents, including key informants and household respondents (Rohingya and Host Community). The questions asked were mainly related to the impact of forced migratory Rohingya influx on wildlife dynamics and forestry, focusing on human activities, nature and environment, relationship dynamics within and outside the communities, internal and external social conflict, engagement in criminal activity, the status of social cohesion, educational status, condition of mental health, the occurrence of man-made disaster, along with their opinion and suggestions related to these issues.

4.4 Field data collection

4.4.1 Key Informant Interview (KII)

The key informant interviews were conducted using a semi-structured questionnaire as indicated in the previous section. The KII provided an overview of the effects of the Rohingya influx, including benefits to the people of different groups, loss and suffering of the people, degradation of the local environment, and improvement of the communication networks and infrastructures. They provided a comparative view of the status of wildlife and their habitats in

the Rohingya-affected localities. In addition, the key informants also provided their opinions about the changes in social and moral values, the spread of drugs and other criminal activities, etc.

4.4.1.1 Data from Key Informant Interview

A total of 202 KIIs (host 179 and Rohingya 23) were conducted to know the policymakers' perception regarding the impacts of the Rohingya influx on wildlife and their habitats. It also helped get institutional observations, data and secondary information related to the forest, wildlife occurrence and the impacts of the Rohingya influx on the forest and wildlife. Different stakeholders, e.g., Bangladesh Forest Department (BFD) personnel such as Divisional Forest Officer (DFO), Assistant Conservator of Forests (ACF), Range Officer (RO), Beat Officer (BO); officials from Bangladesh Police and Border Guard Bangladesh (BGB), representatives from other law enforcement agencies, officials from local government institutions such as Chairman and Vice-Chairman of Upazila Parishad, Upazila Nirbahi Officer (UNO), officials of the different Government agencies, officials of RRRC and CiC, Chairman and members of Union Parishads (UP), commissioners of Pourashova, and officials; local elites as professors, teachers, journalists, land-lords, businessmen, doctors, etc.; representatives of different political parties, co-management organizations representatives, etc. In addition, representatives from national and international NGOs, UN agencies, etc., were surveyed. Semi-structured questionnaires were used to record the data during KII of the Hosts (Annex 2) and KIIs of the Rohingya- Camp Leader, Mazi, Sub-Mazi, Block Mazi, Camp Secretary, etc. (Annex 3).

4.4.2 Data from the Household Survey

Semi-structured questionnaires were also used to interview the respondents from the randomly selected households (Annex 2 – 3). Data were collected through direct interviews, and respondents belong to four distinct age groups comprising both male and female, viz., young aged (18 to <30 years), middle-aged (30 to <45 years), aged (45 to <60 years), and aged >60. The data were also collected from the household survey respondents, including basic demography, livelihoods, forest dependency, availability of forest resources, observations of wildlife before and after the Rohingya influx, and changes in the wildlife habitats. In addition, they provided information related to the influence of Rohingya on social affairs, i.e., early marriage, crime conflicts, etc.; Rohingya children as household labourers; spread of diseases; education; changes in living conditions; spread of drugs; cultural impacts; the role of GOs,

NGOs and INGOs. Moreover, suggestions from the local people for resolving the problems and the improvement of the overall condition were taken.

4.4.3 Survey of the Host and Rohingya Communities

Two types of respondent groups were selected for data collection through interviews. The two respondent groups are named 'Host Respondents' and 'Rohingya Respondents' and used accordingly in the remaining part of the dissertation (Annexes 3 and 4). There are about 150,000 Rohingya refugees and 50,000 host community households in Ukhiya and Teknaf Upazilas. The sampling procedure was different for the two respondent groups. A total of 814 household representatives were interviewed in the study area. Following the principles of quota sampling, among the 814 interviews, 584 (71.74%) were Hosts, and 230 (28.26%) were Rohingyas.

4.5 Sampling Procedure for the Host Communities

The respondents from host communities were selected from the seven Union Parishads (viz., Baharchara, Hnila, Whykong, Palongkhali, Rajapalong, Jaliapalong, and Gungdhum,) of Teknaf and Ukhiya Upazilas that are affected by the Rohingya influx. In the seven Union Parishads (UP), the number of respondents was distributed based on the size of the Rohingya camps. In a particular UP, the higher the area covered by the camps, the greater the impact presumed; thus, a higher number of respondents were selected for interview from that UP. Firstly, the UP Chairman and Members of the five Ups, commissioners of the Tenaf and Ukhiya Pourashovas, were contacted. The discussion with the UP representatives helped identify the affected Wards (wards adjacent to the Rohingya comps) of the host communities. The respondents were then selected randomly from the identified Wards for interview. The host community households that are confined and still living inside the Rohingya camps were also considered for an interview.

4.5.1 Sampling Procedure for Rohingya Community

For interviews in the Rohingya camps, with the permission of the Camp in Charge (CiC) office, an average of six Rohingya respondents were interviewed from each camp with the help of *"*Head *Mazi"* or *"*Super Head *Mazi"* '*Mazi*[1]' or "*Sub-Mazi*[2]*"* or Community Leader or Head or Rohingya Community of the Camp or Rohingya Community Block Leader, Rohingya

[1] The President of the Rohingya community for each camp
[2] Assistant of *Mazi*

Community Member, Camp Secretary, etc. Interviews covering both genders were considered the most important so that the sampling would be balanced with all experiences, considering age and depth of knowledge.

4.5.2 Wildlife Habitat Survey

The Wildlife of Teknaf Wildlife Sanctuary (TWS) and Sheikh Jamal Inani National Park (SJINP) were surveyed through field observations. Different wildlife and indicator bird species were observed and recorded separately.

4.5.2.1 Wildlife Occurrence Data Collection

Wildlife, particularly mammals, birds, reptiles, and amphibians, were observed in the TWS and SJINP through trail surveys. The walking trails of the two PAs were identified earlier under the Integrated Protected Area Co-management (IPAC) and CREL (Climate-Resilient Ecosystems and Livelihoods) projects. Those walking trails were used to observe the wildlife in different seasons. During observations, photographs of the wildlife were also captured where possible.

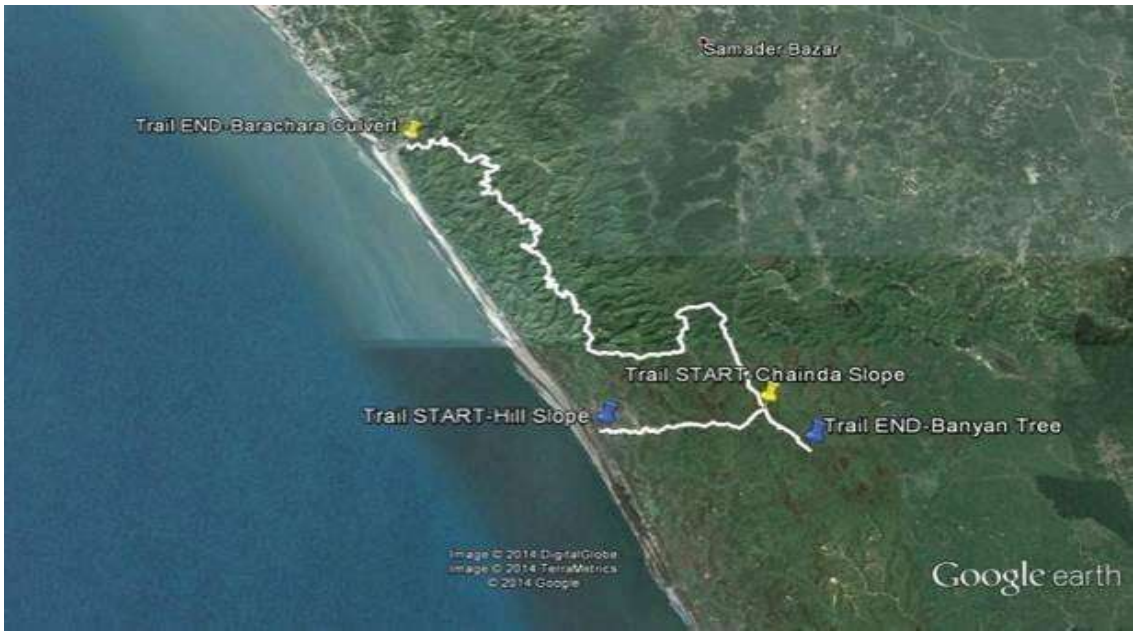
4.5.2.2 Survey of Indicator Birds

The density of indicator bird species was compared for two time periods - eight years (from 2014 to 2022; within this period, the data was not collected in 2017 due to budget limitations of the Climate Resilient Ecosystems and Livelihoods (CREL) Project) for long-term change. For short-term changes in forest state, a four-year time range (from 2019 to 2022) was selected at each study location. Data on the density of indicator birds from 2014 to 2018 were taken from Haque et al. (2018). For the comparisons over 8 years, the mean density of indicator birds for 2021 and 2022 was compared to that of 2014 and 2015, and for the comparisons over 4 years, the density of indicator birds for 2022 was compared to that of 2018 and 2019. Using only the density of indicator birds for 2022 when comparing over 4 years was made to avoid potential overlap or redundancy with the 8-year comparison. Including the mean density of indicator birds from 2021 and 2022 in the 4-year comparison (short-term change) would have included data from a year that was already used in the 8-year comparison, which could have affected the accuracy of the results. Additionally, it is worth noting that a similar approach was used by Haque et al. (2018) when analyzing short-term changes. Therefore, in this study, the density of indicator birds for 2022 was used alone for the 4-year comparison to avoid potential overlap or redundancy with the 8-year comparison that included data from 2021 and 2022.

From 2019 to 2022, 24 sets (4-times / year in 6-trail gives 24-time, i.e., sets) of indicator birds with other birds and animals data were collected following Haque et al. (2018). Each year 4 sets of data were collected. Every year, data was collected from 6 transects, 2 at SJINP (Baro Khal and Silbuniar Chara) and 4 at TWS (Kudum North, Kudum South, Cooty and Toyanga) (Table 4.1, Figs. 4.1 - 4.3).

Table 0.1: Strip transect at two PAs where bird monitoring was conducted during the study

Name of the PA	**Transect Name**	**GPS coordination of two ends**	**Landmarks at two ends**	**Length (km)**
SJINP	Shilbuniar Chara	N 21º13.599´ E 92º03.202´ N 21º13.316´ E 92º03.507´	Shilbuniar Chara Gonamrmore, Lui Kum	2.00
	Baro Khal	N 21º13.300´ E 92º03.509´ N 21º13.385´ E 92º03.108´	Lui Kum, Patakata	1.50
TWS	Kudum North	N 21º05.8´ E 92º09.8´ N 21º05.2´ E 92º10.2´	NSP signboard, Kudum cave	1.25
	Kudum South	N 21º05.2´ E 92º10.2´ N 21º05.4´ E 92º09.5´	Kudum cave, Mahogany plantation	1.27
	Toyanga	N 21º05.2´ E 92º11.9´ N 21º03.9´ E 92º11.6´	Wooden bridge, Toyanga Hill peak	2.49
	Cooty	N 21º03.9´ E 92º11.6´ N 21º04.5´ E 92º11.9´	Toyanga Hill Peak, Cooty cliff	1.21

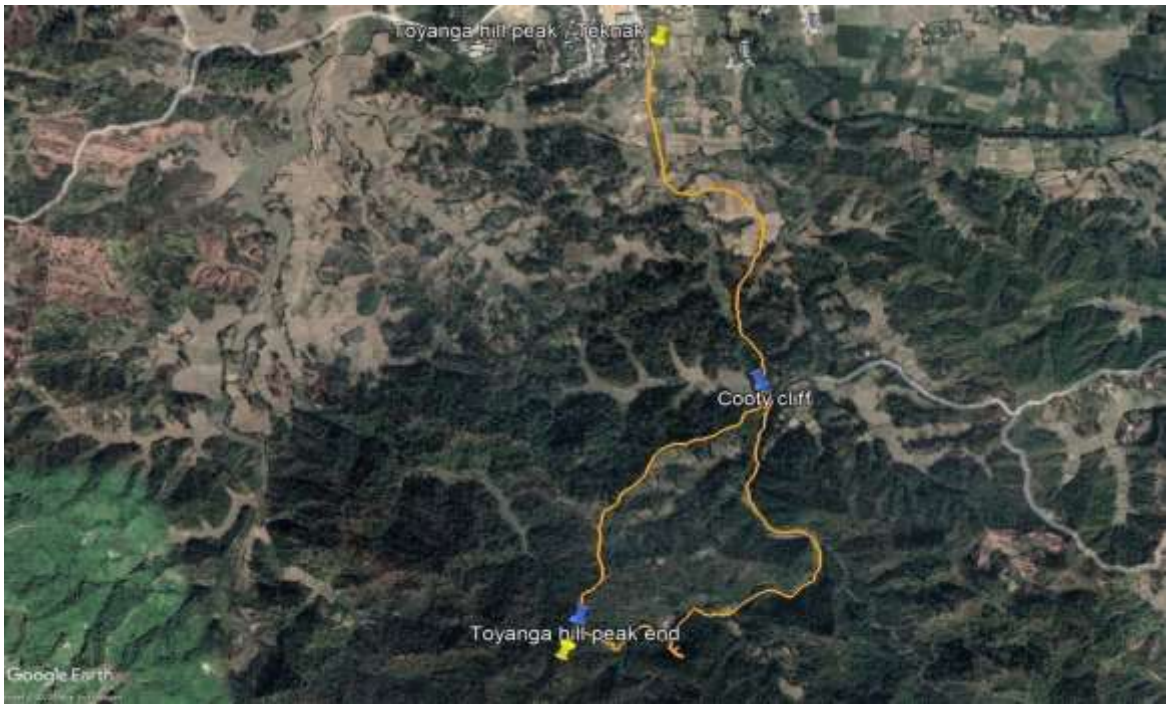


Source: Prepared by the author

Fig. 0.1: Detailed map of Shilbuniar Chara and Baro Khal, SJINP, the white lines represent the transects, yellow and blue marks represent the start and endpoints of each transect.

Source: Prepared by the author

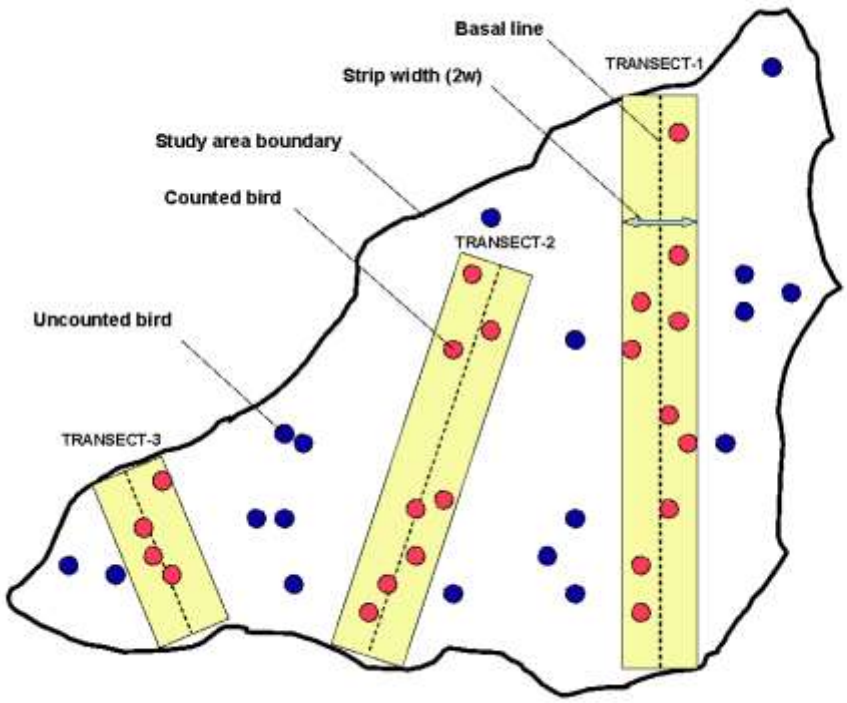
Fig. 0.2: Detailed map of Kudum Cave North and South, TWS, the orange lines represent the transects, yellow and blue marks represent the start and endpoints of each transect.



Source: Prepared by the author

Fig. 0.3: Detailed map of Toyanga and Cooty, TWS, the orange lines represent the transects, yellow and blue marks represent the start and endpoints of each transect.

The initial location of the object (bird) was considered while counting because the object (bird) often moves away after seeing the observer(s). If any object was sighted beyond the pre-determined observation range (strip width), or if the object was seen coming from the back (to avoid duplication), it was not counted; the concept of the method has been shown in Fig. 4.4. For birds documented on-call/song, their distances from the transect line was estimated from experience by the observer(s) and an object was recorded if it was within the defined transect width. A standard data sheet was used to record the counts of indicator birds of TWS (Annex 4) and SJINP (Annex 5).



Source: Anon. 2012a

Fig. 0.4: Diagrammatic representation of strip transect sampling to estimate bird population density in a study area

Each transect was walked each year, and indicator birds (Table 4.2) were counted on 3-5 occasions, but not more than once in any given month. Density was calculated as the mean number of individuals of a species recorded on each transect (mean of different months), summed across all transects in that PA (Protected Area) and divided by the total area of those transects (transact length × 50 m or 40 m according to the site).

Assessing changes in forest conditions is a challenge. Detailed forest inventories are time-consuming and expensive, and while they can characterise and quantify forest structure, they may not measure changes in wildlife due to additional factors such as hunting or plant and tree composition. Since 2005, soon after co-management was piloted in Bangladesh in 2003, a set of resident "indicator" forest birds representative of three forest habitat strata (ground /undergrowth, midlevel (mid-canopy) and upper canopy) have been monitored by experienced birdwatchers through the support of Nishorgo Support Project (NSP), Integrated Protected Areas Co-Management (IPAC) Project and CREL Project. Some indicator species were added to the initial eight, making it 16 in total (Annex 6), with 10 or 11 per site based on the experience of the species typical of different forest types and regions (Haque et al. 2018). For

SJINP, 11 indicator bird species were recorded; for TWS, 10 species were listed (Table 4.2). Methods remained the same –the same defined transects (trails) in each site were walked slowly (by an experienced bird watcher assisted by one or more locally trained person(s)) once per month for 4 months during the breeding season (March to June) indicator bird species in each year. In SJINP, 2 transects totalling 3.5 km in length were surveyed, while in TWS, 4 transects totalling 6.2 km were surveyed.

For SJINP, 11 indicator bird species were recorded, and for TWS, 10 indicator bird species were listed (Table 4.2)

Table 0.2: Indicator bird species in SJINP and TWS

Sl	English Name	Scientific Name	Strata	Main Food	SJINP	TWS
1	Red Junglefowl	*Gallus gallus*	Ground	Seeds	Y	Y
2	Puff-throated Babbler	*Pellorneum ruficeps*	Ground	Insects	Y	Y
3	Abbott's Babbler	*Malacocincla abbotti*	Lower	Insects	Y	-
4	White-crested Laughingthrush	*Garrulax leucolophus*	Lower	Insects	-	Y
5	White-rumped Shama	*Copsychus malabaricus*	Lower	Insects	Y	Y
6	Red-headed Trogon	*Harpactes erythrocephalus*	Middle	Insects	Y	Y
7	Green-billed Malkoha	*Phaenicophaeus tristis*	Middle	Insects	Y	Y
8	Greater Racket-tailed Drongo	*Dicrurus paradiseus*	Middle	Insects	Y	Y
9	Crimson Sunbird	*Aethopyga siparaja*	Middle	Nectar	Y	-
10	Oriental Pied Hornbill	*Anthracoceros albirostris*	Upper	Fruits	Y	Y
11	Hill Myna	*Gracula religiosa*	Upper	Fruits	Y	Y
12	Scarlet Minivet	*Pericrocotus flammeus*	Upper	Insects	Y	Y

4.5.3 Data from Wildlife Habitat Survey

The wildlife occurrence survey collected the names of wildlife, frequency of sight, seasonality of occurrence, etc., from the field. The feces or dung of the wildlife observed in the field during

the survey were also recorded with the name of the respective wildlife. In addition, the availability of food in the habitat was noted in long hand notes during the survey.

All individuals of the indicator bird species found within a 20 - 25 m strip (depending on the site) on either side of the transect line were counted. This was repeated in each survey year. Population density (individuals per km^2) for each species-site-year combination was calculated as the mean number of individuals of a species recorded on each transect (mean of different months), summed across all transects in that PA and divided by the total area of those transects. In addition, other bird species seen during transect surveys were noted to contribute to the total species lists for each protected area.

4.6 Secondary data collection

Wildlife crime-related data were collected from the Bangladesh Forest Department. These data included the number of human-wildlife conflicts, wildlife rescue, casualties, damages by wildlife, etc. In addition, encroachment-related information, such as the number of encroachers, settlers in the forest, eviction, etc., was collected from the respective Beat, Range and Divisional Forest Offices of BFD.

4.7 Data compilation, cleaning and analysis

All data were compiled in MS Excel. The compiled data were cleaned of errors, typos, inconsistencies, outliers, etc. The cleaned data were then processed for estimating the indicators. The analysis was done in MS Excel and R statistical software.

4.8 Data Handling and Analysis

After collecting data, a dataset was built in Microsoft Excel. Based on the suitability and necessity for data analysis according to the research objectives, data were processed and analyzed using the following steps.

4.8.1 Data analysis by MS Excel

Listing: In the questionnaires, there were many lists including lists: (i) list of wildlife, (ii) list of the wildlife which was hunted by the Rohingyas, (iii) list of the collection of NTFPs (Non-Timber Forest Products) by the Rohingyas, (iv) list of threats to the environment with suggestions after the Rohingya influx, (v) list of the created social anarchy issues for host after the Rohingya influx, (vi) list of the suggestions of created social anarchy issues for the host after the Rohingya influx, (vii) types of diseases after the Rohingya influx, (viii) list of the cultural impact of Rohingya influx on the host, (ix) list of the wages of Rohingya children who

are involved in different sectors' workforce, (x) list of the UN organizations, INGOs and NGOs who are working to support the Rohingya and host community, (xi) list of the roles of UN organizations, INGOs and NGOs of forest issues, (xii) list of the impacts on education, (xiii) list of the impacts on mental health about co-existence between Rohingya and host, (xiv) list of the causes of landslides, (xv) list of the damages caused by landslides, (xvi) general comments, and so on. The frequency of responses on these single or multi-select lists was summarized using Microsoft Excel.

Frequency analysis: Frequency analysis was done using the "COUNTIF(range, criteria)" function in Microsoft Excel to find out the frequency of respondents in case of demographic information after the Rohingya influx, which included living duration, educational level, distance from camp, etc., wildlife movement and hunting, exploitation of natural resources, the threat to nature and environment, social imbalance and anarchy, physical and mental health, cultural issues, UN agencies, NGOs, and INGOs role, impacts on educational institutes, landslides and their causes, etc.

4.8.2 Data Analysis by Python

Pandas and Numpy libraries of Python programming language version 3.9 was used to analyze the data on environmental problems faced by Rohingya and the host community and their proposed solutions, causes of social anarchies in host and refugee communities with their suggestions to solve these issues, and the impact of influx on the education of refugees. Fig. 4.5 shows the flow diagram of data analysis in Python programming language. From the survey dataset, all the responses on problems faced by respondents from Rohingya refugees and host communities due to the influx were scrutinized to discover distinct issues using the Python programming language. Distinct issues became new variables in the data file to determine the percentage distribution of each issue. The new data file was fetched in a Python interpreter using Pandas to convert it into a Panda's data frame. After that, specific keywords used to describe different topics were singled out as a *list* data type in the Python interpreter. A *regular expression* was created for each topic to find those keywords in the response column. A function containing the *regular expression* looped through the response was looped through the response column to extract keywords from each cell of the response column. Specific keywords returned were used to generate the specific topic column.

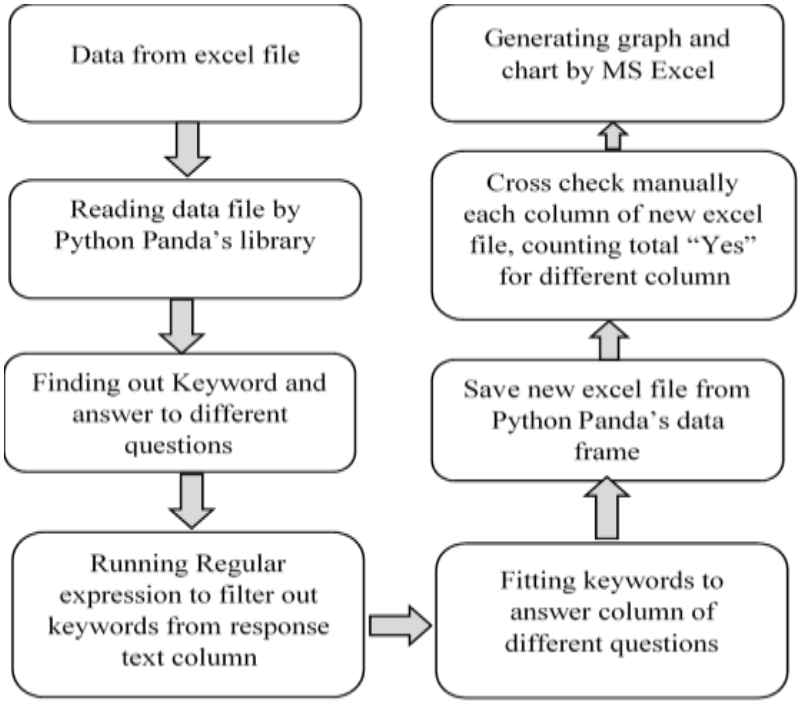


Fig. 0.5: Flow chart showing steps of data Rohingya and host community responses analysis

The updated panda's data frame with new columns was exported as a new Excel file. Finally, all the cells in that Excel file containing the target keywords were replaced by "Yes". Each topic column was manually compared with the main response column to verify the accuracy. In the end, pandas counted the total "Yes" response for each column, and the frequency obtained was used to prepare graphs and charts in MS Excel.

4.8.3 Graphical representation of the summary statistics

Graphical presentations such as graphs, charts, pie charts, etc., based on findings were prepared using MS Excel.

4.8.4 Significance test

The chi-square test was employed to analyze ecologically important wildlife species data (section 6.5). This statistical test was chosen due to its suitability for analyzing categorical data.

4.8.5 Map preparation

Maps shown in Fig. 3.1, Fig. 4.1, Fig. 4.2, Fig. 4.3 and Fig. 6.25 were prepared using Google Earth Pro images retrieved in October 2022. All the maps, including location maps, trail maps, brick field maps, etc., were created using ArcGIS 10.5 software. All other maps noted in this study were taken from different sources and mentioned in the reference section.

CHAPTER 5: DEMOGRAPHY OF THE STAKEHOLDERS

5.1 Introduction

Since both communities (Rohingya and Local) do not receive the same support from their relevant countries' governments, there are some fundamental differences between the two communities in terms of family size, income, education, and so on. Both phases of life of Rohingya in Myanmar and Bangladesh are very different.

5.2 Hypothesis / Research Question

What are the problems of the population size of the host community in the Ukhiya and Teknaf Upazilas and Rohingya communities, and what will be the effects in the future?

5.3 Community-level information

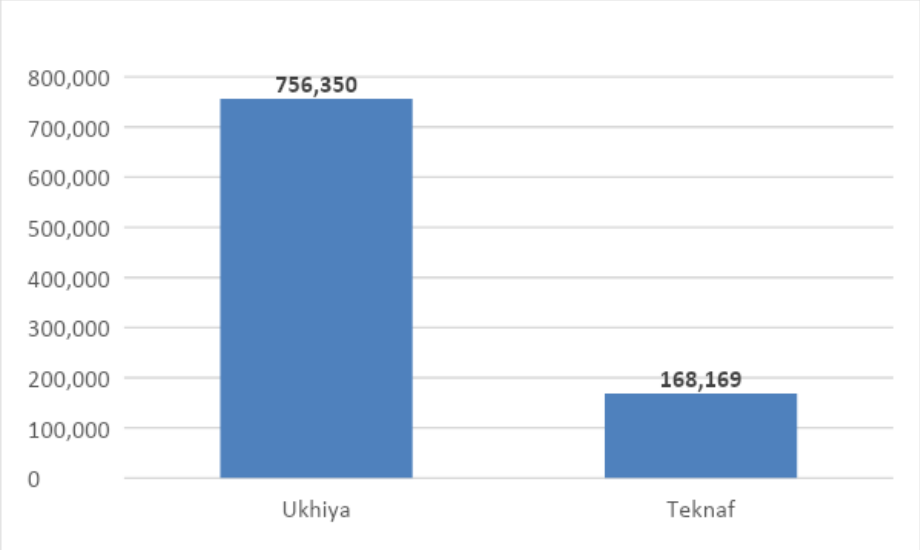
5.3.1 Population and Family Size

Host Community

The total population in Cox's Bazar is 2,823,265, and the total household number in Cox's Bazar is 587,127 (BBS 2022). But no updated Upazila-wise information, such as Ukhiya and Teknaf, is available on the BBS website. In the 2011 BBS study on the National Population Census, the total number of households in Ukhiya upazila was 37,940, and the total population was 207,379. In Teknaf Upazila, the total household number was 46,328, and the total population was 264,389. The average household sizes in Ukhiya and Teknaf Upazilas were 5.4 and 5.7, respectively. At that time, the ratio of males and females in Ukhiya and Teknaf Upazilas were 100:102 and 100:101, respectively (BBS 2011).

Rohingya Community

The average household size is 5.5 people in Rohingya households (ISCG 2020). The Rohingya community population living in Ukhiya and Teknaf Upazilas is 756,350 and 168,169, respectively (Fig. 5.1). Among the total population, 51.4% are male as compared to 48.6% of the female population (Joint GoB - UNHCR 2022b). Based on the age strata, the population of this community consists of 49% children aged 0 to below 18 years and 51% adults aged above 18 to more than 60 years (op. cit.).



Source: Joint GoB-UNHCR 2022b

Fig. 5.1: Population distribution in Ukhiya and Teknaf Upazila of the Rohingya community

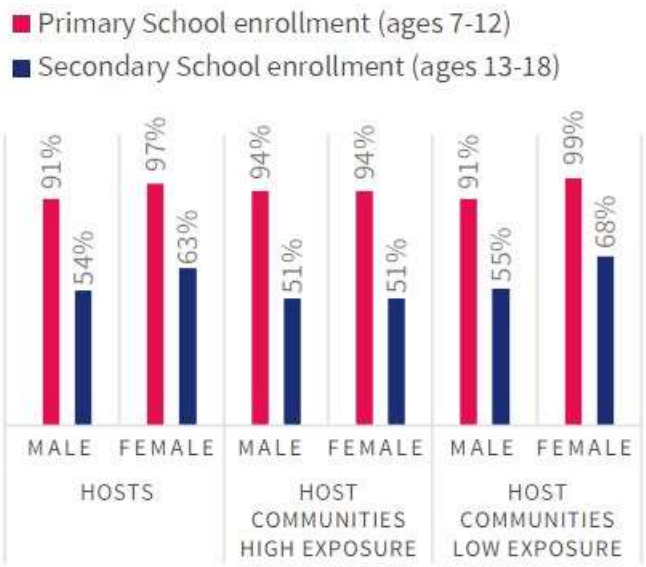
5.3.2 Education

5.3.2.1 Host Community

In high exposure to influx areas, individuals in host communities had less education; in low exposure areas compared to high exposure areas, the percentage of adults with some secondary education is 10% points greater. Children's enrollment rate in high-exposure areas is comparatively less, and drop-out rates are higher (Fig. 5.2, 5.4). Just half of the adult hosts can read, one-third of adults have never attended school, and another quarter of adults have only completed primary school, as illustrated in Fig. 5.3. According to this, only over 60% of adult residents of host towns have access to skilled jobs. Additionally, there is a gender difference in adults' educational attainment: 37% of adult women have no formal education, compared to 29% of men. Men are almost twice as likely as women to complete secondary school, while most women who attend school drop out during secondary school, although 59% of both men and women have only primary education or less (World Bank 2019, Fig. 5.4)**.**

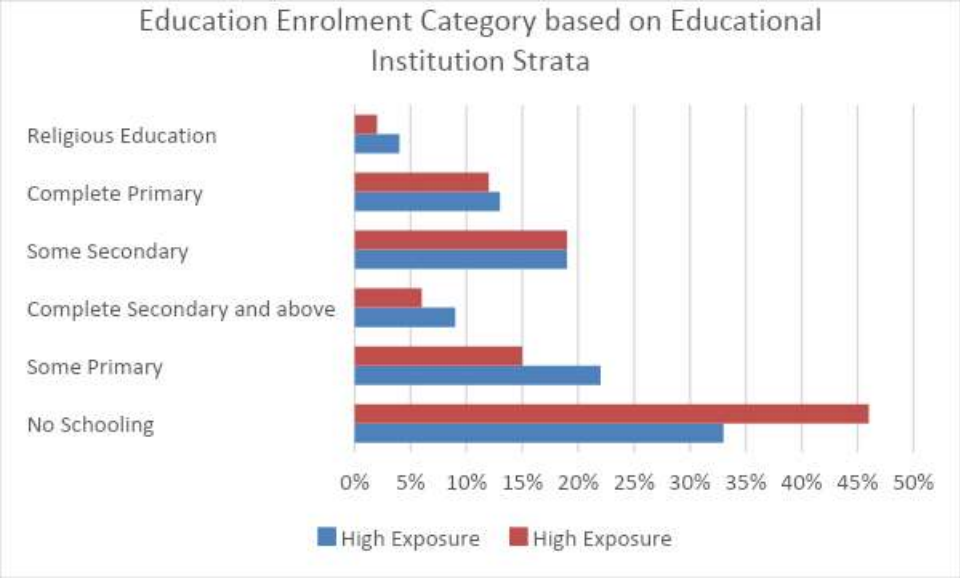
Compared to 32% in low-exposure areas, 38% of adults in high-exposure areas never attended school (Fig. 5.5). This panel study also revealed that adult literacy rates in high-exposure areas are only 52%, but they are 62% in low-exposure areas. Furthermore, low-exposure areas have a share of adults with some secondary education that is 10 percentage points higher than high-exposure areas (World Bank 2019). This study also found that 45% of the children are enrolled in government educational institutions, 34% are enrolled in private educational institutions

(govt. grants or govt. affiliated) and others are enrolled in madrasa and NGO-operated schools as given in (Fig. 5.6).



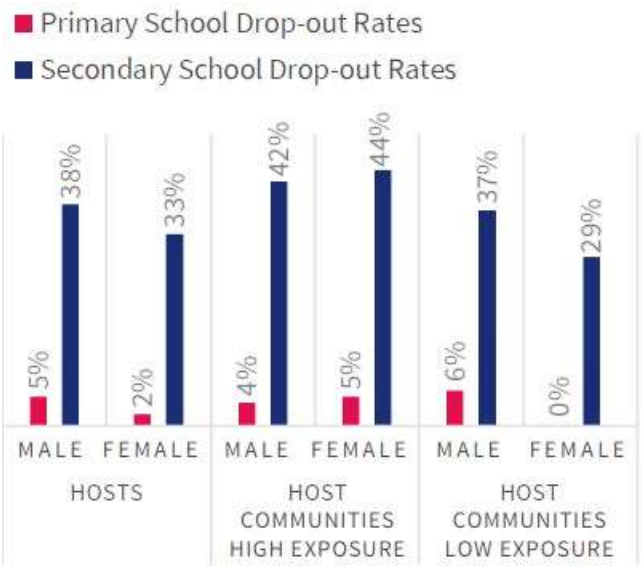
Source: World Bank 2019

Fig. 5.2: Enrollment rate, primary and secondary of the host community



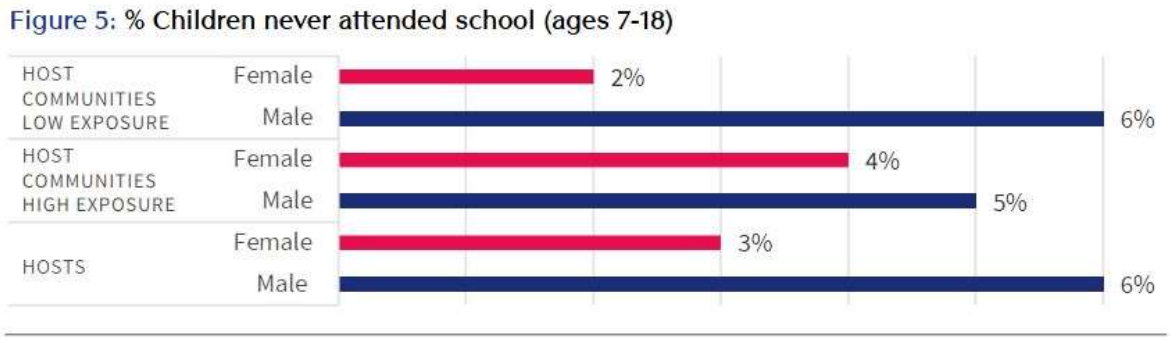
Source: World Bank 2019

Fig. 5.3: Education Enrollment Category based on Educational Institution Strata of the host community



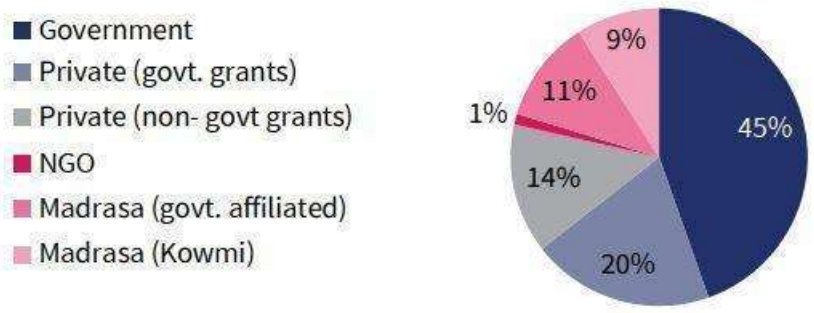
Source: World Bank 2019

Fig. 5.4: Dropout rate, primary and secondary of the host community



Source World Bank 2019

Fig. 5.5: % Children never attended school (ages 7-18) in the host community



Source: World Bank 2019

Fig. 5.6: Host Communities children attending school (ages 7-18)

5.3.2.2 Rohingya Community

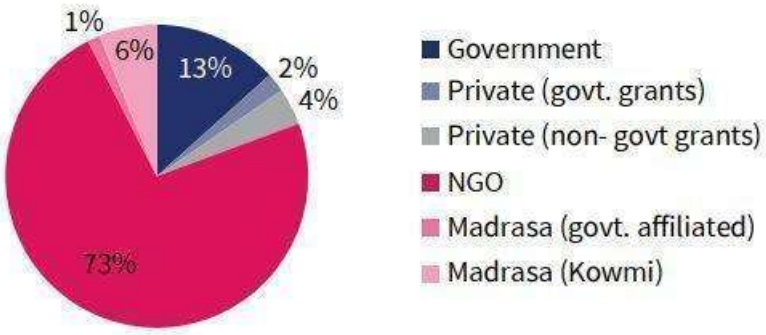
62% of Rohingya adults have never attended school, and another 22% of those who did attend did not finish primary school. Adult literacy is only at 23%. In terms of adult education, there is a significant gender difference as well: 71% of women (compared to 51% of males) never attended school, while an additional 21% did not finish basic school. Only 13% of women can read, compared to 34% of men (Table 5.1).

Table 0.1: Schooling Attainment for Rohingya adults (18+) by gender

Gender	No Schooling	Some Primary	Complete Primary	Some Secondary	Complete Secondary and above	Religious Education
Male	51%	24%	2%	12%	2%	4%
Female	71%	21%	1%	2%	0%	5%

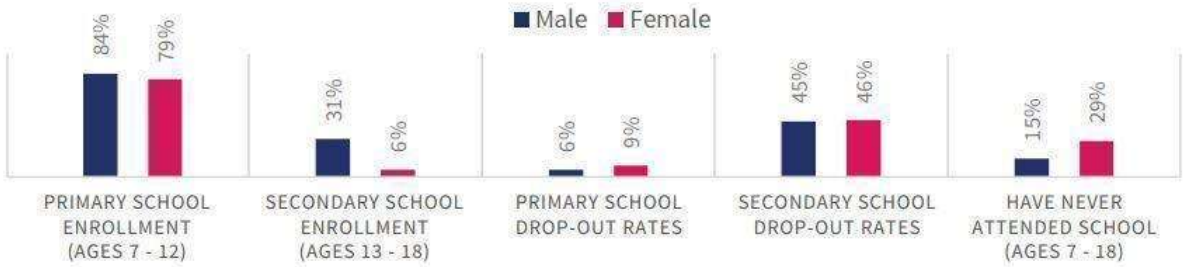
School attendance in Rohingya camps stands at 58%, higher than any education their parents received. A standardized curriculum and instruction are not available to Rohingya children in camps. Approximately 73% of these children attend schools run by non-governmental organizations, as shown in Fig. 5.7

Compared to 95% of Rohingya children in host communities, 82% of Rohingya children in primary school (7-12 years old) are enrolled (with a gender gap in favour of boys). The enrollment rate for secondary school-age children drops significantly, and the gender gap worsens. It is estimated that 84% of Rohingya boys and 79% of Rohingya girls ages 7-12 are enrolled in primary school, but only 31% of Rohingya boys ages 13-18 are enrolled in secondary school, compared to just 6% of girls in a secondary school as given in Fig. 5.8. In this age group, 41% of boys cite financial limitations as their main reason for not attending school. In comparison, 51% of girls cite social restrictions as their main reason. However, the main reason for dropping out of school is displacement, regardless of age and gender, as found in the following World Bank panel study (World Bank 2019).



Source: World Bank 2019

Fig. 5.7: Rohingya children attending school (ages 7-18)



Source: World Bank 2019

Fig. 5.8: Enrollment and dropout rates, primary and secondary, by gender of Rohingya Community

5.3.3 Income

5.3.3.1 Host Community

Bangladeshis living in Teknaf and Ukhiya Upazilas of Cox's Bazar District are poor. According to a recent study (Moslehuddin et al. 2018), approximately 38% of the population lives below the poverty line.

About 42% of adults reside in host communities and are employed or actively looking for work. About 95% of adults who are actively seeking employment are employed. Compared to their counterparts in low-exposure areas, men and women in high-exposure areas participate more in the labour market but have slightly lower employment rates.

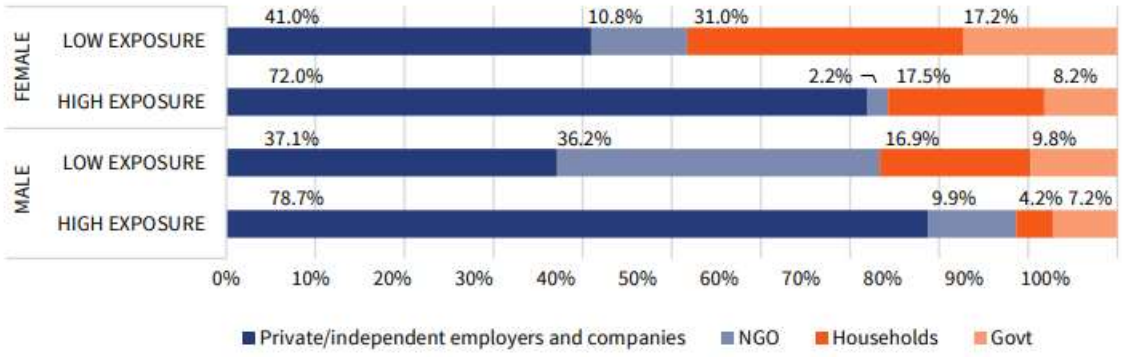
In both categories of hosting areas, women have lower rates of labour force involvement than males. Locations with high and low exposure are responsible for a large portion of all female jobs. 41% of HE (High Exposure) areas rely on agriculture for their subsistence, compared to hosts' 30% of livelihoods in LE (Low Exposure) zones. In HE areas, two out of three

women report farming as their primary industry, compared to 1 in 2 women reporting in LE areas the same in the host communities; employment is held by 42.1% of the population (Fig. 5.9).

While the primary source of female employment is in agriculture, a third of these women who work in LE regions report doing manufacturing work (18%), education (12%), and other self-employed pursuits (9%). Women in HE regions should have the fewest different types of jobs. The top two employers outside of agriculture are 8% of manufacturing and the health and social work sectors (5%). Careers in healthcare and social work, both potentially produced in Rohingya refugee camps, used a slightly more significant percentage of high-exposure women than those with limited exposure, and overall, More host ladies than men are employed there. In HE areas, men and women are notably more likely to mention having a second job. Overall, host workers in HE areas are 66% more likely to have a second job than residents of LE areas.

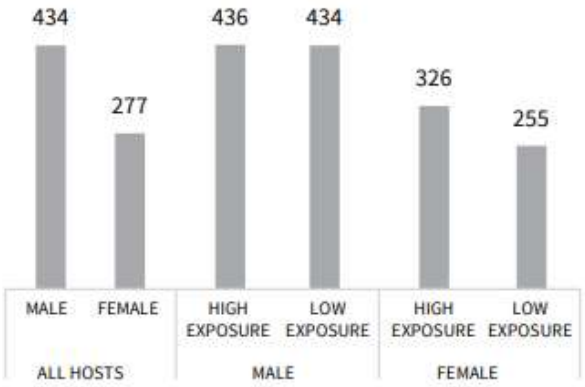
Men in host communities depend equally on paid employment (52%) and self-employment, company ownership, or employment for another household (48%). On the other hand, more than two out of every three women report being self-employed, indicating that they are increasingly dependent on non-wage sources of income.

While the average daily salaries in high and low-exposure areas are both BDT 414 and BDT 409 (1 US$ = 93 BDT), the gender wage disparity is considerable, with men earning 57% more per day than women, mostly due to the low daily wages reported by women in low-exposure areas. On the other hand, the daily wage for women in HE areas (BDT 326) is 28% greater than in LE districts (BDT 255), as shown in Fig. 5.10.



Source: World Bank 2019

Fig. 5.9: Share of employers among men and women of the host community

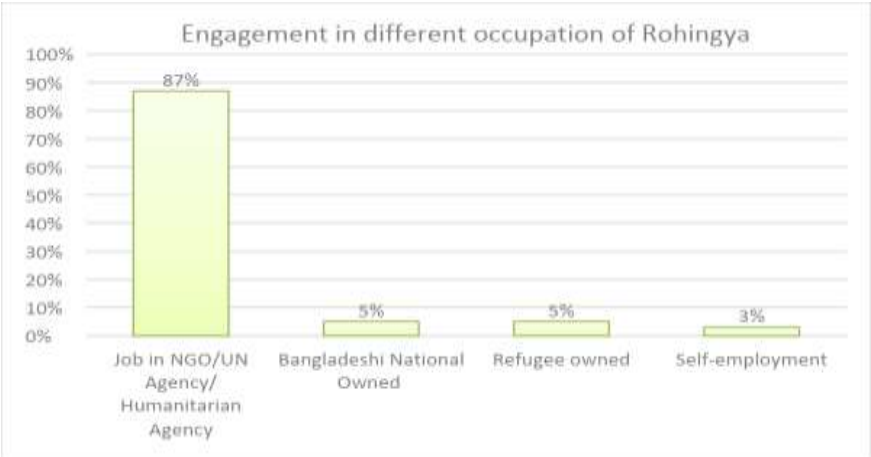


Source: World Bank 2019

Fig. 5.10: Average daily wages for men and women of a host community

5.3.3.2 Rohingya Community

Refugees rely heavily on humanitarian aid since employment opportunities are limited. UNHCR survey reveals that humanitarian organizations primarily assist 87% of refugees. Refugees generate income outside of volunteer work and cash-for-work programs through employment with Bangladeshi-owned businesses (5%) or self-employment (3%), as shown in Fig. 5.11. In the camps, self-employment can include floating vendors, selling subsistence vegetables, crops, tailoring, and other services and goods in their store. Drivers, plumbers, herbal doctors, religious leaders, private tutors, and small businessmen were among the occupations cited by respondents in the UNHCR survey. Workers who work for businesses owned by others are mostly agricultural labourers, earth workers, garbage collectors, manual labourers, tailors, porters, repairmen, carpenters, masons, midwives, and fishermen.



Source: World Bank 2019

Fig. 5.11: Engagement in different occupations of Rohingya

Compared to Rohingya refugees from the Cox's Bazar Panel Survey 2019 baseline report, barely one-third participate in the labour force and only 64% report earnings. Only 7% of the

respondent households had two working individuals, whereas 80% of the households had just one wage earner, and 12% had no employees at all.

The average monthly allowance earned by households with a refugee volunteer is roughly BDT 8,057 (US$ 93), according to respondents to a UNHCR study. The average household income for cash-for-work recipients is BDT 6,694 (US$ 78). Refugee volunteers who qualify for better hourly rates than cash-for-work recipients under the skilled categories make, on average, 20% more than these unskilled category individuals.

The host community (within and around Rohingya Camps) and Rohingya are the stakeholders of this study. During this study, 814 respondents from different families were interviewed (Annex 7). Among the respondents, 584 (i.e., 71.74%) were from the host community, and 230 (i.e., 28.26%) were Rohingya. Of the host community, 179 (i.e., 30.65%) were Key Important Information Respondents (KIIRs) and 23 (i.e.10%) Key Important Information respondents from the Rohingya community were interviewed to assess the entire situation. The KIIRs included *"*Head *Mazi", "*Supper Head *Mazi",* '*Mazi*[3]', or "*Sub-Mazi*[4]*",* Community Leader or Head of the Rohingya Community of the Camp, Rohingya Community Block Leader, Rohingya Community Member or Camp Secretary, and others from the Rohingya community's side. On the other hand, Forest Department personnel such as Divisional Forest Officer (DFO), Assistant Conservator of Forests (ACF), Range Officer (RO), Beat Officer (BO); officials from Bangladesh Police and Border Guard Bangladesh (BGB), representatives from other law enforcement agencies, officials from local government institutions such as Chairman and Vice-Chairman of Upazila Parishad, Upazila Nirbahi Officer (UNO), officials of the different Government agencies, officials of RRRC and CiC Offices, Chairman and members of Union Parishads (UP), and officials; local elites as professors, teachers, journalists, land-lords, businessmen, doctors, representatives of different political parties, co-management organizations representatives, representatives from national and international NGOs, UN agencies, and others, were the key important person for key important information on the side of the host community. Host Community trap in twenty-one camps. Among 584 host community respondents, 363 respondents were from those camps.

[3] The President of the Rohingya community for each camp

[4] Assistant of *Mazi*

5.4 Materials and Methods

The host community (within and around Rohingya camps) and Rohingya are the stakeholders of this study. Data were collected by interviewing Rohingya and local people (host community) with self-made questionnaires (Annexes 3 and 4) about their population compositions in different aspects (See Chapter 4, Section 4.2, 4.3 and 4.4).

5.5 Results and Discussion

5.5.1 Population Structure

During this study, 814 respondents from different families were interviewed. Among the respondents, 584 (i.e., 71.74%) were from the host community, and 230 (i.e., 28.26%) were Rohingya. Of the host community, 179 (i.e., 30.65%) were Key Important Information Respondents (KIIRs), and 23 (i.e., 10.00%) KIIRs from the Rohingya community were interviewed to assess the overall scenario. The KIIRs of the Rohingya population included *"*Head *Mazi"* or *"*Supper Head *Mazi"* '*Mazi*[5]' or "*Sub-Mazi*[6]*"* or Community Leader or Head or Rohingya Community of the Camp or Rohingya Community Block Leader, Rohingya Community Member, Camp Secretary, etc. On the other hand, Bangladesh Forest Department personnel such as Divisional Forest Officer (DFO), Assistant Conservator of Forests (ACF), Range Officer (RO), Beat Officer (BO); officials from Bangladesh Police and Border Guard Bangladesh (BGB), representatives from other law enforcement agencies, officials from local government institutions such as Chairmen and Vice-Chairmen of Upazila Parishad, Upazila Nirbahi Officers (UNOs), officials of the different Government agencies, officials of RRRC (Refugee Relief and Repatriation Commissioner) and CiC (Camp-in Charge) Offices, Chairmen and Members of Union Parishads (UPs), and other officials; local elites as professors, teachers, journalists, land-lords, businessmen, doctors (physicians), representatives of different political parties, co-management organizations' representatives, representatives from national and international NGOs, UN agencies, etc., were the key important persons for key important information on the side of the host community. Host Community trap in twenty-one camps. Among 584 host community respondents, 363 (i.e., 62.12%) respondents were from those camps.

The study was conducted in 13 Wards under seven Union Parishads of three Upazilas, Teknaf, Ukhiya and Naikkongchari (Table 5.2). The highest participation of hosts (44.33%) was from

[5] The President of the Rohingya community for each camp
[6] Assistant of *Mazi*

Palongkhali Union under Ukhiya Upazila; the lowest number of participants was from Gungdhum Union under Naikkongchari Upazila (1.03%).

Table 0.2: Upazila, Union, Ward-wise Participation of General Host (%)

District	Upazila	Union	Number of Ward Study	Participation of Host (%)
Cox's Bazar	Teknaf	Whykong	2	8.25
		Baharchara	2	4.90
		Hnila	2	19.33
-do-	Ukhiya	Rajapalong	1	20.36
		Palongkhali	4	44.33
		Jaliapalong	1	1.80
Bandarban	Naikkongchari	Gungdhum	1	1.03
Total	**3**	**7**	**13**	**100.00**

5.5.1.1 Gender of Stakeholders

In both surveyed communities, the males were higher than the females during this study (Fig. 5.12). During the survey, female participation was less among the Rohingya community 23.04%) than that of the host community (33.9%) (Fig. 5.12). A female leading role was not found in the Rohingya community.

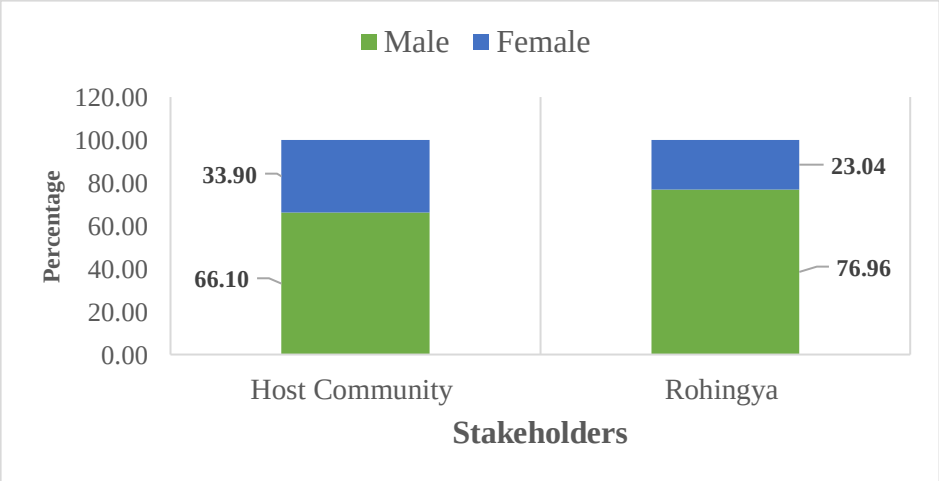


Fig. 5.12: Gender of stakeholders

5.5.1.2 Educational status

Five educational levels: (i) Illiterate, (ii) Below SSC, (iii) SSC, (iv) HSC, and (v) Graduate were categorized to determine the academic status of the host and Rohingya communities. The educational system of Rohingya and host communities are both *Madrasa* (religious education) and *general schooling* based. We fixed an equivalent scale for assessing educational status. The graduate rate is higher in the host community (22.4 %) than in the Rohingya (0.4%). Around 8% of people are illiterate in the host community, the Rohingya community. The education level (below SSC, SSC and HSC) of the Rohingya community is lower than that of the host community (Fig. 5.13).

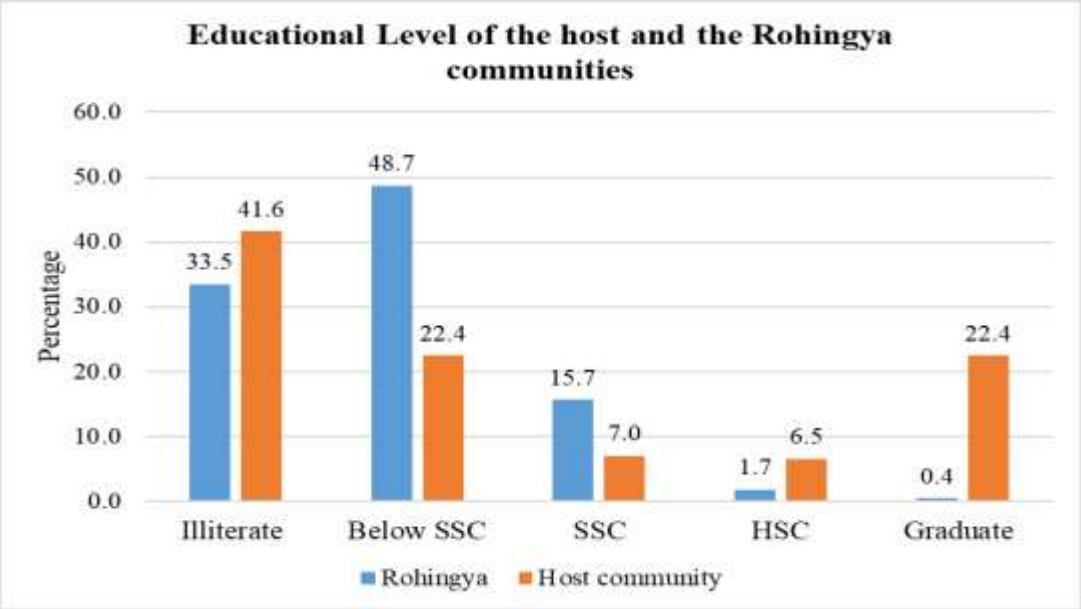


Fig. 5.13: Educational Level of the Host and the Rohingya Communities

5.5.1.3 Age Range of Stakeholders

Four classes of age categories of the stakeholders were considered: (i) 18 - <30 years, (ii) 30 - < 45, (iii) 45 - <60 years, and (iv) > 60 years for easy and better understanding to represent their views through questionnaires. The highest category belonged to 30 - < 45 years, i.e., middle age class in both hosts (44.49%) and Rohingya (43.48%) communities, and the lowest category was also < 60 years in both communities- host (8.09%) and Rohingya (2.17%) (Figure 5.3). The presence of middle-aged (30 - < 45 years) and young-aged (18 - < 30 years) people in both communities reflects the economically productive population in the stakeholders (Fig. 5.14).

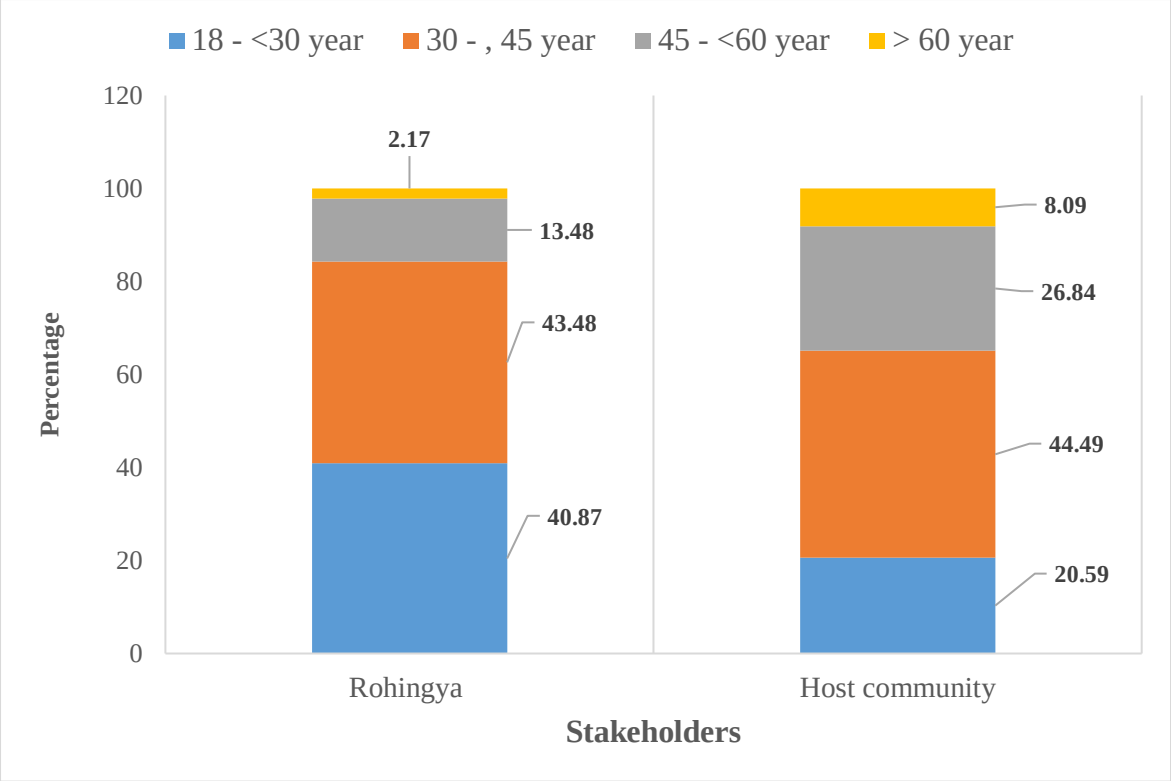


Fig. 5.14: Age comparison between Rohingya and Host community

5.5.1.4 Living Duration of the Stakeholders

Most of the host community (89.63%) live in the Rohingya camp areas for more than 20 years, and the rest of the people live there for less than 20 years, mainly Government employees or migratory people (Fig. 5.15). On the other hand, most of the Rohingya (91.79%) came here after the refugee influx of 25 August 2017, so their living duration in the area is not more than five years, and the rest of them came here after the 1990 influx they are living here more than 20 years (Fig. 5.15).

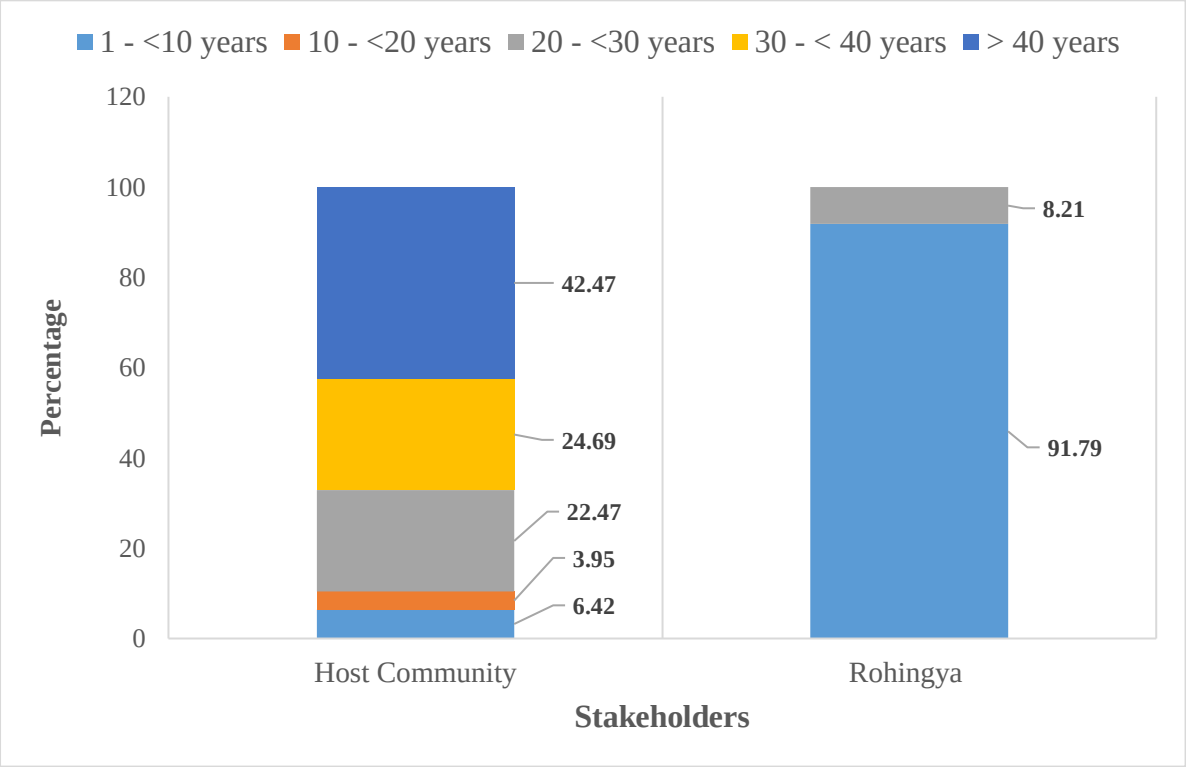


Fig. 5.15: Living duration of the host Community and Rohingya

5.5.1.5 Stakeholders' Engagement in Refugee-related Job

More than half (51.3%) of the Rohingyas are involved in refugee-related jobs, whereas only 10.7% of the host community is involved (Fig. 5.16).

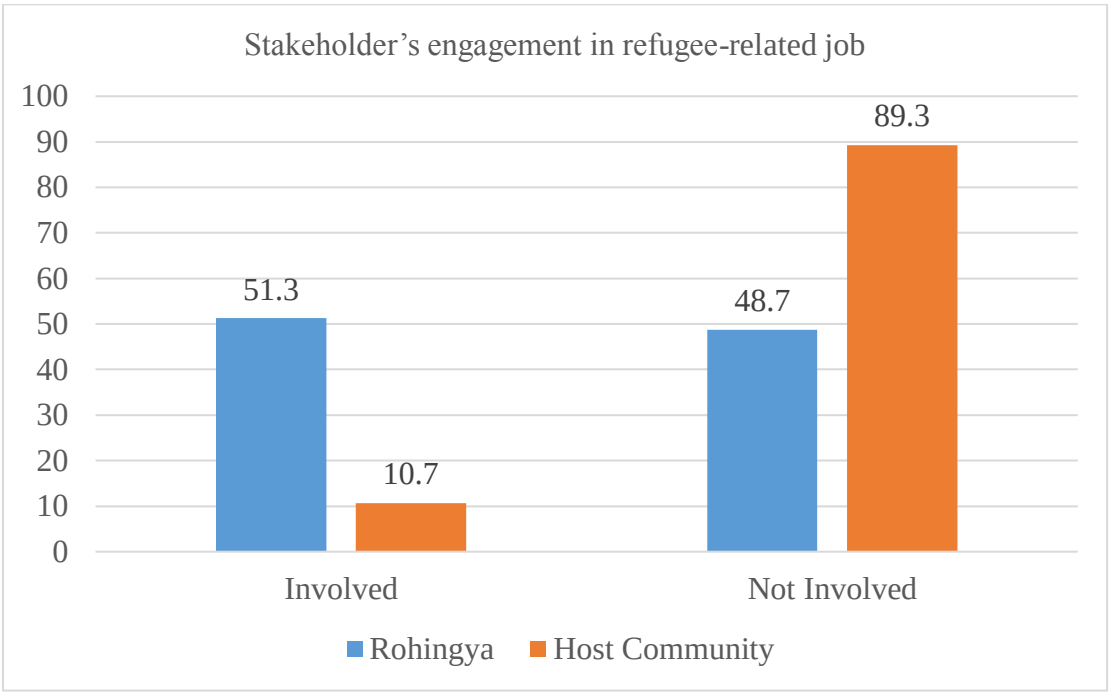


Fig. 5.16: Stakeholders' Engagement in refugee-related job

5.5.1.6 Monthly Income of the Stakeholders

5.5.1.6.1 Monthly Income of the Rohingya

The monthly income of the Rohingya (General and KII) is less impoverished than the host community. Still, they get accessible housing facilities, food, medical, and other essential livelihood facilities like LPG (Liquid Petroleum Gas) facilities from the government and NGOs. So, less income does not hamper their daily life. The monthly income of the majority of the Rohingya people (77%) ranges from BDT 5,000 – 10,000 (US$ 52.63 – 105.26, 1 US$ = 95 BDT), and more than BDT 10,000 is earned by 11% of them, who are mostly leaders of the community (Fig. 5.17).

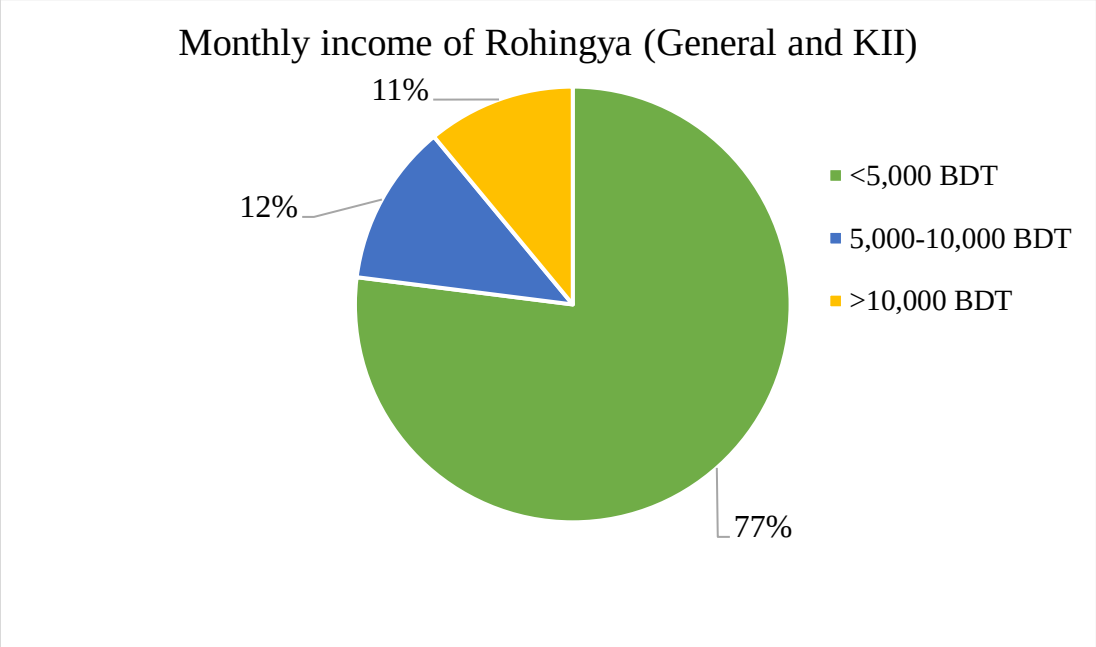


Fig. 5.17: Monthly income of Rohingya (General and KII)

5.5.1.6.2 Monthly Income of the Host Community

The host community's income is further classified as host (general) and Host (Key Informant Interview). Key Important Interviewers include the local leaders, CiC (Camp-in-Charge), Government officials who have linked the Rohingyas, Upazila and Union level Government Officials, Non-government Organization (NGO) officials, etc. Little more than half (51.61%) of the total population in the general host community earn < BDT 10,000 (US$ 105.26). Less than half (46.54%) of the general host community earn BDT 10,000 - <30,000 (US$ 315.79) (Fig. 5.18). So, we can say that more than 95% of general hosts earn < BDT 30,000, but they don't get any government support like the Rohingyas (Fig. 5.18). Among the Key Important Interviewers, 48.46% earn BDT 20,000 - <40,000 (US$ 210.53 - <421.05) per month and

8.46% earn > BDT 100,000 (US$ 1052.63) per month (Fig. 5.19). Most of them are directly or indirectly involved with the Rohingya camps.

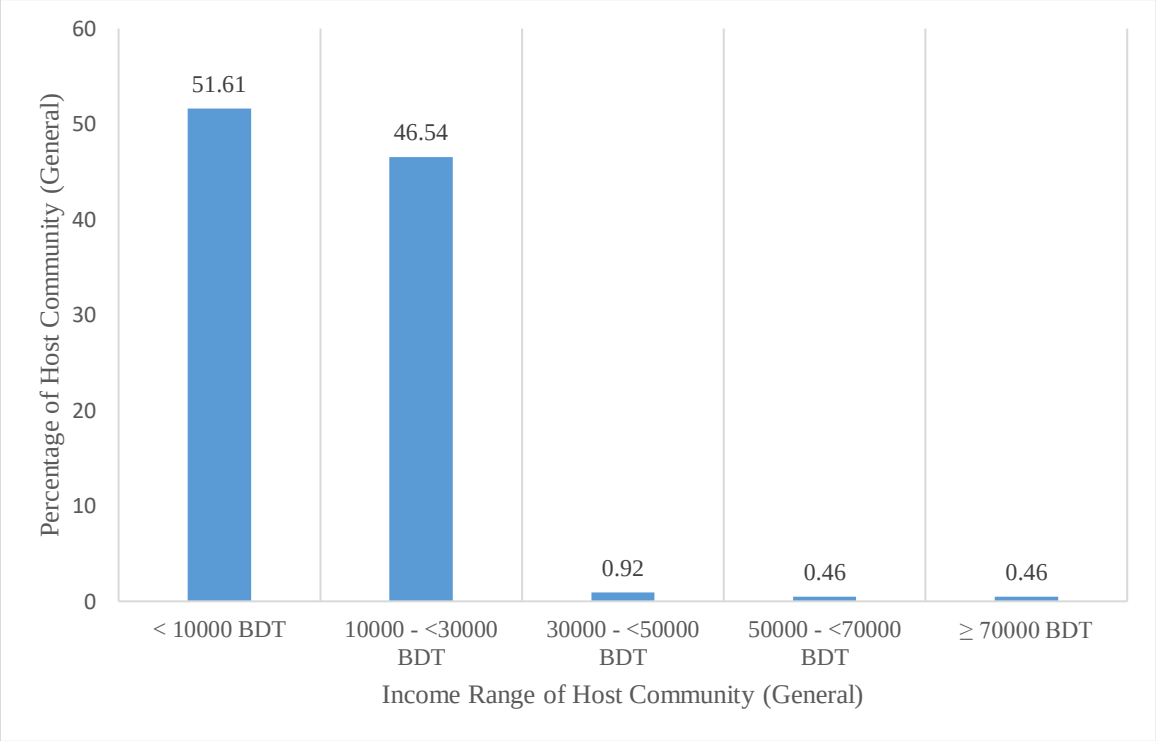


Fig. 5.18: Monthly income of host community (General)

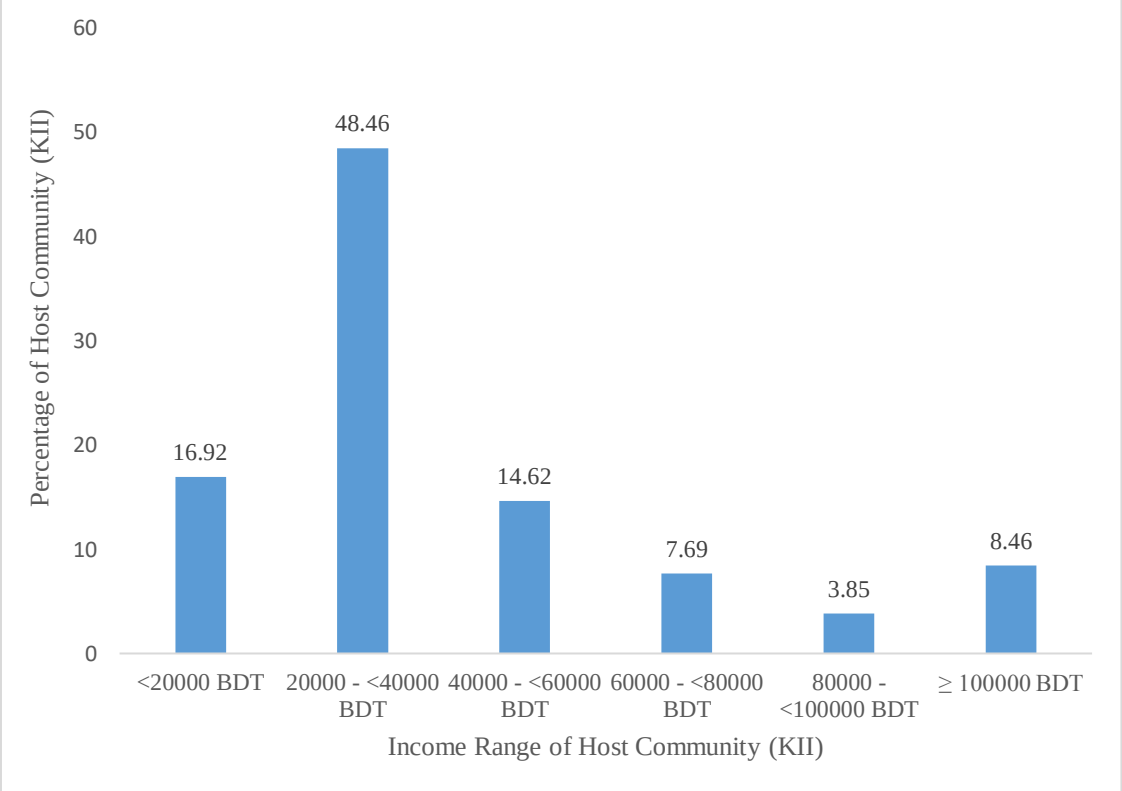


Fig. 5.19: Monthly income of Host Community (KII)

5.5.2 Living distance from camp

All of the Rohingya populations live within the camp. Twenty-one of the 31 Rohingya camps have encircled the host community. Among the host community, 64.88% live within a 1 km radius of the camps, 18.48% live within the Rohingya camps, and 2.59% live more than 5 km away from the Rohingya camps (Fig. 5.20). The lifestyle and daily life of the hosts who live within the camps are significantly influenced by the Rohingyas.

Fig. 5.20: Distance of stakeholders from camp

5.6 Comments on the Hypothesis

The host has become a minority in numbers to that of the Rohingya in the Teknaf and Ukhiya areas, and in the near future, this will create a more imbalanced situation of the host and Rohingya population structure. This can be explained as follows:

The geometric population projection of the host community has been calculated based on the 2011 population census (BBS 2011), and subsequently, the population size has been estimated according to the country's average growth rate. The available data on the population size of Teknaf and Ukhiya Upazilas are available for 2015. According to BBS (2011), Bangladesh's average growth rate population was 1.47%. Based on this rate, the total population of the host community for the two Upazilas were 569,605 in 2015, and it will be 640,829 in 2023 and will be 786,333 in 2040 (Table 5.3). On the other hand, the population growth of the Rohingya

community is 5% (PTI 2022), and their geometric population projection is 960,539 in 2023 and will be 2,201,573 in 2040 (UNHCR 2023b).

Table 0.3: Geometric population projection of host and Rohingya in the Teknaf and Ukhiya

	2015	2023	2040
Teknaf	310,575	349,034	428,939
Ukhiya	259,030	291,795	357,394
Host	569,605	640,829	786,333
Rohingya	0	960,539	2,201,537

The exponential population projection method shows a similar result to geometric population projection (Table 5.4). According to the method, the projected population size of the host will be 640,688 in 2023, and it will be 788,351 in 2040 (Table 5.4). In contrast, in 2040, the Rohingya population will be 960,539 in 2023 and 2,247,322 in 2040 (Table 5.4). It should be mentioned that in 2023, the Rohingya population size will be 1.5 times higher than the total host population. In 2040, the total population size of the Rohingya people will be 3 times higher than the host population.

Table 0.4: Exponential population projection of host and Rohingya in the Teknaf and Ukhiya

	2015	2023	2040
Teknaf	310,575	349,333	429,845
Ukhiya	259,030	291,355	358,505
Host	569,605	640,688	788,351
Rohingya	0	960,539	2,247,322

The analysis indicates that the host would face several problems and challenges in the future due to the pressure of the high population growth rate of the Rohingya population. This will severely threaten the host and put them in a more vulnerable position regarding security, economic crisis, unemployment, social vulnerability, human-induced climate hazards, etc. It will create more imbalance and challenging and vulnerable situations for the host.

CHAPTER 6: IMPACT OF ROHINGYA INFLUX ON WILDLIFE AND THEIR HABITATS

6.1 Introduction

Etymologically, wildlife means all forms of life on Earth which grow and propagate without human interference. That means they remain in wild form without any friendly association with man. The definition of wildlife varies from country to country, society to society and even within a country. In Bangladesh's official context, 'wildlife' means different types and varieties of animals or their different developmental stages of life cycle whose origins are considered as wildlife (Conservation and Security) Act, 2012 (Anon. 2012). Here, wildlife is considered all vertebrates except humans, fish and domesticated animals, which means it includes amphibians, reptiles, birds and mammals, including the eggs of reptiles and birds and their body parts (Ahsan 2022). All undomesticated animals are wildlife, including Amphibia, Reptilia, Aves and Mammalia, but excluding Pisces and all invertebrates (Khan 1982).

The study area covers TWS (Teknaf Wildlife Sanctuary), SJINP (Sheikh Jamal Inani National Park), Teknaf Upazila and Ukhiya Upazila, respectively, so the background description of these areas will provide information about wildlife and their habitats in those areas. This is because wildlife habitats in some of these areas have been totally lost, and the rest are heavily infected by the influx of Rohingya refugees of 2017 in Bangladesh. Much of the existing environmental security literature examines the causal linkages between environmental scarcity and violent conflict (Martin 2005).

6.2 Hypothesis / Research Question

How and what sort of impacts does Rohingya influx have on wildlife and habitats, including related natural resources?

6.3 Background of the Teknaf Wildlife Sanctuary (TWS)

Cox's Bazar Forest Division was created during 1919-1920 (Chowdhury 1993), consisting of reserved forest land of this divisional area. Under this Division, the Teknaf peninsula was declared Teknaf Game Reserve (Elephant) in 1983 by the Gazette Notification No. XIII/For-68/83/770 (dated November 17, 1983), which was the only Game Reserve in the country (Anon. 2011). TGR (Teknaf Game Reserve) was one of the oldest protected areas of the country and the only of its kind, but protection for either wildlife, including the Asian elephant habitat, could not be ensured under its legal status and hence changed to Teknaf Wildlife

Sanctuary in 2010 by the Gazette Notification No. XIII/For-65/83770 (dated March 24, 2010) under the provisions of Article 23 (1) of the Bangladesh Wildlife Preservation Order (President Order No. 23 of 1973) comprising a hill forest area of 28,688 acres (11,609.622 ha, 44.825 sq miles). It is located in Teknaf Upazila of Cox's Bazar District and comprises a range of steep hills aligned north-south and bordered by the Bay of Bengal to the west and a narrow strip of lowlands and settlements along the Naf River to the south and east and Inani reserve forest to the north (http://nishorgo.org/project/teknaf-wildlife-sanctuary/). Numerous hilly streams flow down on both sides and harbour unique eco-tones edging the sea and the hills (Chowdhury 2022).

This Act prohibits activities, living or entering or trapping of any wildlife, and agricultural destruction of the sanctuary habitat. Introducing exotic animals or releasing domesticated animals in the sanctuary is also prohibited. However, such activities could be allowed by the government only when it is deemed necessary for its development, beautification or any other scientific reasons (Bangladesh Wildlife (Preservation) (Amendment) Act, 1974). The main objectives of changing TGR into a Teknaf Wildlife Sanctuary (TWS) were from a management perspective where the management program will be to (i) maintain ecological succession in the constituent forests by providing effective protection against biotic interference, (ii) develop and maintain natural forests as good habitat, favouring wildlife; (iii) conserve the forest resources including the constituent biodiversity; (iv) identify and conserve Asian elephant movement corridors; and (v) establish co-management practices through stakeholders' consultations and active participation (NSP 2006).

TWS spreads in five Union Parishads and one Pourashova of Teknaf Upazila of Cox's Bazar District; these Unions are Baharchara, Hnila, Subrang, Teknaf Sadar and Whykheong, and Teknf Pourshova. From the administrative perspective of the forest, TWS spreads over three forest ranges: Teknaf, Whykheong, and Shilkhali. These ranges comprise 11 Forest Beats as Teknaf Range comprises Teknaf, Mochoni, Hnila and Maddya Hnila; Whykeong Range comprises Whykeong, Rykkong, Shamlapur and Monkhali; and Shilkhali Range comprises Shilkhali, Mathabanga and Rajarchara. At TWS, Forest Range-based 3 CMGCs (Co-Management General Committee, earlier popularly known as Co-Management Council (CMC)), CMCs (Co-Management Councils) are working with and under the guidance of BFD (Bangladesh Forest Department), which Whykong CMC was formed first time on August 29, 2005; similarly, Teknaf CMC on August 29, 2006, and Shilkhali CMC on September 27, 2006.

TWS has several attractions like Nitong Hill, Teknaf Nature Park (this easily accessed area has shady forests, three small lakes, three hiking trails, an interpretation centre, and accommodation for visitors, Shilkhali Garjon Forest, Kudum Cave, Toyangya Hill, Kuthi Hill, Kudum Cave, Cooty Hill, different tribal villages, etc. The Toiangya has the highest peak among the other hills, with an elevation of about 1000 feet (305 m).

To support the BF

D, co-management practices started in TWS during 2005-06 with the financial support of USAID through the Nishorgo Support Project (NSP) ('The Co-management of Tropical Forest Resources in Bangladesh', was also popularly known as the 'Nishorgo Support Project'). Later, these co-management practices were supported by IPAC (Integrated Protected Area Co-Management) (2009-2013), CREL (Climate-Resilient Ecosystems and Livelihoods (2013-2018), and Nature Conservation through Livelihoods Improvements (Nature and Life) Project – Teknaf, Cox's Bazar, Bangladesh from 2020 to date. For the protection of forests as a co-management initiative, based on Protected Area Co-Management Rules 2017 (earlier followed by Co-management Gazette 2006, which was Amended in 2009), BFD formed Range-based 3 CMGCs (Co-Management General Committee, earlier it was popularly known as Co-Management Council (CMC), 128 VCFs (Village Conservation Forum), 3 PFs (Peoples' Forums), 18 CPGs (Community Patrolling Groups consisting of 415 members including 43 females (2 groups)), the first women-only community patrol group, named Kerontoli Female CPG, in Bangladesh, and the President of this group, Mrs. Khurshida Begum, received the international 'Wangari Mathai Award 2012' for Nature Conservation on 27 September 2012 in Italy, which is a significant recognition to this effort. BFD also formed 3 ERTs (Elephant Response Teams consisting of 30 members, all were male).

The TWS is rich in biodiversity (Nishat et al. 2002). Despite the degradation, TWS is still home to a small population of endangered Asian Elephants, and its population ranges from 15-24 (UNHCR and IUCN 2018), which comes into regular conflict with local people. Feeroz (2013) reported 384 wildlife species, including 12 amphibians, 56 reptiles, 260 birds, and 55 mammals from TWS. The fauna of the WS has been only partially studied, but the wider Teknaf peninsula is the home to a diverse fauna: some 260 species of birds, including the impressive and globally vulnerable Great Slaty Woodpecker and Grey Peacock Pheasant and mammals such as Rhesus Macaque, Capped Langur and Hog Badger. Uddin et al. (2013) reported 538 species of plants belonging to 370 genera and 102 families in the TWS.

Once this sanctuary held extensive tropical mixed evergreen forest, patches remain, but much of the original forest has been cleared or degraded since the 1990s. Coastal communities and ecosystems here are vulnerable to cyclones and tidal surges. The hilly terrain of TWS faces several climate-related hazards. In particular, heavy rainstorms, localized flash floods, and landslides in the wet season destroy crops and infrastructures and damage wild habitats. Also, more intense dry seasons result in drying ponds and waterways, and local people face a shortage of fresh drinking water. Restoring a sustainable forest ecosystem to significant areas of the Teknaf watershed hills is vital to improve water and soil retention and enhance the resilience of wildlife and local communities to the threats posed by degradation and climate change after the Rohingya influx of August 2017, which has increased numerous times. Out of 33 Rohingya camps, 7 have been established in the TWS.

6.4 Background of the Sheikh Jamal Inani National Park (SJINP)

Cox's Bazar Working Plan (Chowdhury 1993) mentioned that Cox's Bazar Forest Division was created during 1919-1920, consisting of reserved forest land of this divisional area. Sheikh Jamal Inani National Park (SJINP) (also known as Inani National Park) is a protected area in Bangladesh (Bangladesh Forest Department 2022). It is located at Ukhiya Upazila of Cox's Bazar District. The park is named after Sheikh Jamal, the second son of the Father of the Nation, Bangabandhu Sheikh Mujibur Rahman. The Government of the People's Republic of Bangladesh declared it a national park on 15 April 2019 and published it in the Bangladesh Gazette on 09 July 2019 under the provisions of Article 13 (1) Wildlife (Conservation and Security) Act, 2012. It covers an area of 7,085 ha, similar to TWS and is located in the Inani reserved forest range of Ukhiya under the Cox's Bazar South Forest Division.

Under the above President's Order, the primary objectives are to provide education, research and recreation to the public and manage the conservation of the natural environment of plants and wild animals and outstanding charming scenery. Any development activities could be allowed by the government only when necessary for its development, beautification or any other scientific reasons (Wildlife (Conservation and Security) Act, 2012).

As mentioned in Bangladesh Gazette, SJINP is bounded by Inani Mouza and Jaliapalong Mouza in the north; Monkhali Forest Block and Reserve Ukhiya Ghat in the south; Dochori Forest Block, Ukhiyar Ghat Forest Block, Bot Tali Forest Block, Palongkhali Forest Block, Thainkhali Forest Block and Reserve Ukhiya Ghat in the east; and Inani Mouza and the Bay of Bengal in the west.

According to Feeroz's floristic study (2016), SJINP is represented by 443 plant species belonging to 93 families. It has been classified as a Tropical Evergreen Forest predominated by Garjan (op. cit.). The park was magnificent, dense evergreen with an irregular top story of outstandingly large and tall trees characterized by rich flora. It was abundant in epiphytes with aroids, ferns, mosses and orchids, and climbers were also many. Under-growth was dense, but herbs and grasses were prominent. The main floristic of the multistoried forest were Chapalish, Chundul, Pitraj, Uriam, Toon, Jham, etc. The principal timber species during the 1920s were Garjan, Jarul, Toon, Chapalish, Telsur, Boillam, Gamar, Kamdeb, Kom, Tali, Gab, etc. Although Feeroz (2016) mentioned TWS as a tropical evergreen forest, it is a mixed evergreen subtropical forest as there are many deciduous tree species, including the dominant Garjan species.

SJINP is spread over two Union Parishads - Jaliapalong and Rajapalong of Ukhiya Upazila in Cox's Bazar District. It comprises 4 Forest Beats: Inani Sadar, Jaliapalong, Soankhali and Rajapalong, under the Inani Range of Cox's Bazar South Forest Division.

According to the faunal study of Feeroz (2016), SJINP represented 124 species of butterflies, 29 amphibian species, 58 reptile species, 253 bird species, and 39 species of mammals. The SJINP reserve forest is also a habitat for Asiatic Elephant range 12-15 (UNHCR and IUCN 2018), Western Hoolock Gibbon (18 individuals of 4 groups (Kabir et al. 2021)), wild dogs, etc. Both the Asiatic Elephant and Western Hoolock Gibbon are categorized as Critically Endangered species globally and in Bangladesh.

SJINP is a part of the Ukhiyar Ghat and Uttar Hnila reserve forests. The Father of the Nation, 'Bangabandhu Sheikh Mujibur Rahman' visited Inani Forest Rest-House and took shelter in this forest at Chengchori Tanchogya Para Forest Village in 1958 to avoid arrest by the Government of Pakistan. So, this forest is our national heritage and bears a tremendous emotional and cultural value.

To support the BFD, co-management practices started in the Inani reserve forest area from July 2009 to June 2019 with the financial support of USAID through the Inani Protected Forest Area Co-Management Project, which was implemented by SHED (Society for Health Extension and Development) under the supervision of AF (Arannayk Foundation). The first time CMC was formed was on 10 August 2010 by following the Co-Management Gazette (earlier followed by Co-management Gazette 2006, which was amended in 2009) with the support of the mentioned project. Now, at SJINP, Forest Range-based BFD formed a CMGC (Co-Management General

Committee, earlier it was popularly known as Co-Management Council (CMC)), which is working with and under the guidance of BFD with the support of USAID-funded Greening Environment through Livelihood Improvement and Forest Enrichment (GREEN LIFE) Activity, starting from May 2020, which AF implements. At present, Inani CMC is functioning as per Protected Area Management Rules 2017 and working with 23 VCFs, 1 PF, 5 CPGs of 112 members (male 101 and female 11), 4 ERTs of 40 members (all are males), etc. as per the rules.

SJINP has several attractions like part of Cox's Bazar to Teknaf sea beach and marine-drive road, Swankhali forest trail, a red-crab beach of Imamer Dail area, Kana Rajar Guha, different tribal villages, etc.

Once this sanctuary held extensive subtropical mixed evergreen forest, patches remain, but much of the original forests have been cleared or degraded since the 1990s. Coastal communities and ecosystems here are vulnerable to cyclones and tidal surges. The hilly terrain of SJINP faces several climate-related hazards. In particular, heavy rainstorms, localized flash floods, and landslides in the wet season destroy crops and infrastructures and damage habitats. Also, more intense dry seasons result in drying up ponds and waterways, and local people face a shortage of fresh drinking water. Restoring a sustainable forest ecosystem to significant areas of the Ukhiya watershed hills is vital to improve water and soil retention and enhance the resilience of wildlife and local communities to the threats posed by degradation and climate change. After the Rohingya influx of August 2017, the destruction of wild habitats has increased tremendously. Over a million forcibly displaced Myanmar nationals (Rohingya) living in Ukhiya and Teknaf Upazilas of Cox's Bazar District have created significant negative impacts on the natural resources and livelihood of the local communities.

An analysis of Landsat-8 Satellite images reveals that 3,362 ha of forests (tree-covered areas) turned into 'bare land' and another 2,707 ha of the densely vegetated area got degraded in Ukhiya and Teknaf Upazilas between February 2017 and February 2019 (Arannayk Foundation 2020). The Rohingya-impacted areas include two important protected areas, TWS and SJINP, which are among the few last remaining habitats of endangered Asian Elephants in Bangladesh. Due to habitat loss, human-elephant conflicts, including loss of life on both sides, have increased. Due to massive deforestation, there has been an increase in soil erosion and landslides during the rainy season. Out of 33 Rohingya camps, 26 are established in the reserve forest areas of Ukhiya Upazila, and the camps are very much adjacent to SJINP.

6.5 Ecologically important wildlife species

Determining a study area's ecologically important wildlife species is tough, but some reflect their importance in various ways, such as academics, recreation, beauty, commercial, etc. It is also tough to uncover the ecological roles each of the millions of species plays, let alone all their benefits to humans. That is why the word conservation has come forward for the future fate of this planet. Therefore, determining the ecologically important wildlife species of the study is difficult, but some of the species that have been extinct from the area and some are facing threats near to extinction have been, to some extent, discussed in Section 6.4.4.14.

The interviewed respondents of the local community said that they had seen 440 species of wildlife during their life-time in the study area, of which 332 (75.45.2%) species were observed during this study period (Table 6.1). Among 440 species, 337 were observed by Rohingyas who moved to Bangladesh after 1990, while 241 species were observed by Rohingyas who arrived after 2017 (Fig. 6.1). Although the total number of wildlife species seen by the three respondent groups differs, the difference is not statistically significant ($x^2 = 0.17247$, df = 2, $p > 0.05$).

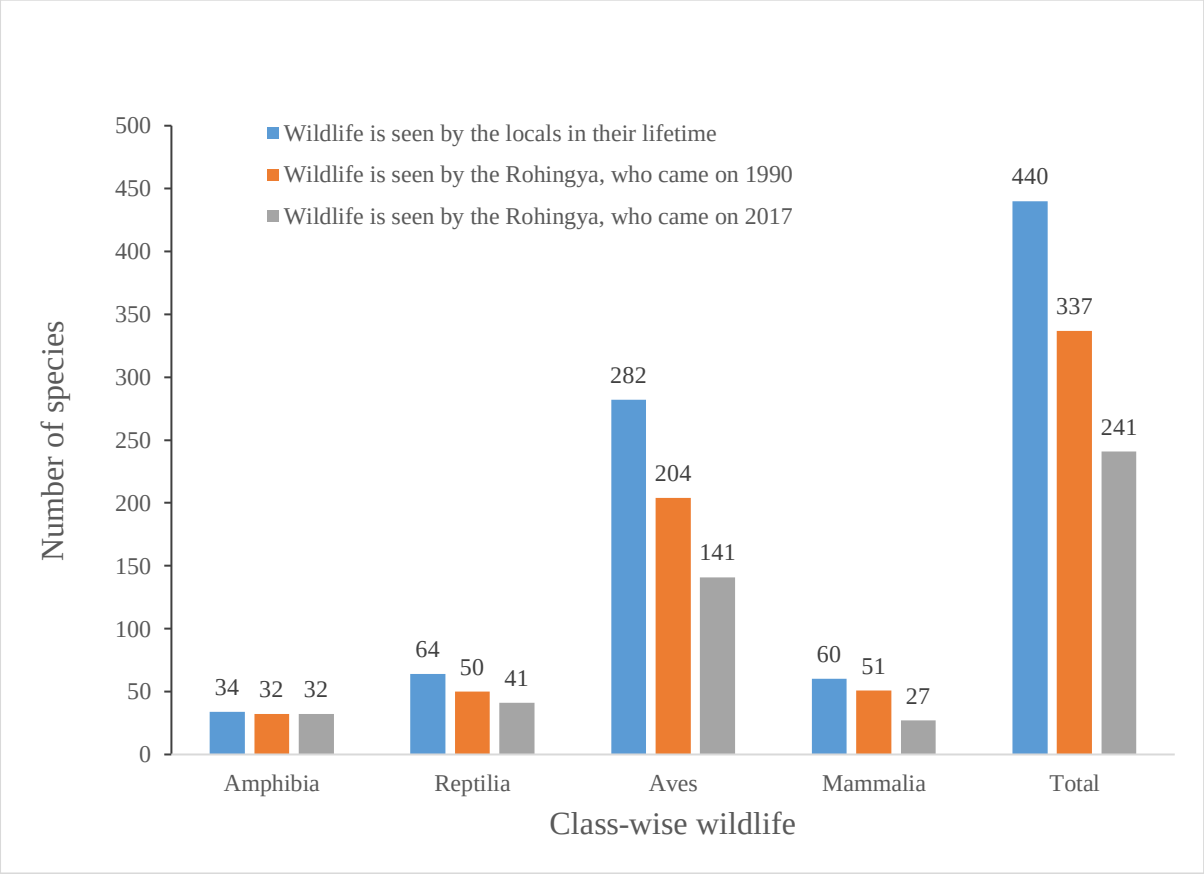


Fig. 6.1: Number of wildlife species seen by the three respondent groups

The number of wildlife species (amphibians, reptiles, birds and mammals) observed by each of the three groups (The locals see wildlife in their lifetime, Wildlife is seen by the Rohingya, who came in 1990 and Wildlife is seen by the Rohingya, who came on 2017) were not statistically significant (Amphibians: $x^2 = 0.0025$, df = 2, $p > 0.05$; Reptiles: $x^2 = 0.1006$, df = 2, $p > 0.05$; Birds: $x^2 = 0.2284$, df = 2, $p > 0.05$; and Mammals: $x^2 = 0.2750$, df = 2, $p > 0.05$).

Table 0.1: List of Wildlife of Teknaf Peninsula

Sl. No.	Taxa	English name	Local name	Wildlife is seen by the locals in their lifetime	Wildlife is seen by the Rohingya, who came in 1990	Wildlife is seen by the Rohingya, who came in 2017
CLASS: AMPHIBIA						
	Order: Anura					
	Family: Bufonidae					
1	*Duttaphrynus melanostictus**	Common Toad	Kuno Bang	√	√	√
	Family: Dicroglossidae					
2	*Euphlyctis cyanophyctis**	Common Skipper Frog	Kot-koti Bang	√	√	√
3	*Minervarya asmati**	Asmat's Frog	Asmoter Bang	√	-	-
4	*Minervarya cancivora**	Crab-eating Frog	Kakrabhuk Bang	√	√	√
5	*Minervarya frithi**	Cricket Frog	Jhi-Jhi Bang	√	√	√
6	*Minervarya nepalensis**	Nepal Cricket Frog	Jhi-Jhi Bang	√	√	√
7	*Minervarya pierrei**	Pierre's Cricket Frog	Pierre's Jhi-Jhi Bang	√	√	√
8	*Minervarya syhadremsis**	Syhadra / Small Cricket Frog	Choto Jhi-Jhi Bang	√	√	√
9	*Minervarya teraiensis**	Terai Cricket Frog	Terai Jhi-Jhi Bang	√	√	√
10	*Hoplobatrachus crassus**	Jerdon's Bullfrog	Ramchago-daka Bang	√	√	√
11	*Hoplobatrachus litoralis**	Coastal Bullfrog	Upokulio Sona Bang	√	√	√
12	*Hoplobatrachus tigerinus**	Bull Frog	Kola/ Sona Bang	√	√	√

13	*Humerana humeralis**	Bhamo Frog	Bhamo Bang	√	√	√
14	*Occidozyga borealis**	Northern Frog	Utturey Bang	√	√	√
15	*Occidozyga lima**	Puddle Frog	Chagol-daka Bang	√	√	√
	Family: Megophryidae					
16	*Leptobrachium smithi**	Smith's litter Frog	Holde-chokha Bang	√	√	√
17	*Xenophrys parva**	Crown Frog	Mukut Bang	√	√	√
	Family: Microhylidae					
18	*Kaloula pulchara**	Asian Painted Frog	Bhenpu Bang	√	√	√
19	*Microhyla berdmorei**	Berdmore's Narrow-mouthed Frog	Boro Loubichi Bang	√	√	√
20	*Microhyla ornata**	Ornate Microhylid /Narrow-mouthed Frog	Choto Loubichi / China Bang	√	√	√
21	*Microhyla rubra**	Red Microhylid / Red Narrow-mouthed Frog	Lal Loubichi / Lal China Bang	√	√	√
	Family: Ranidae					
22	*Hydrophylax leptoglossa**	Cope's Frog	Murgi-Daka Bang	√	√	√
23	*Hylarana taipehensis**	Two-striped Grass Frog	Pana Bang	√	√	√
24	*Hylarana tytleri**	Yellow-striped Grass Frog	Pana Bang	√	√	√
25	*Clinotarsus alticola**	Point-nosed frog	Soru-mata Bang	√	√	√
	Family: Mycrohylidae					
26	*Kaloula pulchra**	Asian Painted Frog	Venphu Bang	√	√	√

27	*Microhyla bermorei*	Beardmore's Microhylid Frog	Boro Laubichi Bang	√	-	-
	Family: Rhacophoridae					
28	*Chiromantis sinus**	Annadale's Pigmy Tree Frog	Annadaler Khude Gacho Bang	√	√	√
29	*Philautus andersoni**	Anderson's Bush Frog	Andersoner Gacho Bang	√	√	√
30	*Philautus parvulus**	Dwarf Bush Frog	Bamon Gacho Bang	√	√	√
31	*Polypedates leucommystax**	Striped Tree Frog	Gecho Bang	√	√	√
32	*Polypedates maculatus**	Spotted Tree Frog	Gecho Bang	√	√	√
33	*Rohanixalus vittatus**	Two-striped Pigmy Tree-Frog	Dui-dagi Khude Gacho Bang	√	√	√
34	*Rhaphorus bipunctata**	Twin-spotted Tree Frog	Lal-pa Gacho Bang	√	√	√
CLASS: REPTILIA						
	Order: Testudines					
	Family: Geoemydidae					
35	*Cyclemys gemeli**	Assam Leaf Turtle	Pata Kaitta	√	√	√
36	*Morenia petersi**	Indian eyed turtle	Holdey Kachim	√	√	√
37	*Pangshura tecta**	Indian Roofed Turtle	Kori Kaitta	√	√	√
	Family: Trionychidae					
38	*Chitra indica**	Narrow-headed Soft-shelled Turtle	Chim Kachim	√	√	√

39	*Lissemys punctata**	Spotted Flap-shelled Turtle	Sundi Kachim	√	√	-
40	*Nilssonia hurum**	Peacock Soft-shelled Turtle	Dhum Kachim	√	√	-
	Family: Testudinidae					
41	*Indotestudo elongata**	Elongated Tortoise	Halud Kachim	√	√	√
	Order: Squamata					
	Family: Agamidae					
42	*Calotes emma**	Forest Crested Lizard	Roktochosha	√	√	√
43	*Calotes versicolor**	Garden Lizard / Common Garden Lizard	Roktochosha	√	√	√
44	*Draco maculatus**	Spotted-flying Lizard	Uronto Tiktiki	√	√	√
45	*Ptyctolaemus gularis**	Green Fan-throated Lizard	Nil-ghoa Girgiti	√	√	√
	Family: Gekkonidae					
46	*Gekko gecko**	Gecko	Tokkhok	√	√	√
47	*Critodactylus ayeyarwadyensis**	Khasi Hill Bent Toad Gecko	Banka-angul Tiktiki	√	√	√
48	*Hemidactylus bowringii**	Bowing's House Gecko	Choto Tiktiki	√	√	√
49	*Hemidactylus brookii**	Brook's House Gecko	Khos-khoshey Tiktiki	√	√	√
50	*Hemidactylus platyurus**	Flat-tailed Gecko	Chapta-legi Tiktiki	√	√	√
51	*Hemidactylus frenatus**	Common House Gecko	Mosrin Tiktiki	√	√	√
	Family: Scincidae					
52	*Eutropis carinata**	Keeled Grass Skink	Anjoni	√	√	√

53	*Eutropis macularia**	Bronze Grass Skink	Anjoni	√	√	√
54	*Eutropis multifasciata**	Many Lined Grass Skink	Baro Ghas Anjoni	√	√	√
55	*Lygosoma bowringii**	Bowring's Supple Skink	Bowringer Nomonio Anjoni	√	√	√
56	*Lygosoma punctata**	Spotted Supple Skink	Chitti Nomonio Anjoni	√	√	√
57	*Sphenomorphus maculatus**	Spotted Litter Skink	Chitti Bon Anjoni	√	√	√
58	*Scincella reevesi**	Reeb's Ground Skink	Khato-pa Anjoni	√	√	√
59	*Takydromus khasiensis**	Khasi Hills Long-tailed Lizard	Lomba-legi Girgiti	√	√	√
	Family: Varanidae					
60	*Varanus bengalensis**	Bengal Lizard	Gui Shap	√	√	√
61	*Varanus flavescens**	Yellow Lizard	Sona Gui	√	√	√
62	*Varanus salvator**	Ring / Water Lizard	Ram Gui / Ram Godi	√	√	√
	Family: Pythonidae					
63	*Python bivittatus**	Burmese Python	Ajagor	√	√	-
64	*Malayopython reticulatus**	Reticulated Python	Ajagor	√	√	√
	Family: Colubridae					
65	*Ahaetula nasuta**	Common Vine Snake	Sutanoli Shap / Laodaga / Urkabaka Shap	√	√	√
66	*Ahaetula prasina**	Short-nosed Vine Snake	Choto-nak Laodaga Shap	√	√	√
67	*Amphiesma stolotum**	Striped Keelback	Dora Shap	√	√	√
68	*Boiga cyanea**	Green Cat Snake	Sobuj Fani Monosha	√	-	-

69	*Boiga ochracea*	Tawny Cat Snake	Tamata / Khori Fani Monosha	√	-	-
70	*Cerberus rynchops**	Dog-faced Water Snake	Maitta Shap	√	√	√
71	*Chrysopelia ornata*	Ornate Flying Snake	Kalnagini	√	-	-
72	*Coelognatus radiatus*	Copper-headed Trinket Snake	Dudhraj Shap	√	-	-
73	*Coelognatus helenus*	Common Trinket Snake	Common Dudhraj Shap	√	-	-
74	*Dendrelaphis pictus*	Painted Bronzeback Tree Snake	Beth Akra / Dora Gacho Shap	√	-	-
75	*Dendrelaphis tristis**	Common Bronzeback Tree Snake	Common Beth Akra / Common Gacho Shap	√	-	-
76	*Fowlea piscator**	Checkered Keelback	Darash Shap	√	√	-
77	*Oligodon albocintus*	White-barred Kukri Snake	Sada-dagi Bongoraj / Kukri	√	-	-
78	*Oligodon dorsalis*	Spot-tailed Kukri Snake	Tila-legi Bongoraj / Kukri	√	-	-
79	*Oligodon taeniolatus*	Russell's Kukri Snake	Russeller Kukri Shap	√	-	-
80	*Lycodon aulicus**	Common Wolf Snake	Common Ghorginni Shap	√	√	√
81	*Lycodon zawi**	Zawi's Wolf Snake	Zawier Ghorginni Shap	√	√	√
82	*Lycodon jara**	Yellow Spotted Wolf Snake	Halud-futi Ghorginni Shap	√	√	-
83	*Ptyas korros**	Indo-Chinese Rat Snake	Pahari Daras / Daraj Shap	√	√	√
84	*Ptyas mucosa**	Indian Rat Snake	Daras / Daraj	√	√	√
85	*Rhabdophis subminiatus*	Red-necked Keelback	Lal-gola Shap	√	-	-

86	*Psammodynastes pulverulentus*	Mock Viper	Nolok Bora Shap	√	-	-
	Family: Homalopsidae					
87	*Enhydris enhydris**	Common Smooth Water Snake	Pinna Shap	√	√	√
	Family: Elapidae					
88	*Bungarus caeruleus**	Common Krait	Kal-keuta / Kalaj Shap	√	√	-
89	*Bungarus fasciatus**	Banded Krait	Shonkhini Shap	√	√	-
90	*Bungarus niger**	Greater Black Krait	Kal-keuta Shap	√	√	-
91	*Naja kaouthia**	Monocellate/ Monocled Cobra	Gokhra Shap	√	√	√
92	*Naja naja**	Binocellate/ Spectacled Cobra	Gokhra Shap	√	√	√
93	*Ophiophagus hannah**	King Cobra	Paddogokhra	√	√	-
	Family: Viperidae					
94	*Trimeresurus albolabris**	White-lipped Pit Viper	Shada-Thot Sabuj Bora	√	-	-
95	*Trimeresurus erythrurus**	Spot-tailed Pit Viper		√	-	-
	Family: Typlopidae					
96	*Argyrophis diardii**	Diard's Blind Snake	Baro Atol Kichcha	√	√	√
97	*Indotyplops braminus**	Brahmin's Blind Snake	Bamon Atol Kichcha	√	√	√
98	*Indotyplops jerdoni**	Jerdon's Blind Snake	Jerdoner Dumoko Shap, Jerdoner Atol Kichcha	√	√	√

CLASS: AVES						
	Order: Galliformes					
	Family: Phasianidae					
99	*Arborophila atrogularis*	White-cheeked Partridge	Dholagal Batai	√	-	-
100	*Polyplectron bicalcaratum**	Grey Peacock Pheasant	Kath Moyur	√	√	-
101	*Gallus gallus**	Red Junglefowl	Bon Murgi	√	√	√
102	*Lophura leucomelanos**	Kalij Pheasant	Mothura	√	√	-
	Order: Anseriformes					
	Family: Anatidae					
103	*Dendrocygna javanica**	Lesser Whistling Duck	Choto Sharali	√	√	-
104	*Anser indicus*	Bar-headed Goose	Raj Hans	√	-	-
105	*Anser anser*	Greylag Goose	Raj Hans	√	-	-
106	*Cairina scutulata*	White-winged Duck	Bhadi Hans	√	-	-
	Order: Piciformes					
	Family: Megalimidae					
107	*Psilopogon asiaticus*	Blue-throated Barbet	Basanta Bauri	√	-	-
108	*Psilopogon cyanotis*	blue-eared barbet	Neelkan Basanta	√	-	-
109	*Psilopogon haemacephalus**	Coppersmith barbet / Crimson-breasted barbet / Coppersmith	Choto Basanta Bauri	√	√	√

110	*Psilopogon lineatus**	Lineated Barbet	Baro / Gorkhod / Kutlush / Basantabouri/ Amtola	√	-	-
	Family: Picidae					
111	*Chrysophlegma flavinucha**	Greater Yellownape	Boro Holdekurali	√	-	-
112	*Dinopium benghalense**	Black-rumped Flameback	Sonali Kaththokra/ Kathkhutali / Kurailla	√	√	√
113	*Dendrocopos macei**	Fulvous-breasted Woodpecker	Jarad Kaththokra	√	√	√
114	*Picus canus*	Grey-headed Woodpecker / Grey-faced Woodpecker	Metematha Kathkurali	√	-	-
115	*Picus chlorolophus**	Lesser Yellownape	Choto Holdekurali	√	√	-
116	*Mulleripicus pulverulentus**	Great slaty Woodpecker	Dhushor Kathtooka	√	-	-
117	*Yungipicus canicapillus*	Grey-capped Pygmy Woodpecker	Dushar Matha Bamon Kaththokra	√	-	-
118	*Sasia ochracea**	White-browed Piculet	Lal Khudy Kathhokra	√	-	-
	Order: Falconiformes					
	Family: Falconidae					
119	*Falco tinnunculus**	Common Kestrel /European Kestrel /Eurasian Kestrel / Old World Kestrel	Kestrel / Pokmara / Shapkhauri Baj	√	√	√
	Order: Trogoniformes					
	Family: Trogonidae					

120	*Harpactes erythrocephalus**	Red-headed Trogon	Lal Trogon	√	-	-
	Order: Columbiformes					
	Family: Columbidae					
121	*Chalcophaps indica*	Grey-capped Emerald Dove	Sona Ghughu	√	-	-
122	*Columba livia**	Rock Pigeon / Rock Dove	Kabutor	√	√	√
123	*Ducula aenea**	Green Imperial Pigeon	Dumkol	√	√	-
124	*Spilopelia chinensis**	Eastern Spotted Dove / Spotted Dove	Tila Ghugu	√	√	√
125	*Spilopelia suratensis**	Western Spotted Dove	Tila / Boron / Pachori / Sit Ghughu	√	√	√
126	*Streptopelia decaocto**	Ring / Collared Dove / Eurasian Collared Dove	Raj Ghughu	√	√	-
127	*Streptopelia tranquebarica*	Red-Collared Dove / Red Turtle Dove	-	√	-	-
128	*Treron bicinctus**	Orange-breasted Green Pigeon	-	√	√	√
129	*Treron curvirostra**	Thick-billed Green Pigeon	-	√	√	-
130	*Treron phayrei**	Ashy-headed Green Pigeon	Botkol / Horial	√	√	-
131	*Treron pompadora*	Pompadour Green Pigeon	Choto Horial	√	-	-
132	*Treron phoenicopterus*	Yellow-footed Green Pigeon	Botkol / Horial	√	-	-
	Order: Caprimulgiformes					
	Family: Caprimulgidae					

133	*Caprimulgus macrurus**	Large-tailed Nightjar	Nolpitani Ratchora / Dinekana / Banspata	√	√	√
	Family: Apodidae					
134	*Apus nipalensis**	House Swift	Chatok / Batashi / Nak-kata	√	√	√
135	*Apus affinis**	House Swift	-	√	√	√
136	*Cypsiurus balasiensis**	Asian Palm Swift	Taai-chata, Taai-chari, Nak-kati	√	√	√
	Order: Cuculiformes					
	Family: Cuculidae					
137	*Cacomantis merulinus*	Plaintive Cuckoo	Korun Kokil	√	√	-
138	*Cacomantis sonneratii*	Banded Bay Cuckoo / Bay-banded Cuckoo	Dora Tamapapiya	√	-	-
139	*Centropus sinensis*	Greater Coucal	Baro Kanakuka	√	-	-
140	*Centropus bengalensis*	Lesser Coucal	Choto Kanakuka	√	-	-
141	*Chrysococcyx maculatus*	Asian Emerald Cuckoo	Eshio Shyamapapiya	√	-	-
142	*Chrysococcyx xanthorhynchus*	Violet Cuckoo	Beguni Papia	√	-	-
143	*Clamator coromandus*	Chestnut-winged Cuckoo / Red-Winged Crested Cuckoo	Badami-dana Papia	√	-	-
144	*Clamator jacobinus*	Jacobin Cuckoo / Pied Cuckoo / Pied Crested Cuckoo	Papia	√	-	-
145	*Cuculus canorus**	Common Cuckoo / Eurasian Cuckoo	-	√	√	-

146	*Cuculus micropterus**	Indian Cuckoo	Chkhgalo / Bau-kotha-kou	√	√	√
147	*Cuculus saturatus*	Himalayan Cuckoo	Himalayee Papia	√	-	-
148	*Eudynamys scolopaceus**	Asian / Western Koel	Kokil	√	√	√
149	*Hierococcyx sparverioides*	Large Hawk-cuckoo	Baro Chokhgalo	√	-	-
150	*Hierococcyx varius**	Common Hawk-cuckoo	Common Chokhgalo	√	√	-
151	*Phaenicophaeus tristis**	Green-billed Malkoha	Malkoha	√	√	-
152	*Surniculus lugubris*	Square-tailed Drongo-cuckoo	Fingey Papiya	√	-	-
	Order: Gruiformes					
	Family: Rallidae					
153	*Amaurornis phoenicurus**	White-breasted Waterhen	Dahuk	√	√	√
154	*Gallinula chloropus*	Common Moorhen	Jalmurgi	√	√	-
155	*Gallicrex cinerea*	Watercock	Kora, Bon Kora	√	√	-
156	*Porphyrio porphyrio**	Purple Swamphen	Kalim	√	-	-
157	*Zapornia fusca*	Ruddy-breasted Crake	Ranga Ulti	√	-	-
	Order: Ciconiiformes					
	Family: Ciconiidae					
158	*Anastomus oscitans**	Asian Openbill / Asian Openbill stork	Shamuk Khol / Bhanga	√	√	-
	Order: Pelicaniformes					
	Family: Ardeidae					

159	*Ardea alba**	Great Egret	Boro Bok	√	√	√
160	*Ardea cinerea*	Grey Heron	Khaira / Pidali / Daing Bok	√	-	-
161	*Ardeola grayii**	Pond Heron / Indian Pond Heron	Kani Bok	√	√	√
162	*Ardea intermedia**	Median / Intermediate Egret	Majhari Bok	√	√	√
163	*Bubulcus ibis**	Cattle Egret	Go-bok	√	√	√
164	*Butorides striata*	Striated Heron / Mangrove Heron / Little green heron / Green Backed Heron	Sabuj Bok	√	-	-
165	*Egretta garzetta**	Little Egret	Choto Bok	√	√	√
166	*Gorsachius melanolophus*	Malayan Night Heron / Malaysian Night Heron / Tiger Bittern	Chora Bok	√	-	-
167	*Ixobrychus cinnamomeus**	Cinnamon Bittern	Lal Bok	√	√	-
168	*Ixobrychus sinensis*	Yellow Bittern	Holdey Bok	√	-	-
169	*Nycticorax nycticorax**	Night Heron / Black-crowned Night Heron	Waak	√	√	√
	Order: Suliformes					
	Family: Phalacrocoracidae					
170	*Microcarbo niger**	Little Cormorant	Choto Pankaori / Pankouri	√	√	√
171	*Phalacrocorax carbo*	Great Cormorant / Black Shag	Baro Pankaori / Pankouri	√	-	-
	Family: Anhingidae					

172	*Anhinga melanogaster*	Oriental Darter	Shap Paki / Ragga / Goyar	√	-	-
	Order: Charadriiformes					
	Family: Charadriidae					
173	*Charadrius mongolus**	Lesser Sand Plover	Choto Tit Jiria	√	√	√
174	*Charadrius leschenaultii**	Greater Sand Plover	Baro Dhuljiria	√	√	√
175	*Charadrius dubius**	Little Ringed Plover	Choto Not Jiria	√	√	√
176	*Pluvialis fulva**	Pacific Golden Plover	Mety Batan	√	√	√
177	*Pluvialis squatarola**	Grey Plover	-	√	√	√
178	*Vanellus cinereus**	Grey-headed Lapwing	Metematha Titi	√	√	-
179	*Vanellus indicus*	Red-wattled Lapwing	Lal-lotika Whot-ti-ti	√	√	-
	Family: Rostratulidae					
180	*Rostratula benghalensis**	Greater Painted-snipe	Rongila / Kunal / Boiragi Chaga	√	√	√
	Family: Jacanidae					
181	*Metopidius indicus**	Bronze-winged Jacana	Jolpipi / Pipi	√	√	-
	Family: Scolopacidae					
182	*Actitis hypoleucos**	Common Sandpiper		√	√	-
183	*Arenaria interpres**	Ruddy Turnstone	Lal Nuribatan	√	√	√
184	*Calidris alba**	Sanderling	Balu Chaga	√	√	√
185	*Calidris canutus*	Red Knot / Knot	Lal Noth	√	-	-

186	*Calidris falcinellus*	Broad-billed Sandpiper	Motathuto Batan	√	-	-
187	*Calidris ferruginea**	Curlew Sandpiper	Gulinda Batan	√	√	-
188	*Calidris minuta**	Little Stint	Choto Chaga / Chorui Cha	√	√	√
189	*Calidris ruficollis**	Red-necked Stint	Lalghar Chaga	√	√	√
190	*Calidris temminckii**	Temminck's stint	-	√	√	√
191	*Gallinago gallinago**	Common Snipe	Kada Khocha	√	√	-
192	*Gallinago stenura**	Pin-tailed Snipe / Pintail Snipe	Chaga / Kadakhucha	√	√	√
193	*Numenius arquata**	Eurasian Curlew / Common Curlew	Baro Gulinda	√	√	√
194	*Numenius phaeopus**	Eurasian Whimbrel / Whimbrel	Choto Gulinda	√	√	√
195	*Tringa glareola*	Wood Sandpiper	-	√	-	-
196	*Tringa nebularia**	Greenshank / Common Greenshank	Sabujpa	√	√	-
197	*Tringa ochropus**	Green Sandpiper	-	√	√	√
198	*Tringa stagnatilis*	Marsh Sandpiper	Piew	√	√	-
199	*Tringa totanus**	Common Redshank / Redshank	Lalpa	√	√	√
200	*Xenus cinereus**	Terek Sandpiper	-	√	√	√
	Family: Turnicidae					
201	*Turnix suscitator**	Barred Buttonquail	Koel Pakhi	√	√	-

	Family: Laridae					
202	*Chlidonias hybrida**	Whiskered Tern	Doriar Chil	√	√	-
203	*Chroicocephalus brunnicephalus**	Brown-headed Gull	Gang Bodor, Gangchil	√	√	√
204	*Chroicocephalus ridibundus**	Black-headed Gull	Kalomata Gangchil	√	√	√
205	*Gelochelidon nilotica**	Common Gull-billed Tern / Gull-billed Tern	Sada Gangchil	√	√	√
206	*Ichthyaetus ichthyaetus**	Pallas's gull / Great Black-headed Gull	Pallaser Ganchil	√	√	√
207	*Larus fuscus heuglini**	Heuglin's Gull	Heugliner Gungchil	√	√	√
208	*Sterna aurantia**	Indian River tern / River Tern	Nodi Panchil	√	√	√
209	*Sternula albifrons**	Little Tern	Choto Gangchil / Choto Panchil	√	√	√
210	*Sterna hirundo**	Common Tern	Pati Panchil	√	√	√
	Order: Strigiformes					
	Family: Tytonidae					
211	*Tyto alba**	Common Barn Owl / Barn Owl	Laxmi Pencha	√	√	-
	Family: Strigidae					
212	*Athene brama**	Spotted Owlet	Khurulay Pencha	√	√	√
213	*Bubo coromandus**	Dusky Eagle-owl	Bhuma Bhutum Pencha	√	√	-

214	*Bubo nipalensis*	Spot-bellied Eagle-owl / Forest eagle-owl	-	√	-	-
215	*Glaucidium cuculoides**	Asian Barred Owlet	Kali Pencha	√	√	√
216	*Otus lettia**	Collared Scops-owl	Nim / Shinge Pencha, Nim-pokh	√	√	-
217	*Otus sunia*	Oriental Scops-owl	Choto Nim Pencha	√	√	-
218	*Ketupa flavipes*	Tawny Fish Owl	Tamate Machranga	√	-	-
219	*Ketupa zeylonensis**	Brown Fish-owl	Bhutum Pencha	√	√	√
220	*Ninox scutulata*	Brown Boobook / Brown Hawk Owl	Ku-pencha	√	√	-
	Order: Accipitriformes					
	Family: Accipitridae					
221	*Accipiter badius**	Shikra	-	√	√	-
222	*Accipiter trivirgatus*	Crested Goshawk		√	-	-
223	*Accipiter virgatus*	Besra / Besra Sparrowhawk	-	√	-	-
224	*Aviceda leuphotes*	Black Baza	-	√	-	-
225	*Aviceda jerdoni*	Jerdon's Baza	Tiki Baj	√	-	-
226	*Buteo rufinus**	Long-legged Buzzard	Idurmar Chil	√	√	√
227	*Elanus caeruleus*	Black-winged / Black-shouldered Kite	Sada Chil	√	√	-
228	*Gyps bengalensis**	White-rumped Vulture	Shakun	√	√	-

229	*Haliastur indus**	Brahminy Kite	Shankho Chil	√	√	√
230	*Milvus migrans**	Black Kite	Bhubon Chil	√	√	√
231	*Nisaetus cirrhatus**	Changeable Hawk-eagle / Crested Hawk-eagle	Kalo Eagle	√	√	-
232	*Pernis ptilorhynchus**	Crested Honey Buzzard / Oriental Honey Buzzard	Madhu Chil	√	√	-
233	*Spilornis cheela**	Crested Serpent-eagle	Tila / Hadal / Dhumba Eagle	√	√	√
	Family: Pandionidae					
234	*Pandion haliaetus**	Osprey / Sea Hawk / River Hawk / Fish Hawk	Machmural	√	√	√
	Order: Bucerotiformes					
	Family: Bucerotidae					
235	*Anthracoceros albirostris**	Oriental Pied Hornbill		√	√	-
236	*Buceros bicornis*	Great Hornbill	Raj Dhanesh	√	-	-
	Family: Upupidae					
237	*Upupa epops**	Common Hoopoe / Hoopoe	Hudhud Pakhi	√	√	√
	Order: Coraciiformes					
	Family: Meropidae					
238	*Merops leschenaulti**	Chestnut-headed Bee-eater / Bay-headed Bee-eater	Shuichora	√	√	-

239	*Merops philippinus**	Blue-tailed Bee-eater	-	√	√	√
240	*Merops orientalis**	Asian Green Bee-eater / Little Green Bee-eater / Green Bee-eater	Banshpati Suchora, Pok Khaori	√	√	√
241	*Nyctyornis athertoni*	Blue-bearded Bee-eater	Baro / Phari Suichora	√	√	-
	Family: Coraciidae					
242	*Eurystomus orientalis*	Oriental Dollarbird	Nilkantha	√	√	-
243	*Coracias affinis**	Indochinese Roller / Burmese Roller	Nilkantha, Saat-kaia, Tauwa, Kewa, Thormocha	√	√	√
244	*Coracias benghalensis**	Indian Roller	Nilkantha, Saat-kaia, Tauwa, Kewa, Thormocha	√	√	√
	Family: Alcedinidae					
	*Alcedo atthis**	Common Kingfisher	Choto Machranga	√	√	√
245	*Ceryle rudis*	Pied Kingfisher	Korikata/Sada Machranga	√	√	-
246	*Halcyon pileata*	Black-capped Kingfisher	Kalotupi Machranga	√	√	-
247	*Halcyon smyrnensis*	White-breasted Kingfisher / White-throated Kingfisher	Sada-buk Machranga	√	√	-
248	*Pelargopsis capensis*	Stork-billed Kingfisher	Megh-hao	√	√	-
	Order: Piciformes					
	Family: Megalamidae					
249	*Psilopogon haemacephalus**	Coppersmith Barbet / Crimson-breasted barbet / Coppersmith	Choto Basantabouri/ Amtota	√	√	√

	Family: Picidae					
250	*Chrysocolaptes guttacristatus**	Greater Flameback / Greater Goldenback / Large Golden-backed Woodpecker / Malherbe's Golden-backed Woodpecker	-	√	√	√
251	*Dinopium benghalense**	Black-rumped Flameback	Sonali Kaththokra	√	√	√
252	*Jynx torquilla**	Eurasian Wryneck / Northern Wryneck	Alseythokra	√	√	√
253	*Micropternus brachyurus**	Rufous Woodpecker	Lal Kaththokra	√	√	√
	Order: Psittaciformes					
	Family: Psittacidae					
254	*Psittacula alexandri**	Red-breasted Parakeet	Lalbuk Tiya	√	√	√
255	*Psittacula eupatria*	Alexandrine Parakeet / Alexandrine Parrot	Chandana / Chandana Tia	√	-	-
256	*Psittacula krameri**	Rose-ringed Parakeet	Tiya Pakhi, Tota Pakhi	√	√	√
257	Psittacula roseata*	Blossom-headed Parakeet	Fulmata / Koiridi Tia	√	√	√
	Order: Passeriformes					
	Family: Pittidae					
258	*Hydrornis nipalensis*	Blue-naped pitta	-	√	-	-
259	*Pitta sordida**	Hooded Pitta	Halti	√	√	√
	Family: Oriolidae					
260	*Oriolus chinensis*	Black-naped Oriole	Kajolchokh Benebou	√	-	-

261	*Oriolus larvatus**	Black-headed Oriole	Holey Pakhi, Haludia	√	√	√
262	*Oriolus traillii*	Maroon Oriole	Tamatey Benebou	√	√	-
263	*Oriolus xanthornus**	Black-hooded Oriole	Holey Pakhi	√	√	√
	Family: Campephagidae					
264	*Coracina macei**	Large Cuckooshrike	Baro Kabashi	√	√	√
265	*Lalage melaschistos**	Black-winged Cuckooshrike / Lesser Grey Cuckooshrike / Dark Grey Cuckooshrike / Black-headed Cuckooshrike	Choto Kabashi, Kalakuli	√	√	-
266	*Pericrocotus cinnamomeus*	Small Minivet	Teni Satshell	√	-	-
267	*Pericrocotus divaricatus*	Ashy Minivet	Mete Saheli	√	-	-
268	*Pericrocotus roseus*	Rosy Minivet	Golapi Saheli	√	-	-
269	*Pericrocotus speciosus**	Scarlet Minivet	Atapori / Lal Satsaheli	√	√	√
	Family: Artamidae					
270	*Artamus fuscus**	Ashy Woodswallow	Latora	√	√	√
	Family: Vangidae					
271	*Hemipus picatus**	Bar-winged Flycatcher-shrike	Pabud	√	√	√
272	*Tephrodornis pondicerianus*	Common Woodshrike	Chot Bonlatora	√	-	-
273	*Tephrodornis virgatus*	Large Woodshrike	Boro Bonlatora / Dukka	√	-	-
	Family: Psittaculidae					
274	*Loriculus vernalis**	Vernal Hanging Parrot	Latkon Teya, Shuk Pakki	√	√	√

	Family: Aegithinidae					
275	*Aegithina tiphia**	Common Iora	Fatikjal	√	√	√
	Family: Rhipiduridae					
276	*Rhipidura albicollis**	White-throated Fantail	Lejnachani, Chakdoel	√	√	√
	Family: Dicruridae					
277	*Dicrurus aeneus**	Bronzed Drongo	Chokchoke Fingey	√	√	√
278	*Dicrurus bracteatus**	Spangled Drongo	-	√	√	-
279	*Dicrurus leucophaeus**	Ashy Drongo	-	√	√	√
280	*Dicrurus macrocercus**	Black Drongo	Fingey	√	√	√
281	*Dicrurus paradiseus**	Greater Racket-tailed Drongo	Baro Bhimraj, Singharaj, Dhiraj	√	√	√
282	*Dicrurus remifer*	Lesser Racket-tailed Drongo	Choto Bhimraj	√	-	-
	Family: Monarchidae					
283	*Hypothymis azurea**	Black-naped Monarch / Black-naped Blue Flycatcher	-	√	√	-
284	*Terpsiphone paradisi**	Indian Paradise Flycatcher / Asian Paradise Flycatcher	Laj Jhola / Dudhraj	√	√	-
	Family: Laniidae					
285	*Lanius cristatus*	Brown Shrike	Badami Kosai	√	-	-
286	*Lanius schach**	Long-tailed Shrike	Dara / Bahatiki / Chomok Kosai	√	√	√

287	*Lanius tephronotus**	Grey-backed Shrike	-	√	√	√
	Family: Corvidae					
288	*Cissa chinensis**	Common Green Magpie	Sonar Thala / Sabuj Harichacha	√	√	-
289	*Corvus splendens**	House Crow	Kak	√	√	√
290	*Corvus macrorhynchos**	Large-billed / Jungle Crow	Dar Kak	√	√	√
291	*Dendrocitta formosae*	Grey Treepie / Himalayan Treepie	Metey Harichacha	√	-	-
292	*Dendrocitta vagabunda**	Rufous Treepie	Harichacha	√	√	√
	Family: Stenotirdae					
293	*Culicicapa ceylonensis**	Grey-headed canary-Flycatcher / Grey-headed Flycatcher	Footfuti	√	√	√
	Family: Paridae					
294	*Parus major**	Great Tit	Titpokh	√	√	√
	Family: Alaudidae					
295	*Mirafra assamica**	Bengal Bush Lark / Bengal lark	Bharat / Bharul	√	√	√
296	*Mirafra erythroptera**	Indian Bush Lark	-	√	√	-
	Family: Cisticolidae					
297	*Cisticola juncidis**	Zitting Cisticola / Streaked Fantail Warbler	Dhantuni	√	√	√

298	*Prinia hodgsonii*	Grey-breasted Prinia / Franklin's Prinia	-	√	-	-
299	*Prinia inornata**	Plain Prinia / Plain Wren-warbler / White-browed Wren-warbler	-	√	√	√
300	*Prinia rufescens**	Rufescent Prinia	-	√	√	√
301	*Orthotomus atrogularis*	Dark-necked Tailorbird	-	√	-	-
302	*Orthotomus sutorius**	Common Tailor Bird	Tuntuni	√	√	√
	Family: Acrocephalidae					
303	*Acrocephalus dumetorum**	Blyth's Reed Warbler	Blaither Nolfotok	√	√	√
	Family: Locastellidae					
304	*Megalurus palustris**	Striated Grassbird	Takteki, Tiktikka	√	√	√
	Family: Hirundinidae					
305	*Cecropis daurica**	Red-rumped Swallow	Ababil	√	√	√
306	*Hirundo rustica**	Barn Swallow	Ababil, Meto Ababil	√	√	√
307	*Riparia chinensis*	Asian Plain Martin	-	√	-	-
	Family: Pycnonotidae					
308	*Alophoixus flaveolus*	White-throated Bulbul	Sadagola Bulbu	√	-	-
309	*Brachypodius melanocephalos**	Black-headed Bulbul	Kalo Bulbuli	√	√	√
310	*Iole viridescens**	Olive Bulbul	-	√	√	√
311	*Pycnonotus cafer**	Red-vented Bulbul	Bubuli	√	√	√

312	*Pycnonotus jocosus**	Red-whiskered Bulbul / Crested Bulbul	Shipahi Bulbuli	√	√	√
313	*Rubigula flaviventris**	Black-crested Bulbul	-	√	√	√
	Family: Phylloscopidae					
314	*Phylloscopus burkii**	Green-crowned Warbler	-	√	√	-
315	*Phylloscopus fuscatus**	Dusky Warbler	-	√	√	√
316	*Phylloscopus trochiloides**	Greenish Warbler	-	√	√	√
	Family: Leiotrichidae					
317	*Argya earlei**	Striated Babbler	Metho Satbhaila / Satarey	√	√	√
318	*Argya striata**	Jungle Babbler	Satbhaila / Satbhai / Satarey / Arakhaskasi	√	√	√
319	*Garrulax monileger*	Lesser Necklaced Laughingthrush	Choto Panga	√	√	-
320	*Garrulax leucolophus**	White-crested Laughingthrush	Shadajhuti Panga	√	-	-
321	*Pterorhinus pectoralis**	Greater Necklaced Laughing Thrush	Boro Panga	√	√	-
322	*Pterorhinus ruficollis**	Rufous-necked Laughingthrush	-	√	√	-
	Family: Zosteropidae					
323	*Zosterops palpebrosus**	Indian white-eye / Oriental white-eye	Babunai	√	√	-
	Family: Timalidae					

324	*Cyanoderma rufifrons**	Rufous-fronted Babbler	-	√	√	-
325	*Erythrogenys hypoleucos*	Large Scimitar Babbler	-	√	-	-
326	*Mixornis gularis*	Pin-striped Tit-Babbler / Yellow-breasted Babbler / Striped Tit-Babbler	-	√	-	-
327	*Pomatorhinus schisticeps*	White-browed Scimitar Babbler	-	√	√	-
328	*Timalia pileata*	Chestnut-capped Babbler	-	√	-	-
	Family: Pellorneidae					
329	*Malacocincla abbotti**	Abbott's babbler	Bhadatuni	√	√	√
330	*Pellorneum ruficeps**	Puff-throated Babbler / Spotted Babbler	-	√	√	√
	Family: Sittidae					
331	*Sitta frontalis*	Velvet-fronted Nuthatch	Banomali / Kanthuni	√	-	-
	Family: Sturnidae					
332	*Acridotheres fuscus**	Jungle Myna	Jhuti Shalik	√	√	√
333	*Acridotheres tristis**	Common Myna	Bhat Shalik	√	√	√
334	*Aplonis panayensis**	Asian Glossy Starling	Juti Shalik	√	√	-
335	*Gracupica contra**	Asian Pied Starling	Gobor Shalik	√	√	√
336	*Gracula religiosa**	Hill Myna	Moyna	√	√	√
337	*Sturnia malabarica**	Chestnut-tailed Starling	Kath / Aam Shalik	√	√	√
	Family: Turdidae					

338	*Geokichla citrina**	Orange-headed Thrush	Dama / Metey Doel	√	√	-
	Family: Muscicapidae					
339	*Copsychus saularis**	Oriental Magpie-robin	Doel	√	√	√
340	*Copsychus malabaricus**	White-rumped Shama	-	√	√	√
341	*Enicurus immaculatus*	Black-backed Forktail / Black-throated Forktail	Kalopith Cheralej	√	-	-
342	*Eumyias thalassinus*	Verditer Flycatcher	Nil Katkatia	√	√	-
343	*Ficedula albicilla**	Taiga Flycatcher / Red-throated Flycatcher	Lalbuk Chotok	√	√	√
344	*Monticola solitarius*	Blue Rock Thrush	Nil Shiladama	√	-	-
345	*Myophonus caeruleus**	Blue Whistling Thrush	-	√	√	√
346	*Muscicapa dauurica**	Asian brown flycatcher	Badami Choto	√	√	√
347	*Saxicola caprata**	Pied Bush Chat	-	√	√	√
348	*Saxicola torquatus**	African / Common stonechat	Pati Shilafidda	√	√	√
349	*Cyornis poliogenys*	Pale-chinned Blue Flycatcher / Brook's Flycatcher	Shadagola Chotok	√	-	-
	Family: Irenidae					
350	*Irena puella*	Asian Fairy-bluebird	Nilpori	√	-	-
	Family: Chloropseidae					

351	*Chloropsis aurifrons**	Golden-fronted Leafbird	Patabulbuli / Horbola	√	√	√
352	*Chloropsis moluccensis*	Blue-winged Leafbird	-	√	-	-
	Family: Dicaeidae					
353	*Dicaeum agile*	Thick-billed Flowerpecker	Thotmota Fuljhuri	√	-	-
354	*Dicaeum cruentatum**	Scarlet-backed Flowerpecker	Lalfuljuri	√	√	√
355	*Dicaeum erythrorhynchos**	Pale-billed Flowerpecker / Tickell's Flowerpecker	Fuljuri	√	√	√
356	*Dicaeum minullum*	Plain Flowerpecker	-	√	-	-
357	*Dicaeum trigonostigma*	Orange-billed Flowerpecker	Lalpet Fuljhuri	√	-	-
	Family: Nectariniidae					
358	*Arachnothera longirostra**	Little Spiderhunter	Mochatuni	√	√	√
359	*Arachnothera magna*	Streaked Spiderhunter	-	√	√	-
360	*Aethopyga siparaja**	Crimson Sunbird	Shidurey Moutushi	√	√	√
361	*Cinnyris asiaticus**	Purple Sunbird	Niltuni / Durgatuntuni	√	√	√
362	*Chalcoparia singalensis**	Ruby-cheeked Sunbird	-	√	√	√
363	*Leptocoma sperata**	Purple-throated Sunbird	-	√	√	√
364	*Leptocoma zeylonica**	Purple-rumped Sunbird	Moutushi	√	√	√
	Family: Ploceidae					

365	*Ploceus manyar*	Streaked Weaver	Teli Babui	√	-	-
366	*Ploceus philippinus**	Baya Weaver	Babul / Baol / Baloi / Bailla	√	√	√
	Family: Estrilidae					
367	*Euodice malabarica*	Indian Silverbill / Shite-throated Munia	-	√	-	-
368	*Lonchura atricapilla*	Chestnut Munia/ Black-headed Munia	Kalomata Munia	√	-	-
369	*Lonchura punctulata**	Scaly-breasted Munia / Spotted Munia	Tila Munia	√	√	-
370	*Lonchura striata*	White-rumped Munia / White-rumped Mannikin / Striated Finch	-	√	-	-
	Family: Passeridae					
371	*Passer domesticus**	House sparrow	Chorui	√	√	√
	Family: Motaciliidae					
372	*Anthus hodgsoni**	Olive-backed Pipit	Jolpaipith Tulica	√	√	√
373	*Anthus rufulus**	Paddyfield Pipit / Oriental Pipit	-	√	√	√
374	*Dendronanthus indicus*	Forest Wagtail	Bon Khonjan	√	-	-
375	*Motacilla alba**	Pied / White Wagtail	Choto Khanjan, Khanjan	√	√	√
376	*Motacilla cinerea**	Grey Wagtail	-	√	√	√
377	*Motacilla citreola**	Citrine Wagtail	-	√	√	√

378	*Motacilla flava**	Yellow Wagtail / Western Yellow Wagtail	Haldey Khanjan	√	√	√
379	*Motacilla maderaspatensis**	White-browed Wagtail / Large pied Wagtail	Baro Khanjan	√	√	√
	Family: Philepttidae					
380	*Neodrepanis coruscans**	Common Sunbird-asity / Sunbird-asity	-	√	√	√
CLASS: MAMMALIA						
	Order: Lagomorpha					
	Family: Leporidae					
381	*Lepus nigricollis**	Indian Hare / Rabbit / Rufous-tailed Hare	Khorgosh	√	√	√
	Order: Rodentia					
	Family: Scuridae					
382	*Callosciurus erythraecus**	Pallas's Squirrel	Kalo Kathbirali / Pallas-er Kathbirali	√	√	√
383	*Callosciurus pygerythrus**	Irrawaddy Squirrel / Hoarybellied Himalayan Squirrel	Badami Kathbirali	√	√	√
384	*Dremomys lokriah**	Orange-bellied Squirrel	Kamla-pet Kathberali	√	√	-
	Family: Muridae					
385	*Bandicota bengalensis**	Lesser Bandicoot Rat	Boro Indur	√	√	√
386	*Bandicota indica**	Large Bandicoot Rat / Greater Bandicoot Rat	Dhari Indur	√	√	√

387	*Mus booduga**	Little Indian Field Mouse	Metho Indur	√	√	√
388	*Mus musculus**	Eastern House Mouse House Mouse	Nengti Indur	√	√	√
389	*Rattus rattus**	House Rat	Gharoa Indur	√	√	√
390	*Vandeleuria oleracea**	Asiatic Long-tailed Climbing Mouse	Gecho Indur	√	√	√
	Family: Hystricidae					
391	*Hystrix brachyura**	Himalayan Crestless Porcupine / Malayan porcupine	Shawjaru	√	√	√
	Order : Pholidota					
	Family: Manidae					
392	*Manis crassicaudata**	Indian Pangolin	Bonrui	√	√	-
393	*Manis pentadactyla**	Chinese Pangolin	Bonrui	√	√	-
	Order: Carnivora					
	Family: Viverridae					
394	*Paguma larvata**	Masked Palm Civet / Gem-faced Civet	Gandho Gakul	√	-	-
395	*Paradoxurus hermaphroditus**	Asian Palm Civet / Common Palm Civet	Gandho Gokul	√	√	-
396	*Viverra zibetha**	Large Indian Civet	Baro Baghdash / Baghdash	√	√	√
397	*Viverricula indica**	Small Indian Civet	Choto Baghdash	√	√	-
	Family: Felidae					

398	*Catopuma temminckii**	Asian Golden Cat	Sonali Biral / Sona Bagh	√	√	-
399	*Felis chaus**	Jungle / Wild Cat	Bon Biral	√	√	√
400	*Neofelis nebulosa**	Clouded Leopard	Gecho Bagh / Lam Chita	√		
401	*Panthera pardus*	Leopard	Chita Bagh	√	-	-
402	*Panthera tigris*	Tiger	Bagh	√	-	-
403	*Prionailurus bengalensis**	Leopard Cat	Chita Biral	√	√	-
404	*Prionailurus viverrinus**	Fishing Cat	Mecho Bagh	√	√	
	Family: Herpestidae					
405	*Herpestes auropunctatus**	Small Indian Mongoose	Choto Beji / Nakul	√	√	√
406	*Herpestes edwardsii**	Common / Indian Grey Mongoose	Baro Beji / Nakul	√	√	√
407	*Herpestes urva*	Crab-eating Mongoose	Goaf-wala Beji / Nakul	√	-	-
	Family: Canidae					
408	*Canis aureus**	Golden Jackal	Shial / Pati Shial	√	√	√
409	*Canis alpinus**	Dhole / Wild Dog / Asiatic Wild Dog	Ram Kutta	√	√	-
410	*Vulpes bengalensis**	Bengal Fox	Kenkhshial	√	√	√
	Family: Ursidae					
411	*Helarctos malayanus*	Sun Bear	Choto Bhalluk	√	√	-
412	*Ursus thibetanus*	Asiatic Black Bear	Kalo Bhalluk	√	√	-
	Family: Mustelidae					

413	*Arctonyx collaris**	Hog Badger	Gorkhudani	√	√	-
414	*Lutra lutra**	Eurasian Otter	Udbiral / Pati Udbiral	√	√	√
415	*Lutrogale perspicillata**	Smooth-coated Otter	Baro Udbiral, Udbiral	√	-	-
	Order: Soricomorpha					
	Family: Soricidae					
416	*Suncus etruscus**	Etruscan Shrew / Etruscan Pygmy Shrew, Pigmy White-toothed Shrew	Gecho Chika / Sucho	√	√	-
417	*Suncus murinus**	Asian House Shrew	Chika / Sucho	√	√	√
	Order: Chiroptera					
	Family: Pterpodidae					
418	*Cynopterus sphinx**	Greater Short-nosed Fruit Bat / Short-nosed Indian Fruit Bat	Kola Badur	√	√	√
419	*Pteropus medius**	Indian Flying Fox	Baro Badur	√	√	√
	Family: Megadermatidae					
420	*Lyroderma lyra**	Greater / Indian False Vampire Bat	Badur	√	√	-
	Family: Rhinolophidae					
421	*Rhinophorus lepudus**	Blyth's Horseshoe Bat	Chamchika	√	-	-
	Family: Vespertilionidae					
422	*Pipistrellus coromandra**	Indian Pipistrelle	Khudey Chamchika	√	√	√

423	*Pipistrellus tenuis**	Least Pipistrelle	Cham Badur, Chamchika	√	√	√
424	*Scotophilus heathii**	Greater Asiatic Yellow Bat	Baro Rongila Chamchika	√	√	-
425	*Scotophilus kuhlii**	Lesser Asiatic Yellow Bat	Choto Rongila Chamchika	√	√	-
	Order: Primates					
	Family: Loridae					
426	*Nycticebus bengalensis**	Slow Loris	Lojjabati Banor, Nai-phonda	√	√	-
	Family: Cercopithecidae					
427	*Macaca fascicularis*	Long-tailed Macaque	Parailla Banor	√	√	-
428	*Macaca leonina**	Northern Pig-tailed Macaque	Ulto-leji Banor	√	-	-
429	*Macaca mulatta**	Rhesus Macaque	Rhesus Banor	√	√	√
430	*Trachypithecus pileatus**	Capped Langur	Lal / Mukhpora Hanuman	√	√	-
	Family: Hylobatidae					
431	*Hoolock hoolock**	Western Hoolock Gibbon	Ulluk	√	√	-
	Order: Artiodactyla					
	Family: Suidae					
432	*Sus scrofa**	Wild Boar	Shukor / Buno Shukor	√	√	√
	Family: Cervidae					
433	*Muntiacus vaginalis**	Barking Deer	Maya Horin	√	√	√
434	*Rusa unicolor*	Sambar deer	Sambar	√	√	-
	Family: Bovidae					

435	*Bos gaurus*	Gaur	Goyal / Bon Goru	√	-	-
436	*Capricornis rubidus*	Red Serow	Bon Chagol	√	√	-
	Order: Scandentia					
	Family: Tupaiidae					
437	*Tupia belongeri**	Northern Tree Shrew	Gecho Chhucho	√	√	-
	Order: Cetacea					
	Family: Platanistidae					
438	*Platanista gangetica*	Ganges River Dolphin	Shishu, Shushuk	√	√	√
	Family: Delphinidae					
439	*Stenella longirostris**	Spinner / Long-beaked Dolphin	Lomba-thot Shushuk	√	√	-
	Order: Proboscidea					
	Family: Elephantidae					
440	*Elephas maximus**	Asian Elephant	Hati	√	√	√

* Observed during this study period

6.5.1 Observations of Wildlife before and after influxes

Among the host community, an average of nearly 21 species of wildlife was observed before the first Rohingya influx occurred in 1990. After the first influx, the Rohingya followed nearly 15 species of wildlife on average. Massive damage contained after the 2017 influx, which reflects the observed value of wildlife, has been seen. Around 9 species of wildlife were observed after this influx (Fig. 6.2).

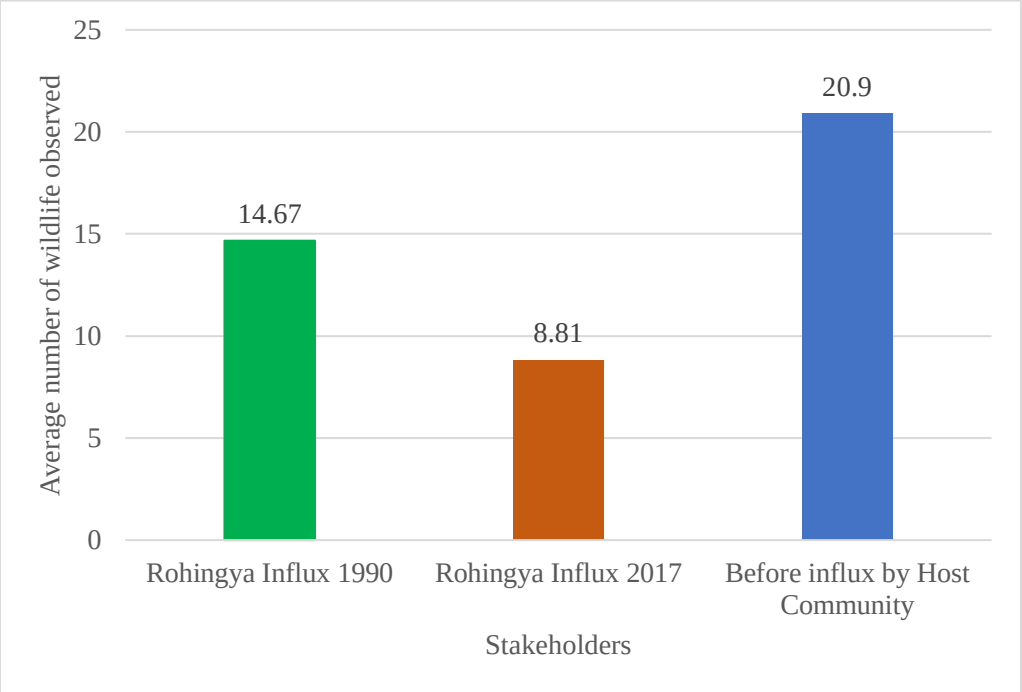


Fig. 6.2: Observations of Wildlife before and after influxes

6.5.2 Wildlife movement or presence after the Rohingya influx of 2017

Due to habitat loss and immense human pressure in a minimal area, the Teknaf Peninsula's wildlife, specifically TWS and SJINP, has suddenly decreased after the Rohingya Invasion of 2017. The environment of the area was suddenly degraded, and no time was given for wildlife to adapt. Environmental degradation has happened in various ways such as water, air, soil, etc. During the study period, 100% of respondents, both host and Rohingya, agreed that the presence of wildlife species in the area has decreased after the Rohingya influx any previous time. After the recent Rohingya Influx of 2017, there is a common phenomenon of wildlife coming out of the forest habitat to the locality. People have a common tendency to kill snakes, so almost all captured snakes are killed by Rohingya and/or the host communities. Most people are ignorant and don't know their roles and responsibilities in wildlife conservation. Sometimes, people release the captured wildlife to their habitat, with the support of BFD or

local administration, ensuring the relevant primary treatment, treatment, etc. (Annex 8 and Annex 9). The summary of the release of wild animals after being captured from September 2019 to September 2022 is shown in Table 6.2.

Table 0.2: List of rescued wildlife as well as released wildlife in the wild habitats in the study area from September 2016 to September 2022*

Sl. No.	Taxa	English name	Local name	No. (n)	Remarks
1.	**Reptilia: Squamata: Varanidae** *Varanus bengalensis / salvator*	Bengal Monitor / Water Monitor	Guishap	1	
2.	**Colubridae** *Ptyas korros / mucosa*	Rat Snake	Daras/Daraj		
3.	**Pythonidae** *Python bivittatus*	Burmese Python		4	
4.	*Malayopython reticulatus*	Reticulated Python		4	
5.		-	Pokhiraj	1	
6.	**Elapidae** *Ophiophagus hannah*	King Cobra	Paddogokhra	2	
7.	**Aves: Columbiformes: Columbidae** *Spilopelia chinensis*	Eastern Spotted Dove	Ghugu	7	
8.	**Pelicaniformes: Ardeidae** *Ardea intermedia*	Intermediate Egret	Majhari-bok	6	
9.	*Bubulcus ibis*	Cattle Egret	Go-bok	6	
10.	**Accipitriformes: Accipitridae**	Eagle	Egol	1	
11.	**Coraciiformes: Coracidae** *Coracias benghalensis*	Indian Roller	Nilkantho	1	

12.	**Passeriformes: Cisticolidae** *Orthotomus sutorius*	Common Tailobird	Tuntuni	1	
13.	**Ploceidae** *Ploceus philippinus*	Baya Weaver	Babui	1	
14.	**Passeridae** *Passer domesticus*	House Sparrow	Charui	8	
15.	**Mammalia: Carnivora: Viverridae** *Viverra zibetha*	Large Indian Civet	Baro Baghdash	1	
16.	**Felidae** *Prionailurus viverrinus*	Fishing Cat	Mecho Bagh	1	
17.	**Primates: Cercopithecidae** *Macaca mulatta / leonina*	Rhesus Macaque/Pig-tailed Macaque	Rhesus Banor / Ulto-leji Banor	2	
18.	**Artiodactyla: Cervidae** *Muntiacus vaginalis*	Barking Deer	Maya Horin	1	
19.	**Proboscidea: Elephantidae** *Elephas maximus*	Asian Elephant	Hati	1	
20	-do-	Baby Asian Elephant	Hati / Bachcha Hati	1	Local Forest Department handover to Bangabandhu Sheikh Mujib Safari Park, Dulahazara

* Source: Cox's Bazar South Forest Division 2022b

For killing, hunting, capturing, poaching, etc. purposes, BFD files cases that support wildlife for their conservation. When any offence occurs in the premises forests, three types of cases are filed: COR (Compound Offence Report), UDOR (Undetected Offence Report), and POR (Prosecution Offence Report). Usually, COR and UDOR-type cases are resolved in the DFO (Divisional Forest Officer) Office. When any case cannot be resolved in the DFO Office, the

Forest Department files that case to the court, which is treated as a POR case. Table 6.3 shows the number of POR cases filed by the Cox's Bazar South Forest Division from 2016 to 2022.

Table 0.3: Number of POR cases filed by Cox's Bazar South Forest Division from 2016 to 2022

Name of Upazila	Year						
	2016	2017	2018	2019	2020	2021	2022
Teknaf	30	48	20	25	17	15	37
Ukhiya	63	140	124	74	75	76	125
Ramu	49	45	23	44	23	41	50
Cox's Bazar Sadar	2	5	2	14	12	15	17
Total	144	238	169	157	127	147	229

Source: Author's communication from Cox's Bazar South Forest Division

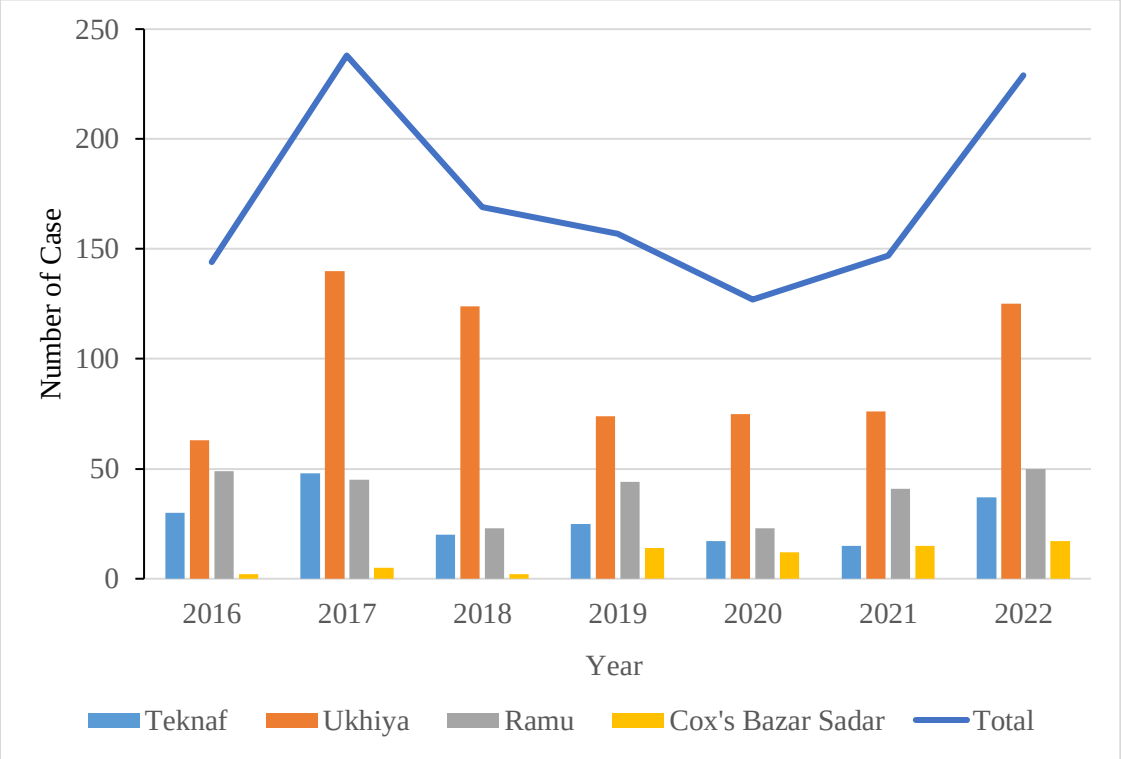


Fig. 6.3: Number of POR cases filed by Cox's Bazar South Forest Division from 2016 to 2022

The total number of POR cases filed by Cox's Bazar South Forest Division from 2016 to 2022 is 1211 (Fig. 6.3). The graph shows that the number of cases increased from 2016 to 2017. From 2017 to 2020, the graph shows a decreasing trend; however, from 2020 to 2022, the graph

shows an upward trend, which indicates that the number of cases is increasing again. Sometimes, BFD seized and destroyed the illegally hunted wildlife meat (Annex 10).

6.5.3 Indicator Bird Survey

6.5.3.1 Teknaf Wildlife Sanctuary (TWS)

Ten indicator bird species (Table 6.4) have been monitored following Haque et al. (2018) for this study in the Teknaf Wildlife Sanctuary (TWS) from 2019 to 2022 (Annex 4). Among these birds, however, White-rumped Shama and Scarlet Minivet have only been spotted in this location in 2019, and Hill Myna and Red-headed Trogon have not been observed here since 2015 (Fig. 6.4). It should be mentioned that White-crested Laughingthrush has not been spotted in the research site for the past eight years (since 2014). The density of indicator birds of all three strata has decreased over the past years- indicating a gradual decline in forest conditions. Worryingly, the percentage of decline for all three strata has further increased in the recent four years (2019-2022), showing severe deterioration of forest habitats (Table 6.5) in the TWS. This result is also consistent with the changes in species-wise density, and it can be seen that the density of nine species has declined dramatically in recent years (Table 6.6).

Table 0.4: Trends in bird populations in TWS

Species	% Change pa*	
	8 years	4 years
Greater Racket-tailed Drongo	-6.21	-6.39
White-crested Laughing-thrush	-	-
Red Jungle-fowl	-3.20	-25.00
Green-billed Malkoha	-10	-14.51
White-rumped Shama	nr	-25.00
Hill Myna	-12.5	no
Puff-throated Babbler	-6.94	2.47
Scarlet Minivet	nr	-25.00
Oriental Pied Hornbill	-4.13	no
Red-headed Trogon	-12.5	no

* Percentage change in density standardised per year based on 8 years = mean of 2021 and 2022 compared with a mean of 2014 and 2015; 4 years = 2022 compared with a mean of 2018 and 2019.

nr = Not recorded during 2014-2015; no=Not observed during 2018-2019; pa* = Per year on average

Table 0.5: Average indicator bird population trends in TWS (% Change pa*)

Strata	8 years	4 years
Undergrowth / ground (Low)	-5.07	-11.263
Middle	-9.57	-15.30
Upper	-8.31	-25.00

pa* = Per year on average

The loss density of birds in all three strata in the TWS has continued to decline (Table 6.6).

Table 0.6: Most recent density estimates (birds/km^2) of indicator species in TWS from 2014 - 2022

Indicator Bird Species	Strata	2014*	2015	2016	2018	2019	2020	2021	2022
White-crested Laughing-thrush	Low	-	-	-	-	-	-	-	-
		0	0	0	0	0	0	0	0
Red Jungle-fowl	Low	-	√	√	√	-	√	√	-
		0	2.16	2.16	3.59	0	0.80	1.61	0
Puff-throated Babbler	Low	√	√	√	√	√	√	√	√
		32.33	30.89	22.99	28.02	5.63	10.45	9.65	18.49
Greater Racket-tailed Drongo	Mid	√	√	√	√	-	√	√	√
		1.2	3.59	3.59	4.32	0	0.81	0.80	1.61
Green-billed Malkoha	Mid	√	√	√	√	-	√	√	√
		5.99	10.06	12.21	11.49	0	2.41	0.80	2.41
	Mid	√	√	-	-	-	-	-	-

Red-headed Trogon		1.2	0.72	0	0	0	0	0	0
White-rumped Shama	Mid	-	-	-	-	√	-	-	-
		0	0	0	0	0.80	0	0	0
Hill Myna	Canopy	√	√	-	-	-	-	-	-
		3.59	3.59	0	0	0	0	0	0
Scarlet Minivet	Canopy	-	-	-	-	√	√	√	
		0	0	0	0	1.61	0.80	0.80	0.00
Oriental Pied Hornbill	Canopy	√	-	-	-	-	-	-	-
		1.2	0	0	0	0	0	0	0.80

* Upper row indicates the presence (give right mark) or absence (-) & lower row indicates the density of birds

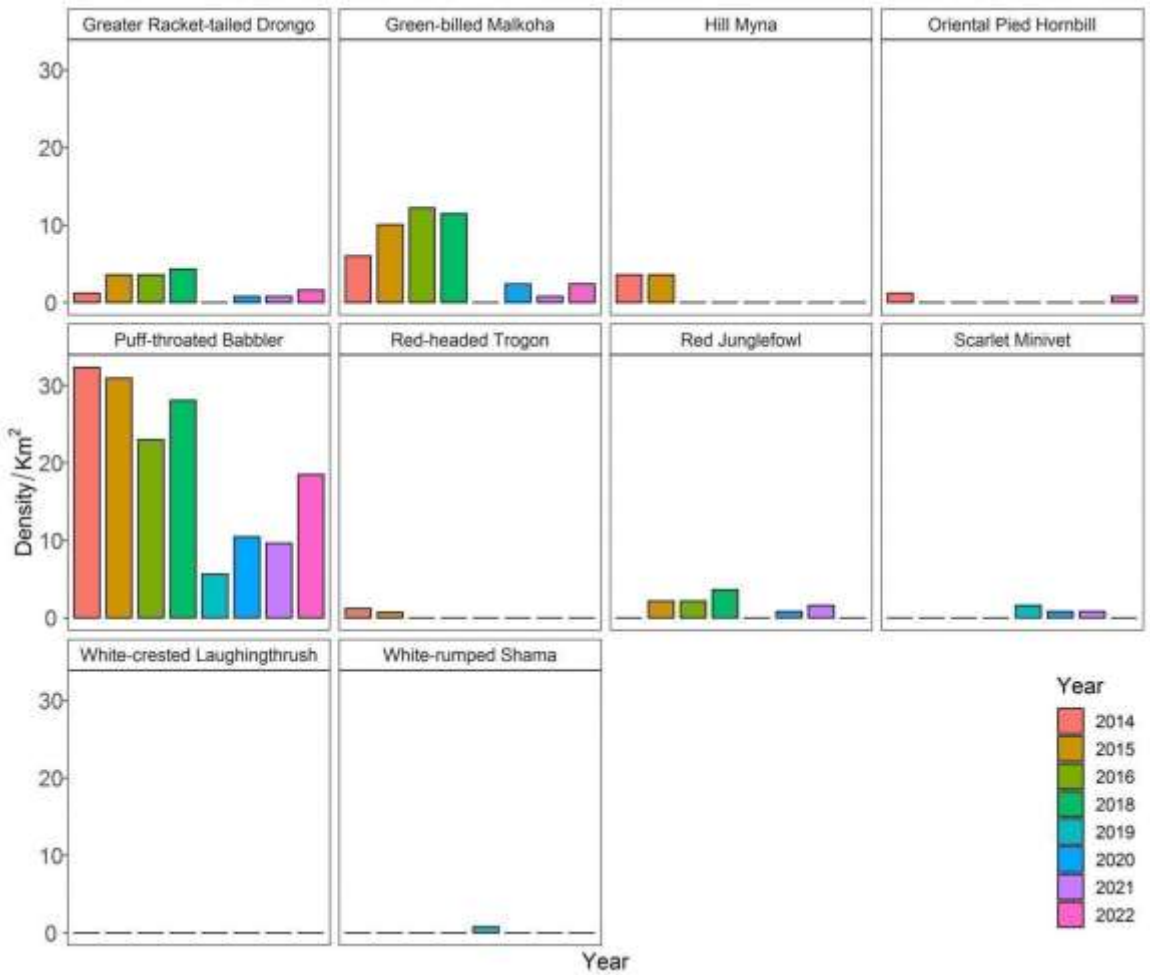


Fig. 6.4: Density of indicator birds (birds/km²) in TWS from 2014 to 2022

6.5.3.2 Sheikh Jamal Inani National Park (SJINP)

For this study, eleven indicator bird species (Table 6.7) have been monitored based on Haque et al. (2018) in the Sheikh Jamal Inani National Park (SJINP) from 2019 to 2022 (Annex 5). Among these 11 indicator bird species, the Oriental Pied Hornbill was only seen once in 2016, and the Scarlet Minivet hasn't been seen in the last nine years (since 2014). Red Junglefowl, meanwhile, was only seen in 2018 (Fig. 6.5). Based on observed density changes, indicator birds of the middle and upper canopy strata have declined over the last eight years, indicating a decline in the condition of middle and upper tree strata. However, in the last four years (2019 - 2022), the percentage of changed density for middle strata birds was positive, showing the regeneration of these habitats. However, the density of upper strata birds has further decreased, indicating a severe loss of suitable habitat for birds such as the Hill Myna (Table 6.7). These findings are also consistent with species-specific density changes (Table 6.8), and it can be shown that the density of lower stratum birds increased by 17.87% and 20.6% in both 8 and 4 years, respectively, due to an increase in the population of Abbott's Babbler and Puff-throated Babbler. Year-wise density and occurrence of indicator birds in SJINP are present in Table 6.8.

Table 0.7: Trends in bird populations in SJINP

Species	**% Change pa***	
	8 years	**4 years**
Greater Racket-tailed Drongo	1.58	58.28
Red Junglefowl	nr	-25
Green-billed Malkoha	-2.55	3.57
White-rumped Shama	-12.5	-25
Hill Myna	-12.5	-25
Puff-throated Babbler	-3.69	80.57
Abbott's Babbler	39.43	6.24
Scarlet Minivet	-	-
Crimson Sunbird	nr	-25
Oriental Pied Hornbill	nr	no
Red-headed Trogon	-3.10	no

* Percentage change in density standardised per year based on 8 years = mean of 2021 and 2022 compared with a mean of 2014 and 2015; 4 years = 2022 compared with a mean of 2018 and 2019

nr = Not recorded during 2014-2015; no=Not observed during 2018-2019; pa* = Per year on average

Table 0.8: Average indicator bird population trends in SJINP (% change pa*)

Strata	**8 years**	**4 years**
Undergrowth / ground (Low)	17.87	20.604
Middle	- 4.14	2.96
Upper	-12.5	- 25

pa* = Per year on average

Table 0.9: Most recent density estimates (birds / km^2) of indicator species in Sheikh Jamal Inani National Park from 2014 to 2022

Indicator Bird Species	Strata	2014	2015	2016	2018	2019	2020	2021	2022
Red Jungle-fowl	Low	-	-	-	√	√	√	-	-
		0	0	0	5.71	1.43	1.43	0	0
Puff-throated Babbler	Low	√	√	√	√	√	√	√	√
		34.29	28.57	12.86	8.57	4.29	8.57	17.14	27.14
Abbott's Babbler	Low	√	√	√	√	√	√	√	√
		1.9	4.29	12.86	14.29	8.57	10	11.43	14.29
Greater Racket-tailed Drongo	Mid	√	√	√	√	√	√	√	√
		1.9	5.71	1.43	2.86	1.43	4.29	1.43	7.14
Green-billed Malkoha	Mid	√	√	√	√	√	√	√	√
		13.33	10	14.29	17.14	2.86	5.71	7.14	11.43
White-rumped Shama	Mid	-	√	√	√	√	√	-	-
		0	2.86	1.43	2.86	1.43	2.86	0	0
Crimson Sunbird	Mid	-	-	√	√	-	-	-	-
		0	0	5.71	1.43	0	0	0	0
Red-headed Trogon	Mid	√	-	-	-	-	-	√	-
		1.9	0	0	0	0	0	1.43	0
Oriental Pied Hornbill	Canopy	-	-	√	-	-	-	-	-
		0	0	2.86	0	0	0	0	0
Hill Myna	Canopy	√	√	√	-	√	√	-	-
		7.62	7.62	1.43	0	1.43	1.43	0	0
Scarlet Minivet	Canopy	-	-	-	-	-	-	-	-
		0	0	0	0	0	0	0	0

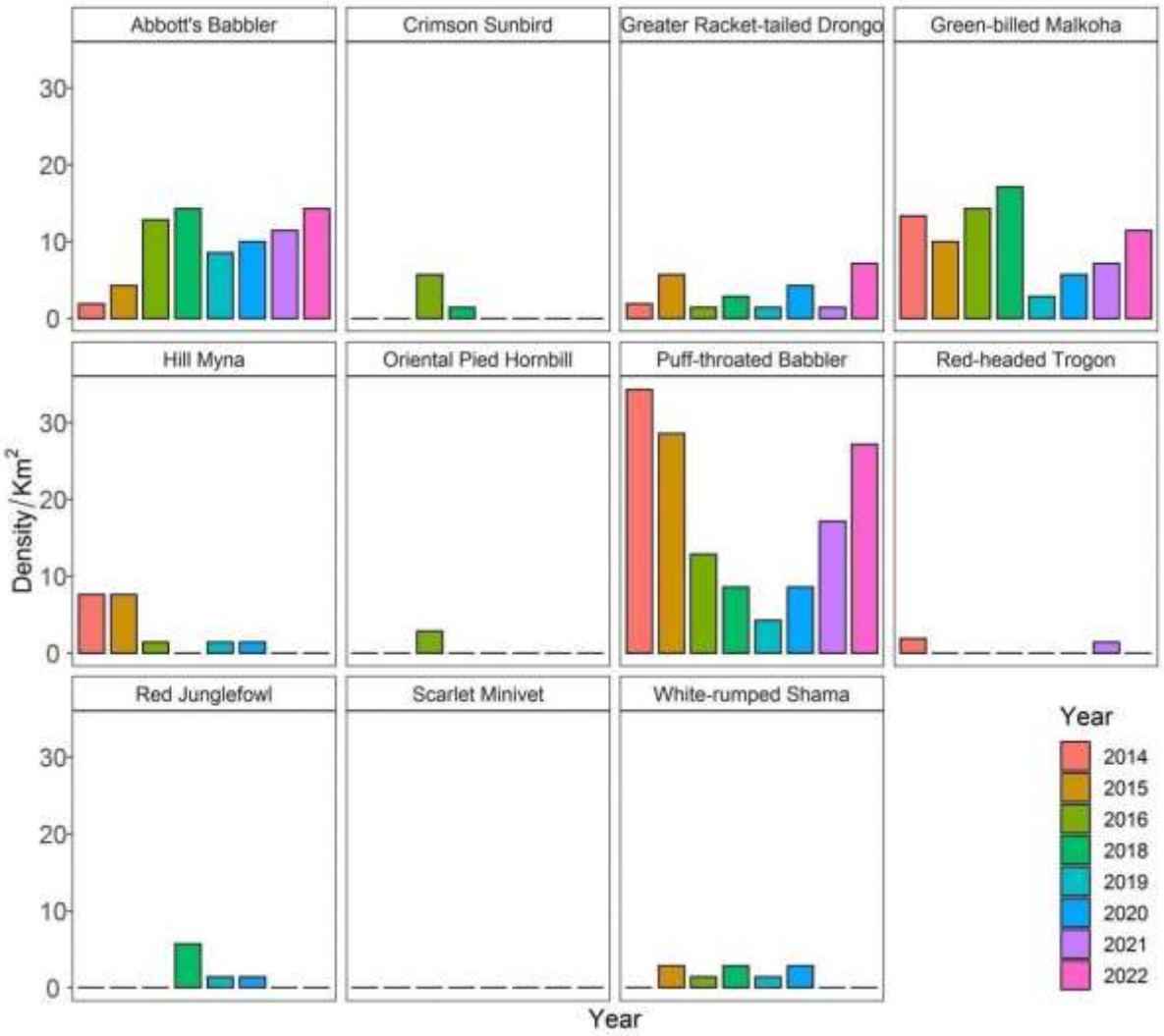


Fig. 6.5: Density of indicator birds (birds/km²) in SJINP from 2014 to 2022

6.5.4 Movement of wildlife after the Rohingya influx (elephant and other wildlife)

Generally, it has been observed that during the field visit, the movement of wildlife has decreased after the Rohingya influx in 2017. When any wildlife comes out from their shrieked habitat for food or response to any other biological needs, they are attacked by Rohingya or locals and eventually injured or die. In very exceptional cases, captured wildlife is rescued, and if it is found in an injured condition, it provides primary treatment with the help of the Forest Department or other government agencies and is finally released to the nearest wild habitats. In some cases, they tried to move from one forest patch to another.

6.5.4.1 Elephant movement

Almost all (99.57%) Rohingya interviewed perceive that the elephant movement is decreasing. About 91.61% of the host community share an opinion about the elephant movement. 8.39% of hosts and 0.43% of Rohingya said the elephant movement is increasing (Fig. 6.6). Loss of

habitat, food scarcity, search for drinking water and forest fragmentations are the main reasons for the frequent movement of elephants. However, elephants maintain a large territory, another reason for observing frequent elephant movements. Corridors play a crucial role in the lives of elephants, as they require a large home and day range and follow the same route year after year.

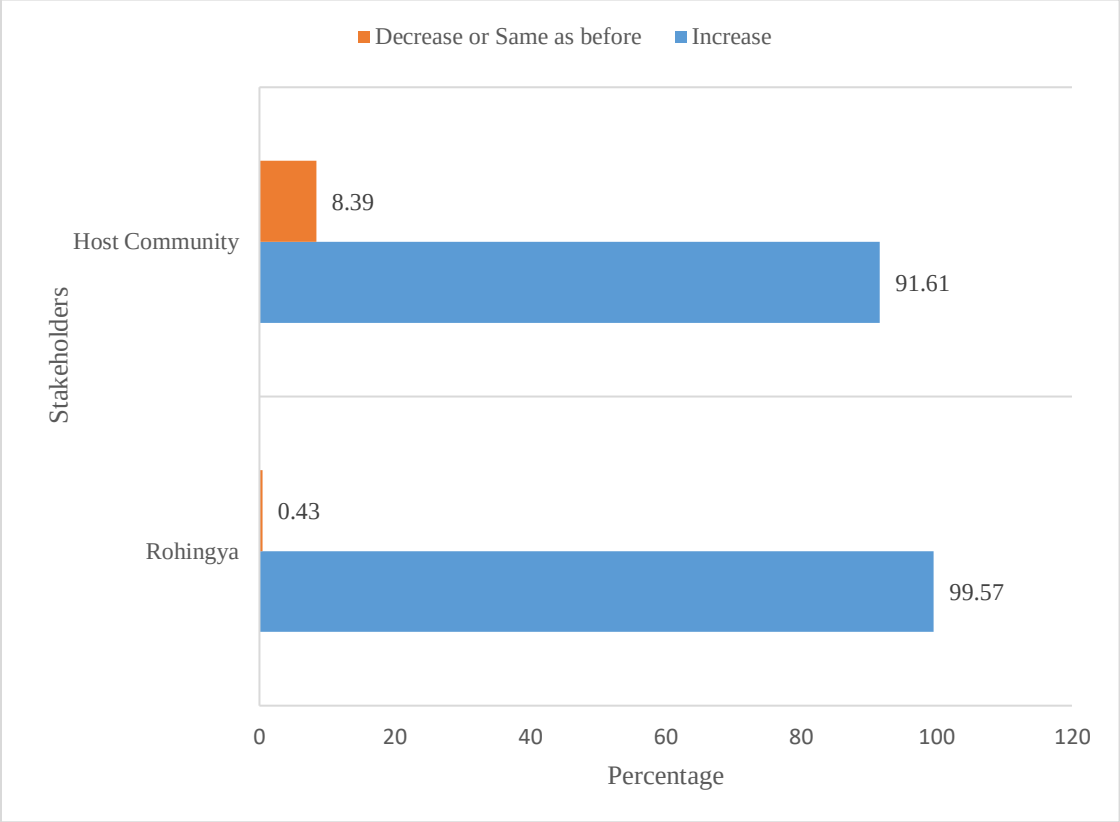


Fig. 6.6: Effect of Rohingya influx on Elephant movement

The main reasons for the decreased elephant movement are the fencing of the camps, elephant corridors being blocked, the lighting of the camp area, humans creating threats to the elephants coming into the human habitats, etc. Even people directly or indirectly killed 13 elephants after the Rohingya influx in 2017. Cox's South Forest Division keeps records of dead elephants from January 2005 to till date. Thirty-three elephants died (either hunted or naturally dead) during the mentioned periods (Annex 11). A summary of dead elephants is shown in Table 6.10 with the causes of elephant death.

Table 0.10: List of summary of dead elephants at Cox's South Forest Division from January 2005 to till date*

Sl. No.	Cause of elephant death	Number
01	During the teeming / birth time	02
02	Natural / Illness	18
03	Old age	05
04	Trap / electrification / shooting by the miscreants	06
05	Unknown	02
	Total	33

Source: *Cox's Bazar South Forest Division 2022c

Electrification in the forest area is one of the major causes of wild elephant death. When an elephant came into the local area, actually a forest area, they were electrified due to the illegal electric line while searching for their food. Sometimes, the electricity line was very low, intentionally electrifying the cropland to save the crop or threatening the elephant.

6.5.4.2 Movement of other wildlife

All Rohingya interviewed opined that they have observed a decrease in the wildlife population. The over-extraction of forest genetic resources immediately after the influx is one of the significant issues. Around and within the camp initially after the influx, Rohingya people denuded the hills and created a scarcity of food and habitat for wildlife. That is the reason for wildlife reduction. However, in some places, different plantation programmes mitigate this problem. About 5.65% of the host communities observed that wildlife, mostly birds, increased in some places, as some plantation programmes were held in recent times (Fig. 6.7).

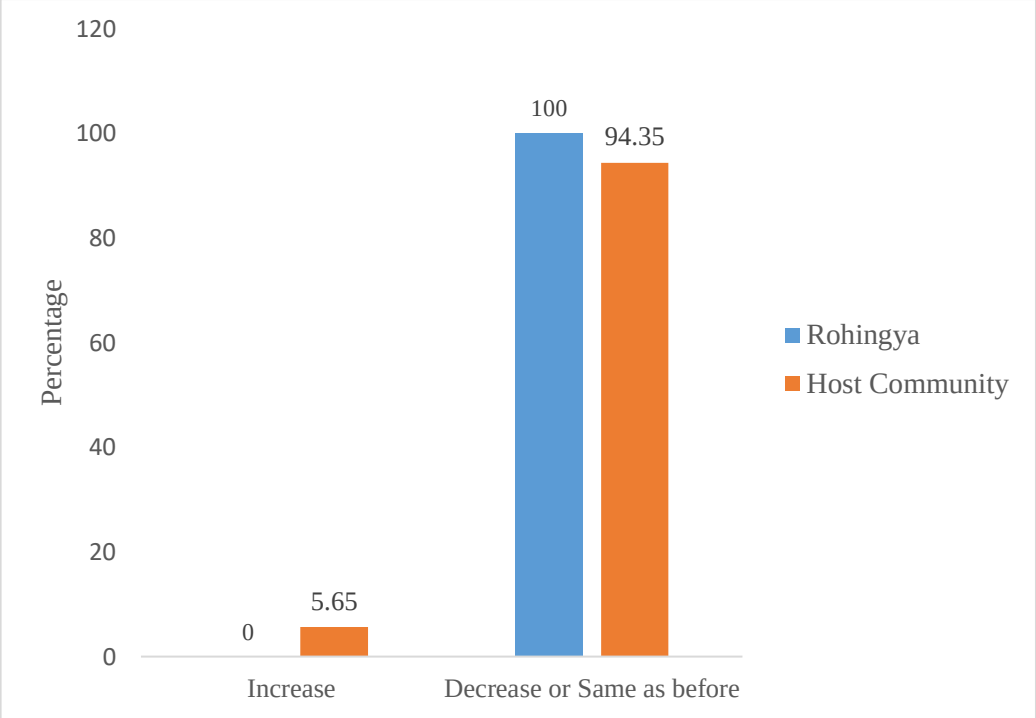


Fig. 6.7: Movement of other wildlife

6.5.4.3 Wildlife damage to human property

As the Rohingya community stays in a fenced area the rate of property damage by wildlife is decreasing or remains the same. Only a few Rohingya (0.43%) have been hampered by wildlife who live close to the fence, adjacent to the forest area. Host community affects much. About 8.56% of the host communities face some damage to their property, especially elephants, wild boars, foxes, monitors lizards, wild cats etc. (Fig. 6.8).

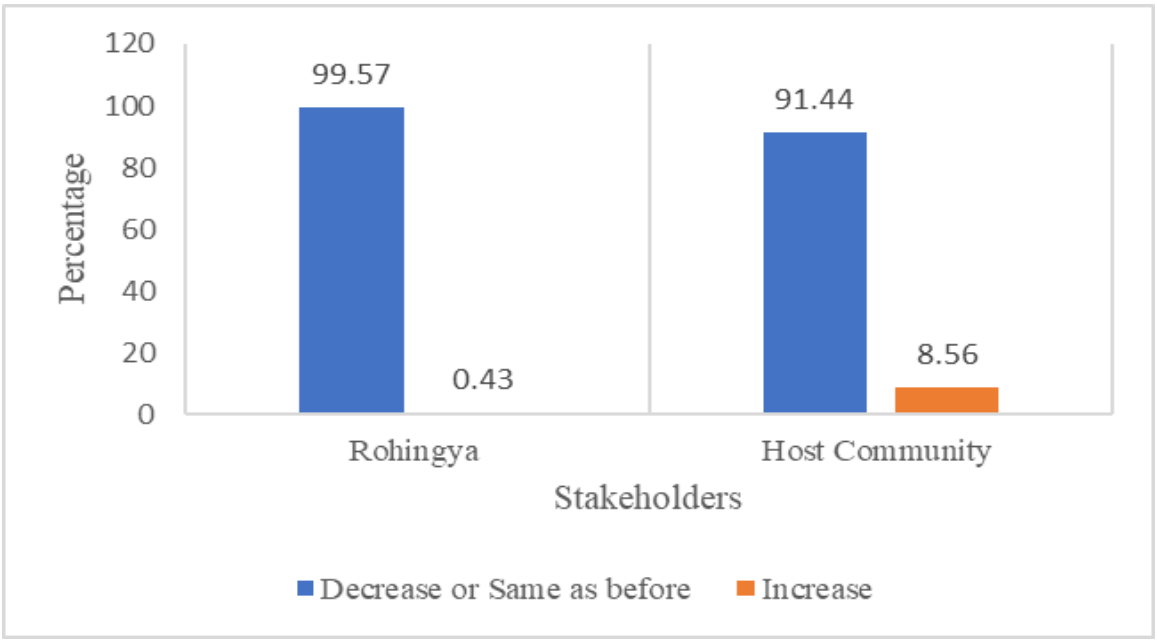


Fig. 6.8: Damage to human property by wildlife

6.5.4.4 Humans' damage to wildlife habitat

Compared to the immediate impacts of the Rohingya influx in 2017, 98.26% of Rohingya and 86.99% of host communities agreed that wildlife habitat destruction has decreased. Some people (13.01%) from the host community perceive that wildlife habitat destruction has increased compared to the immediate effects of the Rohingya influx in 2017 (Fig. 6.9). Denudation of hills, hill cutting, reduction of forest genetic resources (FGRs), creation of commercial betel leaf fields by the host community, creation of dams at water flows, etc., are the leading causes of habitat loss of wildlife.

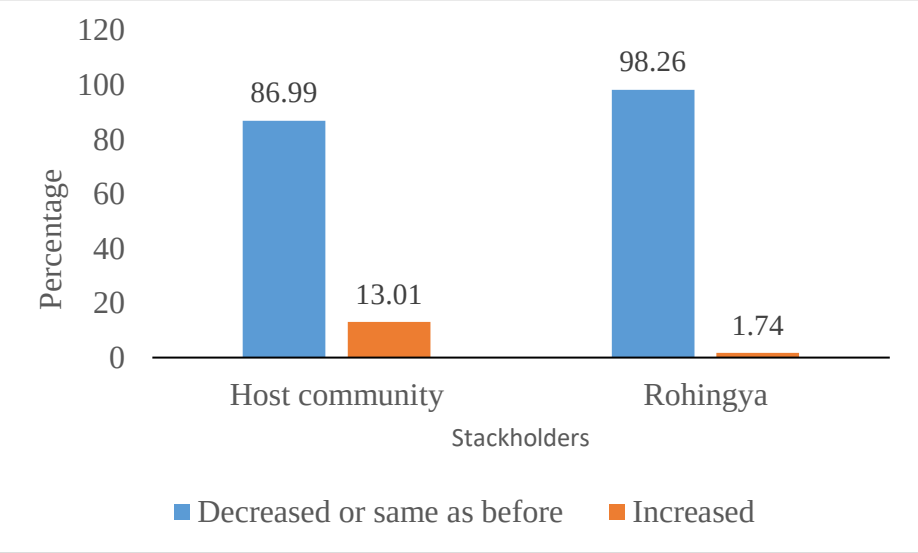


Fig. 6.9: Humans' damage wildlife habitat

6.5.4.5 Human killed / hunted wildlife

The 10.10% of people in the host community said Rohingya people increase the rate of killing wildlife to sell to the local community. Poor fencing systems around some camps, accessible entrances by the host and Rohingya of the forest for fuel wood collection, non-timber forest products (NTFPs), collection of fish from natural water flows, etc., are the main reasons. Though most hosts (89.90%) said the rate remains the same or decreases. All the Rohingya (100%) said the rate of wildlife hunting is decreasing (Fig. 6.10).

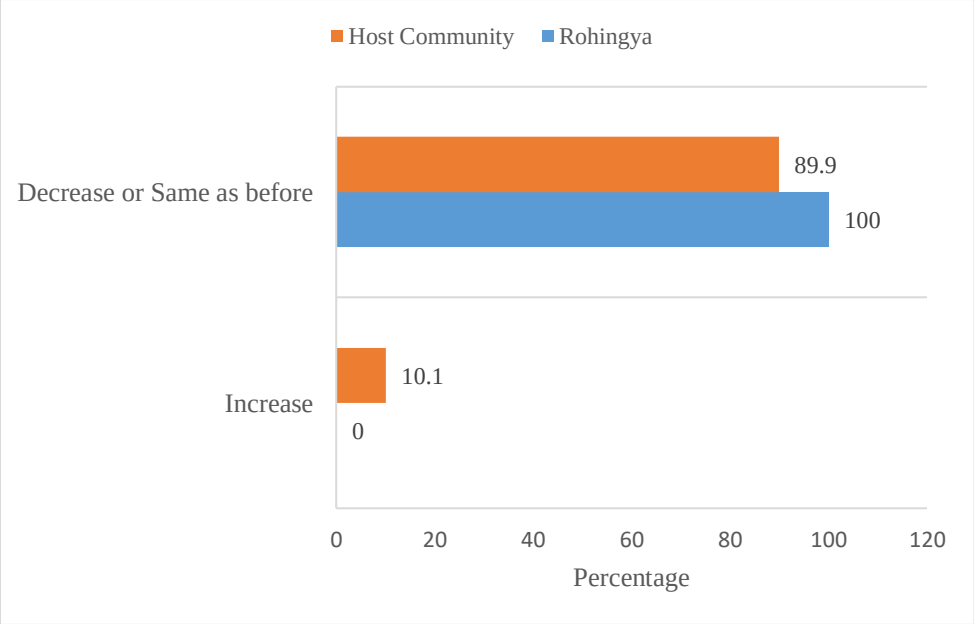


Fig. 6.10: Frequency of killed / hunted wildlife by humans

6.5.4.6 Wildlife killed / wounded human

All interviewed Rohingyas believed that the killing or wounding of humans and wildlife is declining. With the over-extraction of forests, the genetic resources of the wildlife population are getting lower. That is why they do not face any conflict. Fencing is also a reason to decrease the killing rate of humans by wildlife. As hosts are not fencing around, some (4.11%) face an increasing death rate by wildlife (Fig. 6.11).

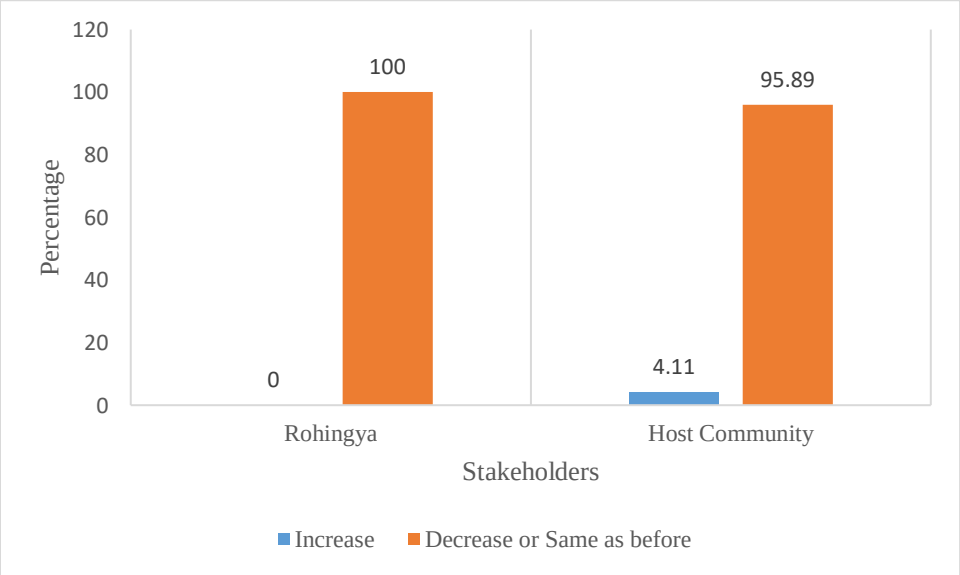


Fig. 6.11: Wildlife killed / wounded human

Because of the Rohingya influx of 2017, 17 people died, including 12 Rohingyas and 5 locals, and many others were injured. After the Rohingya influx of 2017, 12 Rohingyas died in

elephant attacks at Kutupalong Camp and the new Camps of Balukhali area of Ukhiya between 25 August and December 2017 (RRRC 2022) and wounded many. From April 2018 to December 2022, five locals died, and five were wounded because of elephant attacks (Annex 12).

6.5.4.7 Wildlife killed / injured domestic animals

Rohingya and the host communities observed a decreasing rate of killing or injuring domestic animals by wildlife. Not many carnivorous animals exist after the influx (See Section 6.4.1). However, 2.91% of host people face that the wildlife attack is increasing as the Rohingya have destroyed forests in a flash immediately after the influx, and the wildlife has no or less food to eat (Fig. 6.12). So, domestic animals are a good source of food for them.

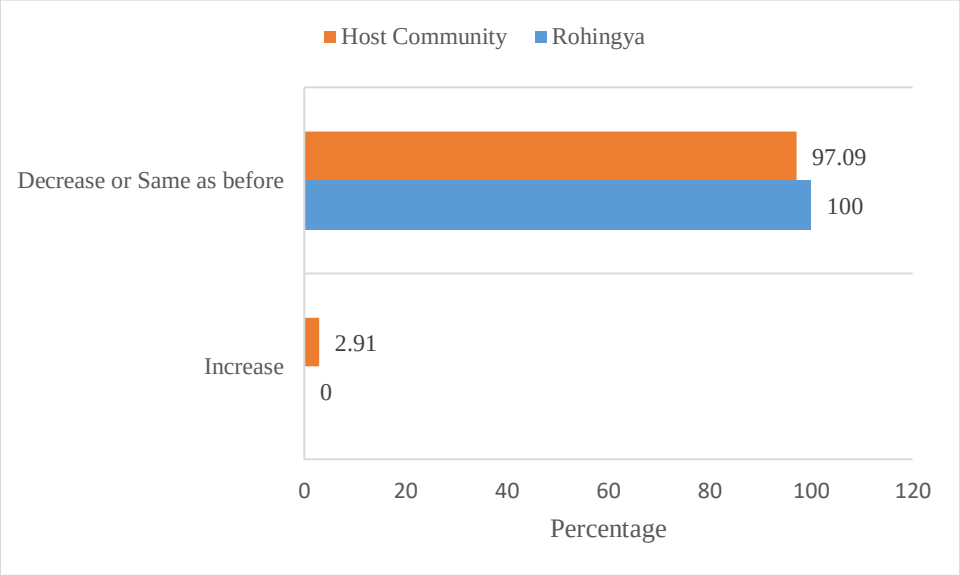


Fig. 6.12: Wildlife killed / injured domestic animals

6.5.4.8 Food Source of Wildlife

The Rohingya (100%) community admits all the food sources for wildlife in that place were destroyed after the Rohingya influx of 2017. The same opinion was heard during the survey of most hosts (Fig. 6.13). Only 0.68% said food sources are increasing due to several initiatives of BFD through different project interventions, mainly the SUFAL (Sustainable Forests And Livelihoods) Project and different initiatives of NGOs and INGOs natural resource management-related activities. Homestead and institutional plantations have a vital role in this regard after the Rohingya influx of 2017 (Fig. 6.13).

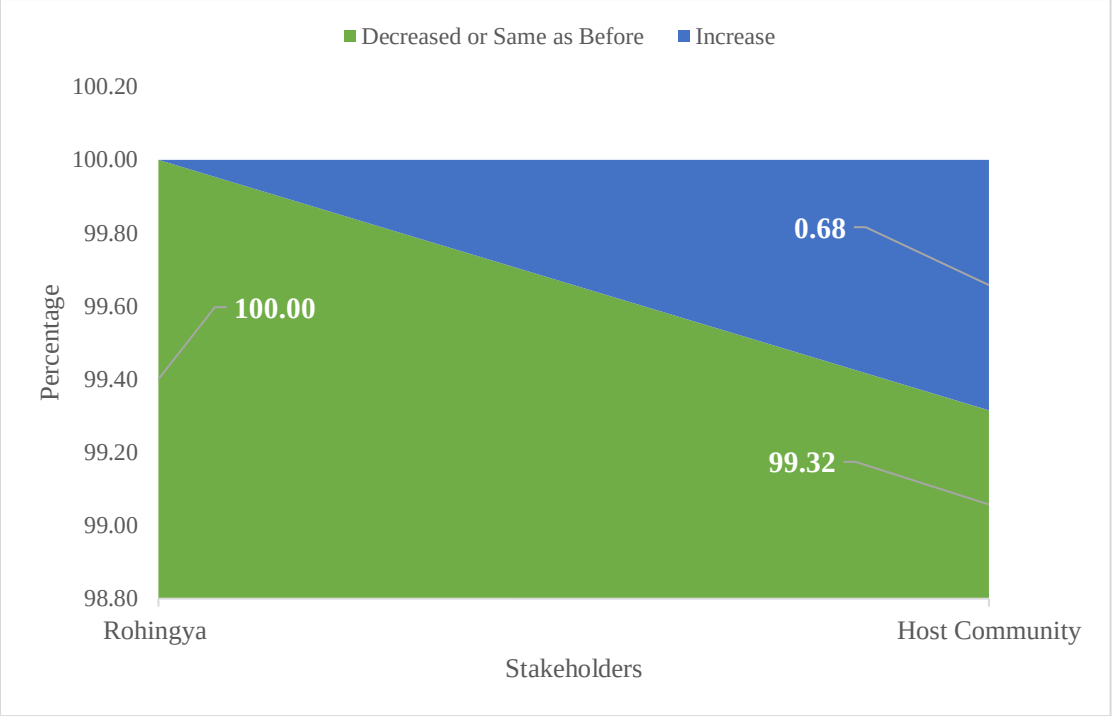


Fig. 6.13: Food Source for Wildlife

6.5.4.9 Suitable Habitat for Wildlife

After the Rohingya influx of 2017, almost all Rohingya and host communities (Fig. 6.14) believe suitable habitats have decreased. Only 0.51% admit it is increasing due to the natural healing process in nature and to different types of plantation initiatives after the Rohingya influx of 2017 (Fig. 6.14).

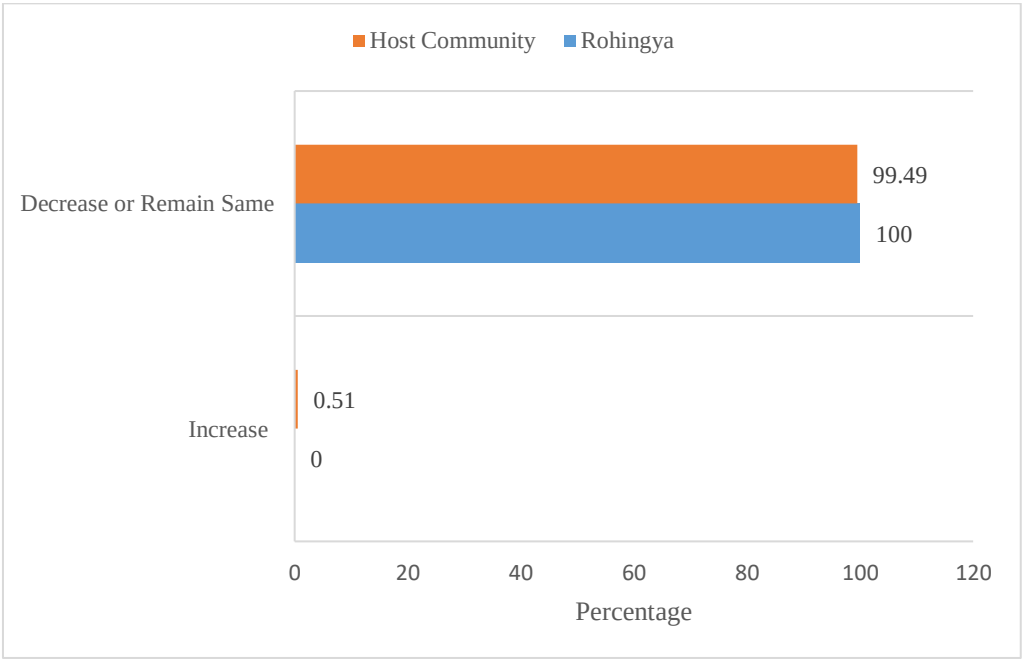


Fig. 6.14: Suitable habitat for wildlife

6.5.4.10 Scope of Wildlife Reproduction

The majority of both communities (Rohingya and Host) (Fig. 6.15) admit that the reproduction rate of wildlife is decreasing gradually. Destruction of forests is the central issue of this problem. Only 0.86% of hosts believe that the forest destruction due to influx does not harm reproduction (Fig. 6.15).

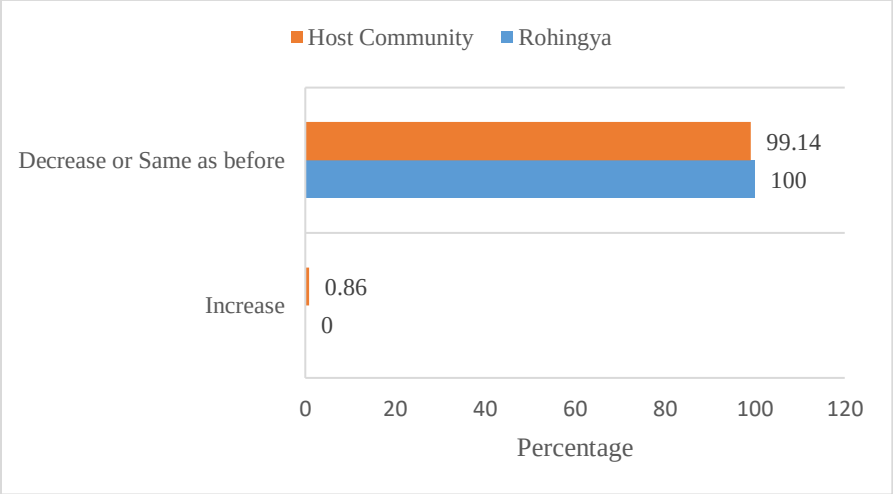


Fig. 6.15: Reduction of wildlife reproduction

6.5.4.11 Wildlife population

Both communities, the Rohingya and the host, have agreed that the wildlife population decreased after the Rohingya influx in 2017. Only 1.03% of the host community perceives that the wildlife population is increasing but not the diversity (Fig. 6.16). However, the wildlife population is declining for two reasons after the Rohingya influx in 2017. One is the destruction of their habitats, and another is hunting or killing by the Rohingya people.

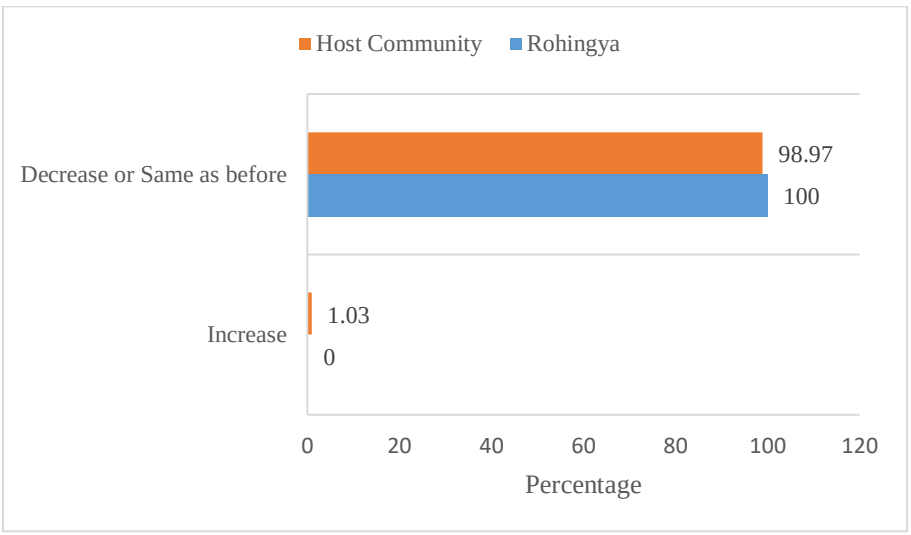


Fig. 6.16: Wildlife population

6.5.4.12 Species diversity

The diversity of wildlife (i.e., species diversity) is decreasing, as both communities admit. About 0.34% believe species diversity does not face any difficulty (Fig. 6.17). However, the change in land use of that place significantly impacted the variety of wildlife species. In the study area, locals saw over 440 species of wildlife, of which 337 species were observed by Rohingyas who fled to Bangladesh after 1990 and 241 species by Rohingyas who arrived after 2017 (Table 6.1).

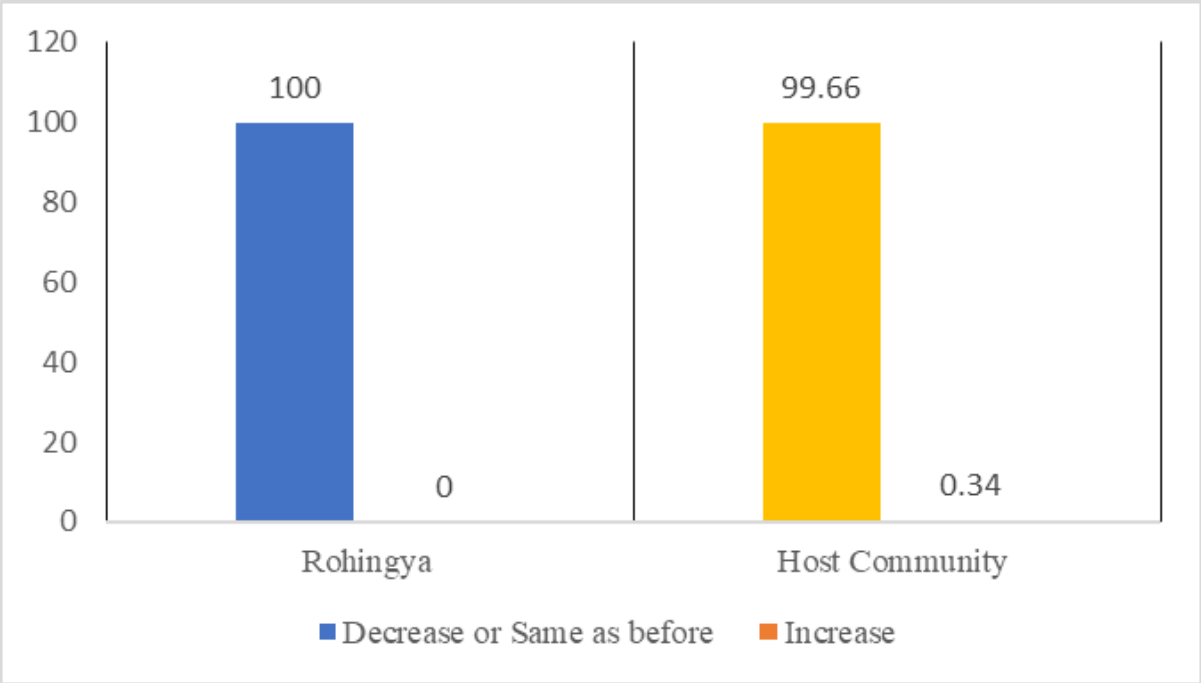


Fig. 6.17: Species diversity

6.5.4.13 Wildlife hunted / killed by the Rohingya

Before fencing, Rohingya people hunted different wildlife (amphibians, reptiles, birds and mammals), but after fencing, generally, it is not possible except where the fencing has been damaged. At the beginning of the influx, they killed different frogs, snakes, rats, foxes, monitor lizards, porcupines, etc., for their safety in the area of their makeshift settlement. Generally, based on the scope and availability, boys and young people usually hunt birds through traps such as slingshots, nets, etc. They hunt different birds such as egrets, storks, pigeons, doves, tailorbirds, robins, sparrows, badoi / titir, harikhuri / harichacha (*Rufous treepie*), junglefowl, pond heron, mynas / shaliks (juti and bhat), migratory birds, wild migratory ducks, etc. The Rohingya have different mammals such as barking deer, wild goats, boars, porcupines, foxes, monkeys, langurs, etc. They mostly hunt for consumption, but they hunt different types of wildlife, such as pythons, monitor lizards, wild boars, foxes, etc., to sell to tribal and Hindu

communities. They kill monitor lizards, foxes, etc., to save their poultry. Sometimes, some Rohingyas capture monkeys, langurs, etc. for rearing. Local people suspect that sometimes they are involved in killing the Asian elephant when it enters their areas. Recently, the Rohingya people have been less interested in hunting than earlier.

Some Rohingya people are involved in fishing from waterfalls, freshwater streams, canals and rivers and others by net, making dams, etc. They catch fishes like Chang (*Ophiocephalus* spp.), different species of Shrimps (*Macrobrachium* spp.), Bailla (*Glossogobius* spp.), Mola (*Amblypharyngodon* sp.), Puti (*Puntius* spp.), Kawa guilla (*Mystus* sp.), Crabs (*Sartorina* spp.), Molluscs (*Pila* sp.), etc. from waterfalls of the hills in the forests.

Recently, most of the water bodies have been polluted, and no fish are there, even though it is impossible to fish due to the fencing of the camps. Sometimes, it is observed that the Rohingya people use 'Mel-lota/Mel Gota' (*Sapium indicum)* to make poison for catching fish, which causes a significant impact on wildlife, fish and aquatic diversity in the water. Rohingyas catch many fish from the waterfalls of the hills in the forest.

6.5.4.14 Extinct and nearly extinct wildlife from the study area

This study confirms that some of the wildlife species have been extinct from the area mainly due to habitat loss and habitat destruction. Some species were extinct from the study area before the Rohingya influx; these species are Bengal Tiger (*Panthera tigris*), Sun Bear (*Helarctos malayanus*), Long-tailed Macaque (*Macaca fascicularis*), Gaur (*Bos gaurus*), White-winged Duck (*Asarcornis scutulata*), Great Hornbill (*Buceros bicornis*), Grey Peacock Pheasant (*Polyplectron bicalcaratum*), etc.

After the Rohingya influx, some of the nearly extinct species from the area are Leopard (*Panthera pardus*), Clouded Leopard (*Neofelis nebulosa*), Asiatic Black Bear (*Ursus thibetanus*), Red Serow (*Capricornis rubidus*), Asian Elephant (*Elephas maximus*), Kalij Pheasant (*Lophura leucomelanos*), Oriental Pied Hornbill (*Anthracoceros albirostris*), etc.

Besides the above species, there are other species of wildlife whose populations have drastically decreased that need to be studied.

6.6 The impact of Rohingya people on natural resources

6.6.1 Collection of Forest Trees by the Rohingya People

All the surveyed Rohingyas opined that the collection of forest trees is decreasing, but initially, they build their houses by collecting trees, bamboo, cane etc., from the nearby forest and social forest. At present, they get all the materials for building their houses from the government and different NGOs / INGOs. Around 95% of the hosts also provided the same view (Fig. 6.18). According to the host people, not many forest trees exist to be cut down in the forest, which is the fundamental reason for the decrease in forest tree extraction. Only a few from the host community (4.78%) said this rate is increasing, especially adjacent to the camp areas (Fig. 6.18).

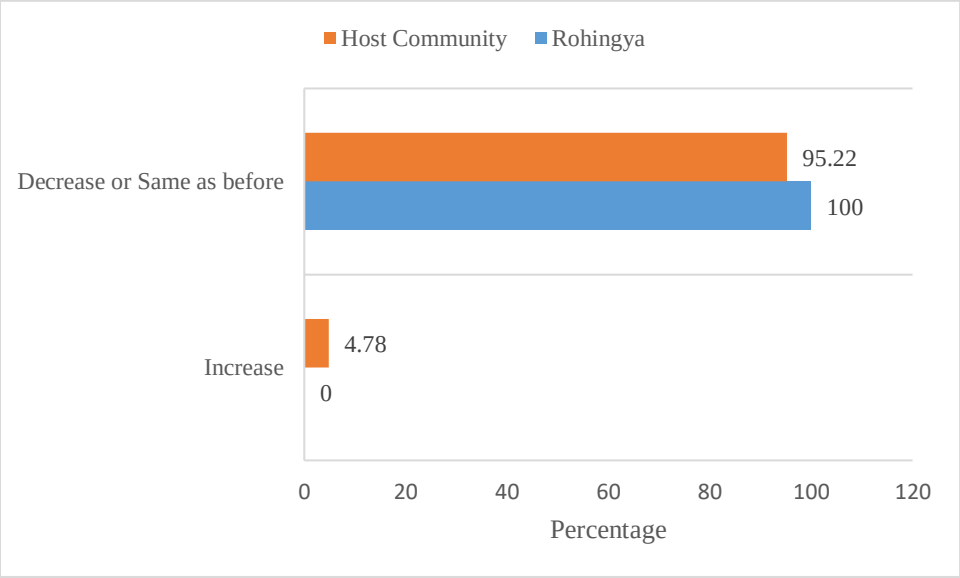


Fig. 6.18: Stakeholders' perception of the collection of forest trees

6.6.2 Collection of saplings / poles by the Rohingya People

In the initial stage after the influx in 2017, the Rohingya people used poles for housing. So, the pole extraction rate was higher than that of today. Now, all the Rohingya and 94.67% of the host community do not collect poles from the forest. Only 5.33% of the host community said these poles and saplings' extraction rate is increasing (Fig. 6.19).

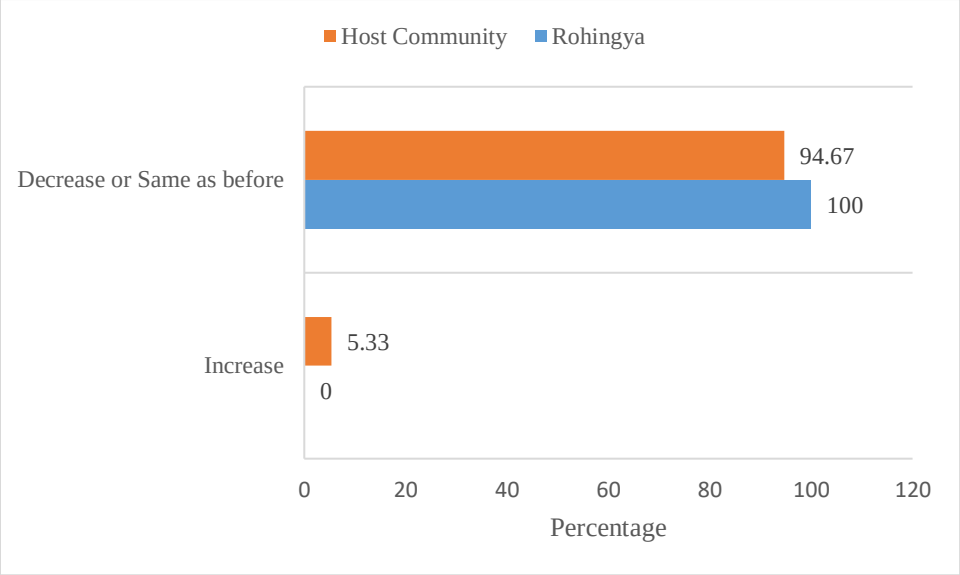


Fig. 6.19: Stakeholders' Perception of Saplings / Poles Collection by Rohingya People

6.6.3 Collection of fuel wood by the Rohingya People

All the Rohingyas (100%) said they have been using LPG cylinders in the last few years, free from the Bangladesh government, NGOs, or INGOs. At the beginning of LPG cylinder support, they also got free gas stove support. So, according to them, they do not use fuel wood anymore. Most of the host community (96.32%) agree with it. Around 4% of the locals informed that Rohingyas had increased the rate of collecting fuel wood even after getting the free LPG cylinder (Fig. 6.20). They collect the fuel wood from the forest and sell it in the market for extra income.

Some locals also got free gas stoves and free LPG cylinder support, but from December 2021, they have stopped. At the same time, the Rohingyas are getting continuous LPG cylinder support. Now, the locals are using traditional earthen stoves or improved cooking stoves (ICS), which creates direct or indirect pressure on the forest for fuel wood. Solvent locals use LPG cylinders.

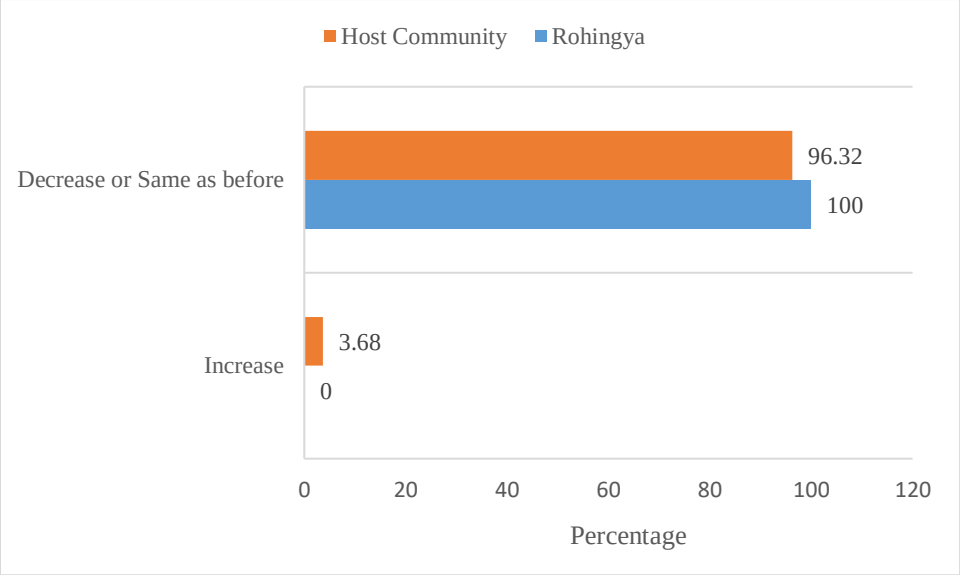


Fig. 6.20: Stakeholders' Perception of Fuel Wood Collection by Rohingya People

6.6.4 Collection of non-wood / timber forest products by the Rohingya People

After the Rohingya influx in 2017, slash-cutting went through the forest. So, most of the non-timber/wood forest products (NTFPs) were erased at that time. However, 100% of Rohingya believe that the extraction of NTFPs is decreasing now, and 96.14% of the hosts also believe that. Most of them said that not many NTFP resources exist. That is why there is a decrease in NTFP extraction (Fig. 6.21).

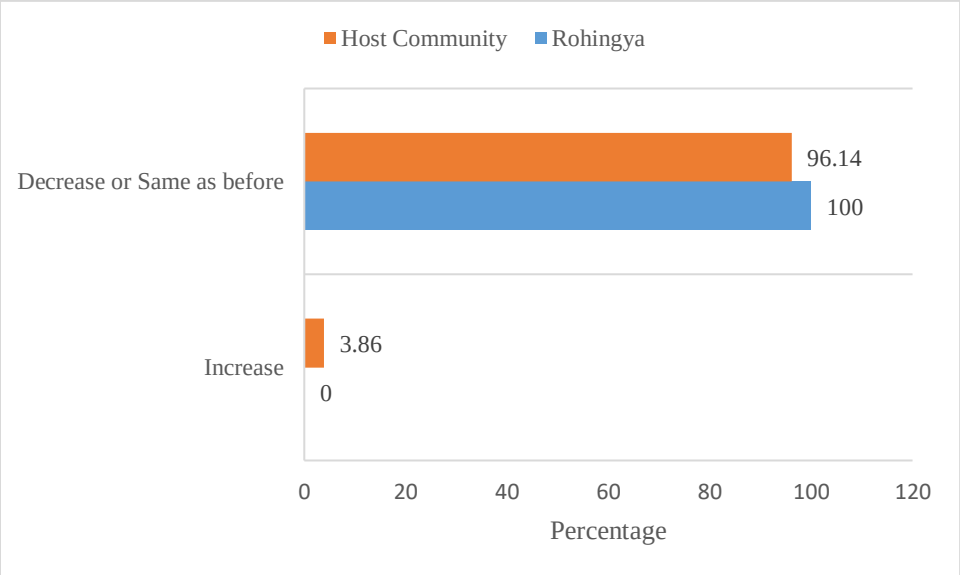


Fig. 6.21: Stakeholders' Perception of NTFPs Collection by the Rohingya People

During the field data collection period, the items of NTFPs are collected from the forest as per (Table 6.11).

Table 0.11: List of NTFPs of TWS and SJINP

Sl. No.	Categories	Description	Bangla / Local name	English / Botanical name
1	Food	Vegetable foodstuffs & beverages provided by fruits, nuts, seeds, roots, etc.	Elena	*Antidesma ghaesembilla*
2			Chapalish/Bon kantal	*Artocarpus chama*
3			Chalta	*Dillenia indica*
4			Dewa / Barta	*Artocarpus lacucha*
5			Latkan	*Baccaurea ramiflora*
6			Uriaam	*Mangifera sylvatica*
7			Sita bet	*Calamus erectus (fruit)*
8			Jali bet	*Calamus tenuis*
9			Deshi gab	*Diospyros malabarica*
10			Kala-huza	*Ehretia serrata*
11			Jalpai	*Elaeocarpus floribundus*
12			Anjir dumur	*Ficus carica*
13			Jagadumur	*Ficus hispida*
14			Painnagola / Lukluki	*Flacourtia jangomas*
15			Kaw / Kawgula	*Garcinia cowa*
16			Ban-tezpata	*Melastoma malabathricum*
17			Bon kala	*Musa ornata*
18			Tang phal	*Passiflora edulis*
19			Amloki	*Phyllanthus emblica*

20			Gutguitya	*Protium serratum*
21			Gotaharina	*Lepisanthes senegalensis*
22			Tit begun	*solanum torvum*
23			Bon amra	*Spondias pinnata*
24			Jangli badam	*Sterculia foetida*
25			Painna jam	*Syzygium clavifolium*
26			Kalo jam	*Syzygium cumini*
27			Khudi jam	*Syzygium fruticosum*
28			Bon lichu	*Walsura robusta*
29			Bon boroi / Gut boroi	*Ziziphus rugusa*
30			Keora	*Sonneratia apetala*
31			Chaila	*Sonneratia caseolaris*
32			Taragota	*Ammomum aromaticum*
33			Chupri Alu / Mete Alu	*Dioscorea alata*
34			Rat alu / Gach alu	*Dioscorea bulbifera*
35			Sushni alu / Mou alu	*Dioscorea esculenta*
36			Taro	*Colocasia esculenta*
37			Kanta notey	*Amaranthus spinosus*
38			Genti notey	*Amaranthus tenuifolius*
39			Bhul-maresh / Notey shak	*Amaranthus viridis*
40			Katchu	*Colocasia esculenta*
41			Dhekia Shak	*Angiopteris evecta*

42			Shada Dhekia	*Helminthostachys zeylanica*
43			Gima shak	*Hydrocotyle sibthorpioides*
44			Kalar thor, Kalar bouli	*Musa ornata*
45	Fodder	Animals & bee fodder are provided by leaves, fruits, etc.	Kata Kushui / Kata Koi	*Bridelia retusa*
46			Dumur / Jagyadumur	*Ficus racemosa*
47			Jialbhadi	*Lannea coromandelica*
48			Jangallya shak / Maricha	*Sarcochlamys pulcherrima*
49			Lalshakh / Danga / Data shak	*Amaranthus tricolor*
50			Dhan Sabarang / Lemon Ghas	*Cymbopogon citratus*
51			Durba grass	*Cynodon dactylon*
52			Mutha	*Cyperus rotundus*
53			Kash / Kaichcha/ Kagara	*Saccharum spontaneum*
54			Phul Jaru	*Thysanolaena maxima*
55	Firewood / Fuelwood	Wood, branches and twigs, foliage, etc. are used for cooking, burning, etc.	Minjiri	*Senna siamea*
56			Jigni	*Trema orientalis*
57			Akashmoni	*Acacia auriculiformis*
58			Gamar	*Gmelina arborea*
59			Assar gula	*Microcos paniculata*
60	Medicine	Medicinal plants (leaves, bark, roots, flowers, fruits /seeds, etc.)	Amloki	*Phyllanthus emblica*
61			Tulsi/Bon tulsi	*Ocimum americanum*
62			Arjun	*Terminalia arjuna*
63			Bahera	*Terminalia bellirica*

64			Haritaki	*Terminalia chebula*
65			Sata muli	*Asparagus racemosus*
66			Akanda	*Calotropis gigantea*
67			Sarpagandha	*Rauwolfia serpentina*
68			Datura	*Datura metel*
69			Thankuni	*Centella asiatica*
70			Ram tulsi / Bon tulsi	*Ocimum gratissimum*
71	Dying and tannings	Mainly bark, fruit, seeds, and leaves of some plants	Doi gota	*Bixa orelana*
72			Mehendi	*Lawsonia inermis*
73			Deshi gab	*Diospyros malabarica*
74	Utensils, handicrafts, etc.	Thatch, fiber, wrapping leaves, etc.	Hogla	*Typha elephantina*
75			Fashya Udal	*Sterculia villosa*
76			Jangli ada	*Alpinia nigra*
77			Pahari ada	*Alpinia zerumbet*
78			Murta / Patipata	*Schuminanthus dichotoma*
79	Construction materials	Bamboo, cane, sun grass, phul jaru, etc.	Muli Bans	*Melocanna baccifera*
80			Mitinga	*Bambusa burmanica*
81			Baijja	*Bambusa vulgaris*
82			Parua / Ora	*Dendrocalamus longispathus*
83			Kali	*Gigantochloa andamanica*
84			Golla	*Daemonorops jenkensiana*
85			Jail	*Calamus tenuis*
86			Sundi	*Calamus guruba*
87			Bhudum	*Calamus latifolius*

88			Udum	*Calamus longisetus*
89			Kerak	*Calamus viminalis*
90			Chhan	*Imperata cylindrica*
91			Broom grass	*Thysanolaena maxima*
92	Ornamental plants	Entire plants (trees, orchids, ferns, etc.)	Bon sonalu	*Cassia javanica*
93			Jarul	*Lagerstroemia speciosa*
94			Bon tagor	*Tabernaemontana divaricata*
95			Tagor	*Tabernaemontana recurva*
96	Exudates	Honey, gums (water soluble), resins (water insoluble), latex (milky or clear juice), etc.	Indian bee	*Apis cerana*
97			Little bee	*Apis floria*
98			European or Italian bee	*Apis melifera*
99			Rocky or hilly bee	*Apis dorsata*
100			Jiga / Bhadi	*Lannea coromandelica*
101			Ball gota	*Cordia dichotoma*
102	Thatching materials	Thatching for the houses, fences etc.	Hogla	*Typha elephantina*
103			Murta / Patipata	*Schuminanthus dichotoma*
104			Golpata	*Nypa fruticans*
105			Sun grass	*Imperata cylindrica*
106	Cotton	Fibrous materials	Simul tula	*Bombax ceiba*
107			Bon simul	*Bombax insigne*
108	Fishes and aquatic resources	Different aquatic resources include fish, prawns, crustaceans, etc., from the waterfalls,	Chang	*Ophiphagus* spp.
109			Different species of shrimps	*Macrobrachium* spp.
110			Bailla	Glossogobius spp.

111		canals, lowlands, etc.	Mola	*Amblypharyngodon* spp.
112			Puti	*Puntius* spp.
113			Kawa guilla	*Mystus* spp.
114			Crabs	*Sartorina* spp.
115			Molluscs	*Pila* spp.

As per Table 6.11, 115 items of NTFPs are still found in the TWS and SJINP forests. The items may mainly be categorized into 12 types: (a) food, (b) fodder, (c) firewood or fuelwood, (d) medicines, (e) dying and tannings, utensils, handicrafts, etc., (f) construction materials, (g) ornamental plants, (h) exudates, (i) thatching materials, (j) cotton, and (k) fishes / aquatic resources. Most items are decreasing daily due to human pressure, dramatically decreasing since the Rohingya influx in 2017.

6.7 Impact of Rohingya Influx on Nature and Environment and its mitigation measure

Cox's Bazar district of Bangladesh, well-known for its biodiversity and transboundary wildlife corridor, has two protected areas: TWS and SJINP. Ukhiya and Teknaf are the two Upazila of Cox's Bazar district which are enriched in forests and biodiversity. Those forests are the habitat of numerous wildlife. The Asian elephant is the flagship species of this area. Two transboundary elephant corridors have disappeared for the settlement of Rohingya refugees.

Consequently, this area is ecologically critical. As Bangladesh is a populated country, forests are being shrunk by the demands of local people. When the forests and wildlife of Cox's Bazar were already endangered, the influx of Rohingya in 2017 prompted forest destruction in that area exponentially. The ecosystem services have shrunk, and many species are in threat of extinction. As a result, the Rohingya influx profoundly impacts the nature and environment of Cox's Bazar district. To mitigate these problems, the participation of all the stakeholders is essential.

Consequently, the participants, host community and Rohingya people provided their opinions on mitigation measures. Approximately 814 people, including Rohingya people, Rohingya Key Informant personnel, host community people, host community Key Informant personnel, including Bangladesh Forest Department (BFD) personnel, law enforcement agencies personnel, NGO / INGO workers in Cox's Bazar was surveyed in this study. Local people who live in and around the camp area and general Rohingya people are the primary sufferers of

environmental effects. As they are directly affected by the environmental phenomena, data collected from their interview are analyzed. In total, 612 general Rohingya people and host community people's opinions on environmental issues have been considered; 207 were general Rohingya people, and 405 were general people from the host community.

6.7.1 Impacts on Environment after the Rohingya Influx of 2017

Respondents from both the Rohingya and host communities showed concerns about the degradation of the environment due to the influx. Fig. 6.21 shows the opinions of the Rohingya refugees and the host community on different aspects of environmental degradation due to the Rohingya influx in Bangladesh. Interestingly, as evident from Fig. 6.22, concerns about ecosystem disturbance due to the Rohingya influx were evident in the host community respondents (54.27%) and Rohingya refugee respondents (40.24%). The most significant environmental problem provoked by the Rohingya influx that the highest percentages of both the Rohingya refugees and the host communities considered is deforestation. Deforestation has been indicated as an outcome of the Refugee influx by 95.81% and 80.68% of the host community and the Rohingya refugee respondents. DFO (Divisional Forest Officer) of Cox's Bazar South Forest Division said, "*The Rohingya influx was like a disaster that obliterated the natural forests in the area almost overnight*." Palongkhali Union Parishad Chairman, under Ukhiya Upazila, said, "*The Rohingya influx was not only devastating for the natural forests of Cox's Bazar region but also the social forests*." He showed utmost frustration on the demolition of social forests that Rohingya people used for fuelwood and building houses. A Rohingya community block leader from KPRC (Kutupalong Rohingya Camp) also agreed that the influx caused the deforestation of natural forests along with the social forests of that area. However, a more recent survey indicates that 12,807 ha of forest cover has been lost from 2017 to 2020, of which 1,337 ha of forests disappeared directly by the Rohingya camps (Dampha et al. 2022). As per Cox's Bazar South Forest Department report (2022a), after the Rohingya influx of 2017, Rohingya destroyed forestry resources to make their makeshift settlements, fuelwood collection, and different livelihoods. For the set up of the camps, a total of 2,494.49 ha (6,164.02 acres) of Cox's Bazar South Forest Division's lands have been destroyed, including 820 ha (2,027.50 acres) of Social Forestry and 1,673.99 ha (4,136.52 acres) of natural forests.

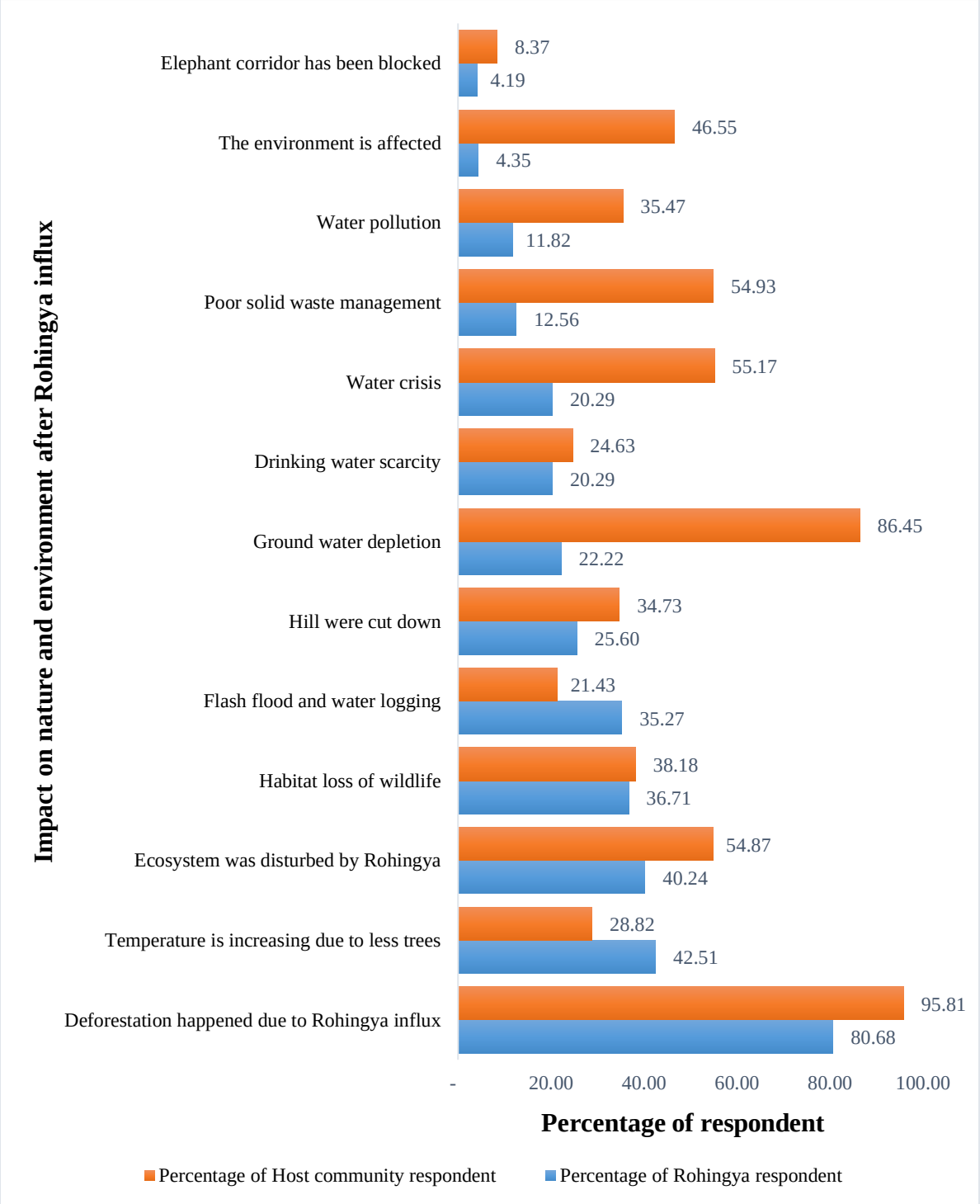


Fig. 6.22: Impacts on nature and environment after the Rohingya influx of 2017

Temperature increase in the area has been marked as an issue by 28.82% of host community respondents and 42.51% of Rohingya refugee respondents. On the other hand, 55.17%, 24.63%, and 86.45% of the host community respondents identified water crisis, drinking water scarcity, and groundwater depletion as environmental degradations caused by the influx. An Assistant Teacher of Shamlapur High School, Baharchara, Teknaf Upazila, was concerned about the water crisis. She said, *"The water crisis is becoming more severe daily. Due to*

ground-water depletion, many tube wells don't function during the dry season, which causes a big problem in the case of accessing drinking water."

On the contrary, the respective percentages of Rohingya community respondents marking the water crisis, drinking water scarcity, and groundwater depletion as negative externalities of the influx are 20.29%, 20.29%, and 22.22%. The Head Mazi of Camp 5 said, *"The water crisis is prominent in the camp area. Flash floods occur in the lower side of the camp during the rainy season."*

Water pollution has been identified as an issue created by the camps by 35.27% of the host community respondents and 11.82% of the refugee respondents. Respectively, 38.18% and 34.73% of the host community and 36.71% and 25.60% of the Refugee respondents indicated habitat loss, wildlife, and hill cutting. Mr Md. Younus, a UP (Union Parishad) member of the local government, said, *"Rohingya people hunt different types of wildlife from the nearest forest area. As a result, the number of wildlife is decreasing daily."* Poor solid waste management was identified by 54.93% of host community respondents and 12.56% of the Rohingya refugee respondents. UNO (Upazila Nirbahi Officer) of Ukhiya Upazila said, "*The cultivation land is polluted due to the mixing of solid and liquid wastes of Rohingya inhabitants. Different wastes are shipped to the cultivation lands*." A Sub-Mazi of Camp 7 said, "*Due to poor solid waste management, waste is everywhere in the camp."*

Among the host community respondents, 8.37% indicated the blockage of the elephant corridor as a negative impact of the influx, while only 4.19% of the Rohingya refugees agreed. An UP Member of Rajapalong Union Parishad said, "*This area was known for its elephant habitat. Before the Rohingya influx, elephants could be seen here regularly. Elephants used this area, Balukhali-Gungdhum Elephant Corridor, to move from Cox's Bazar to Bandarban, and even it was a transboundary corridor between Bangladesh and Myanmar. As the forests were destroyed for Rohingya settlement, elephants can no longer move from Bangladesh to Myanmar by using this corridor*."

Similarly, a Rohigynga, Sub-Mazi of Camp-7, said, "*Previously, when we came here in 2017, human-elephant conflict was common. We used to see elephants around this area. However, seeing the elephant in this area is rare now.*" Of the host community respondents, 21.43% indicated the flash flood and water logging as problems caused by the influx, which was

indicated by 35.27% of the Rohingya refugee respondents. As per Annex 13, flood is a common problem in some camps, causing suffering to the inhabitants of those camps.

6.7.2 Mitigation measures to overcome the problems of Rohingya influx on nature and environment

Natural forests of the world are the oldest creatures of nature. Though destroyed natural forests can never be fully recovered, extensive mitigation measures can be helpful to restore forests and biodiversity at least partially. The restoration of forests is vital for ecosystem services. With the participation of different communities and authorities, it is possible to implement mitigation measures to restore forests.

Fig. 6.23 demonstrates solutions to identified problems by Rohingya and host community respondents. Most of the host community respondents (97.29%) think that the repatriation of Rohingya refugees is the solution to the problems induced by the Rohingya influx, supported by 57.97% of the Refugee respondents. Most of all, the community leaders of the Rohingya refugee people surveyed expressed a strong urge for repatriation to Myanmar with full rights. All the host community leaders considered repatriation of the Rohingya refugees with full rights as the only solution to the Rohingya problem. The President of Cox's Bazar Chamber of Commerce & Industry (CCCI) said, "*Repatriation is the priority otherwise replacement to save the local people as well as the environment of the area*". Head Mazi of Camp 5 said, "*We want to return to our country, and Myanmar will have full rights as a citizen of Myanmar*".

Almost half of the Rohingya refugee respondents (50.49%) considered reforestation the solution to refugee-induced environmental degradations created by the Rohingya influx compared to the host community respondents' 70.05%. The Range Officer of Teknaf Range, Cox's Bazar South Forest Division, emphasized reforestation inside and outside the Rohingya camps. A Sub-Mazi of Camp 4 also said, "*We need to plant trees as much as possible.*" Interestingly, an *awareness programme for the local people to conserve wildlife* has been considered a countermeasure against environmental degradation and is supported by only 5.42% of the host community respondents, while none of the Rohingya refugee respondents supported it. The percentages of host community respondents seeking to solve the water crisis, ensuring drinking water, and deep-tube-well for local people are 14.04% and 6.65%, respectively. For the exact solutions, respective support is 8.36%, and 2.56% from the refugee respondents. A female UP member of Hnila Union Parishad, Teknaf Upazila of the local government, wanted more tube-well and other water sources for the local people.

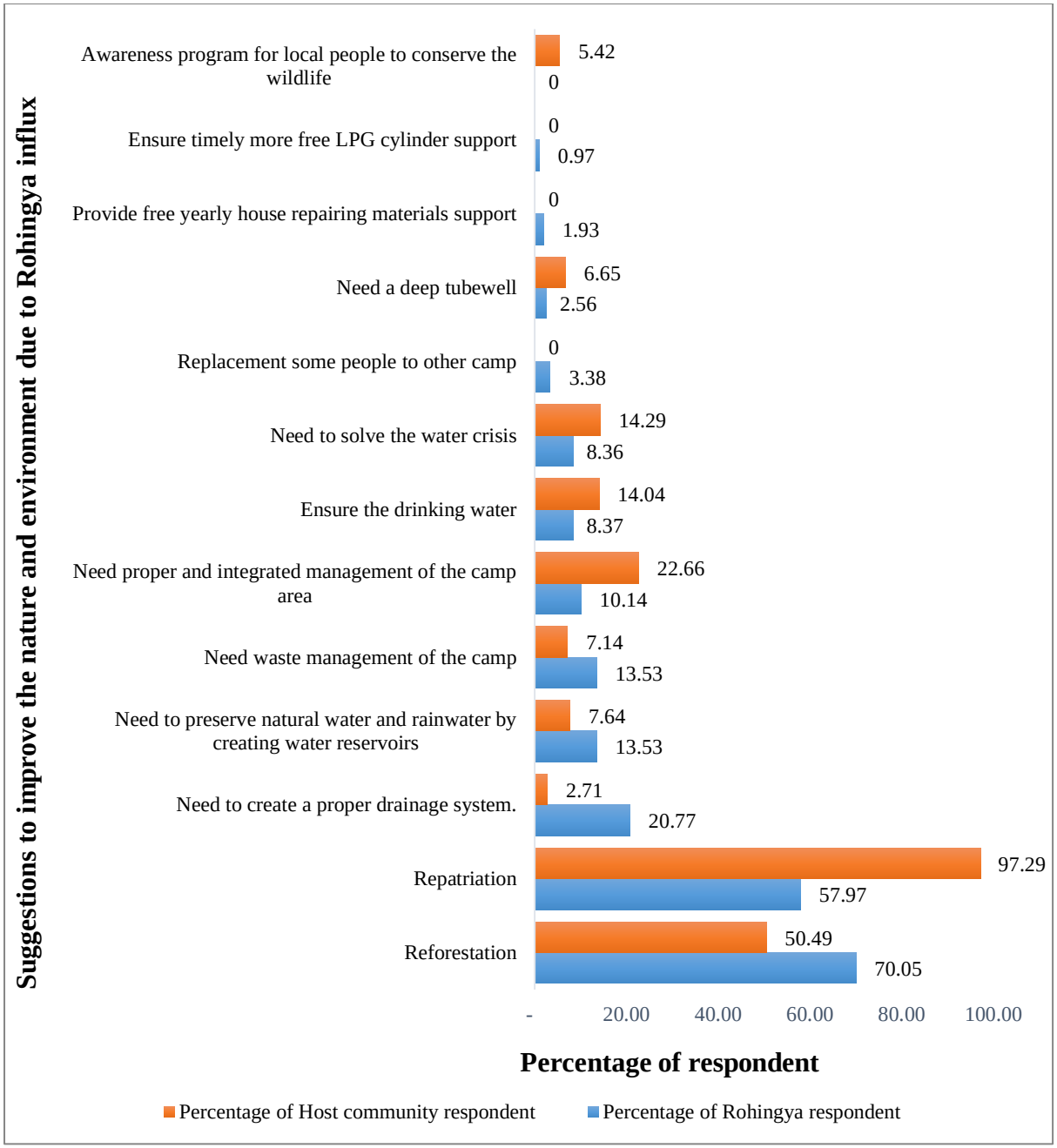


Fig. 6.23: Suggestions to improve the nature and environment due to the Rohingya influx of 2017

A member of the Rohingya committee at KPRC (Kutupalong Rohingya Camp) said they need a solution to the water crisis. Creating a proper drainage system was another solution supported by 2.71% and 20.77% of the host community respondents and the Rohingya refugee respondents. About 14% of Rohingya refugee respondents considered rainwater harvesting by creating reservoirs to solve the water problem, which is acceptable to only 7.64% of the host community respondents. Of the respondents from Rohingya refugees, 0.97% asked for freer LPG (liquid petroleum gas) support and 1.93% for free annual house repair material to solve the environmental degradation problem. Of the host community respondents, 7.14% considered

solid waste management in the camp as a solution to the problems, compared to 13.53% of the Rohingya refugee respondents. On the other hand, 22.66% of the host community respondents urged proper and integrated management of the camp area to solve the problems emanating from the Rohingya influx, whereas 10.14% of the refugees supported it.

6.8 Decreases in Forest Coverage

6.8.1 Decreases in Forest Coverage in Bangladesh

Bangladesh had 2.22 m ha of tree cover in 2010, extending over 16% of its land area. According to BNFI (GoB 2015), forest cover in Bangladesh was 1,884,019 ha or 12.8% of the country's total area. This amounts to 11.7 ha per 1000 people. When only terrestrial land area was considered (i.e. excluding river area), the forest cover was 14.1%. Hill forest was the largest forest type by area (4.6% of the country area), followed by shrubs with scattered trees (4.2%) and mangrove forest (2.7%). Land covered by permanent crops accounted for half of the country's area, and although these areas are primarily used for agriculture, they still had a mean tree cover of approximately 7% (GoB 2020b). Nationally, there was a net decrease in tree cover of 3.4% from 2000 to 2015 (GoB 2020b). However, the highest increase in tree cover occurs within mangrove plantations (12%) and mangrove forests (4%). The highest decrease in tree cover occurs within the plain land forest (Sal Forest) (18%). A decrease in average tree cover is also observed in hill forests (8%), forest plantations (7%), and bamboo forests (5%).

6.8.2 Decrease of forest coverage in Cox's Bazar South Forest Division

The Greater Cox's Bazar Forest Division is one of Bangladesh's most important and resourceful forest divisions, with a forested area of 940.58 sq km (94,058 ha). Cox's Bazar Forest Division was split into Cox's Bazar North and South Forest Divisions as per the reorganization of the Forest Directorate on 1st July 2001 (Chowdhury 2006). The forested areas from the Baghkhali River in the north to the Bay of Bengal in the south fall within the jurisdiction of Cox's Bazar South Forest Division. These forests are situated within Teknaf (13,859.74 ha), Ukhiya (18,850.96 ha), and partially in Ramu (10,569.87 ha) and Cox's Bazar Sadar Upazilas (894.34 ha).

The total area of forest lying within Cox's Bazar South Forest Division is 44,174.91 ha, of which 36,602.05 ha is reserved forest, and the remaining 7,572.86 ha is Protected Forest (Table 6.12). The forests of this Division are administered by 10 Forest Ranges, including 50 Forest Beats/ Patrol Camps (Fig. 6.24). The original forests of this division were typically dominated

by *Dipterocarpus* spp., *Hopea* spp., *Swintonia* spp., *Anisoptera scaphula*, *Quercus* spp., *Lithocarpus* spp., etc.) The area of natural forest and old plantations of native tree species once covered most of the areas is thought to have declined by 80% (GoB 2020a). Degraded secondary growths, bamboo, scrubs, and sun grasses with extensive encroachment for human settlement and cultivation now cover most areas. More than 10,589.0 ha of forest lands have already been encroached upon by the locals, displaced people from coastal areas and Rohingya refugees from Myanmar. The worst case of deforestation and forest degradation ensued after the massive Rohingya influx in August 2017.

Table 0.12: Range-wise forest lands of Cox's Bazar South Forest Division

No.	Name of the Range	Forest land (ha)		
		Protected	Reserve	Total (ha)
01	Sadar Range	---	----	----
02	Cox's Bazar Range	887.32	2,432.60	3,319.92
03	Panerchara Range	834.59	1,311.04	2,145.63
04	Doapalong Range	740.13	1,701.74	2,441.87
05	Rajarkul Range	2,203.16	2,424.52	4,627.68
06	Ukhiya Range	1,865.21	6,804.86	8,670.07
07	Inani Range	433.21	7,769.63	8,202.84
08	Whykong Range	10.87	5,186.30	5,197.17
09	Teknaf Range	576.16	6,015.09	6,591.25
10	Shilkhali Range	22.21	2,956.27	2,978.48
11	Jilonja FETC	---	----	----
	Total	**7,572.86**	**36,602.05**	**44,174.91**

The influence of many Rohingya refugees has caused detrimental effects on the forests and the forest lands. The loss from the deforestation and degradation of forests is manifold, e.g., loss of forest area, loss of timber trees, loss of livelihoods for forest-dependent people, loss of environmental services, etc., that include climate mitigation, watershed, and loss of all the plants and animals inhabiting the ecosystems. Besides all these, there is also a loss of the scenic beauty they have always provided for humankind. Deforestation and degradation of these forests are reducing the ecosystem services (especially water regulation, nutrient cycling, and

wildlife habitat), reducing the range and quality of goods and services received by local people, increasing climate change impact, increasing soil erosion, threats of landslide, loss of biodiversity and infestation with invasive species in barren, exposed areas of these forests. Species-rich forests of Teknaf, Ukhiya, Whykong, and Inani Ranges are deteriorating rapidly not only for habitation alone but also for the collection of firewood, poles, and posts for making houses, timbers for selling in the markets, etc. It was also reported that 9,712.88 ha of plantations were damaged in 1971 during the Liberation War, the Rohingyas damaged 2,493.21 ha of plantations during 1990-1997, and 23,858.41 ha of plantations were damaged by the devastating cyclones of 1994, 1995, and 1997 (Chowdhury 2006). Erosion of the forest's genetic resources is also visible in this division's Protected Areas (Teknaf Wildlife Sanctuary, Sheikh Jamal Inani National Park, Himchari National Park, etc.).

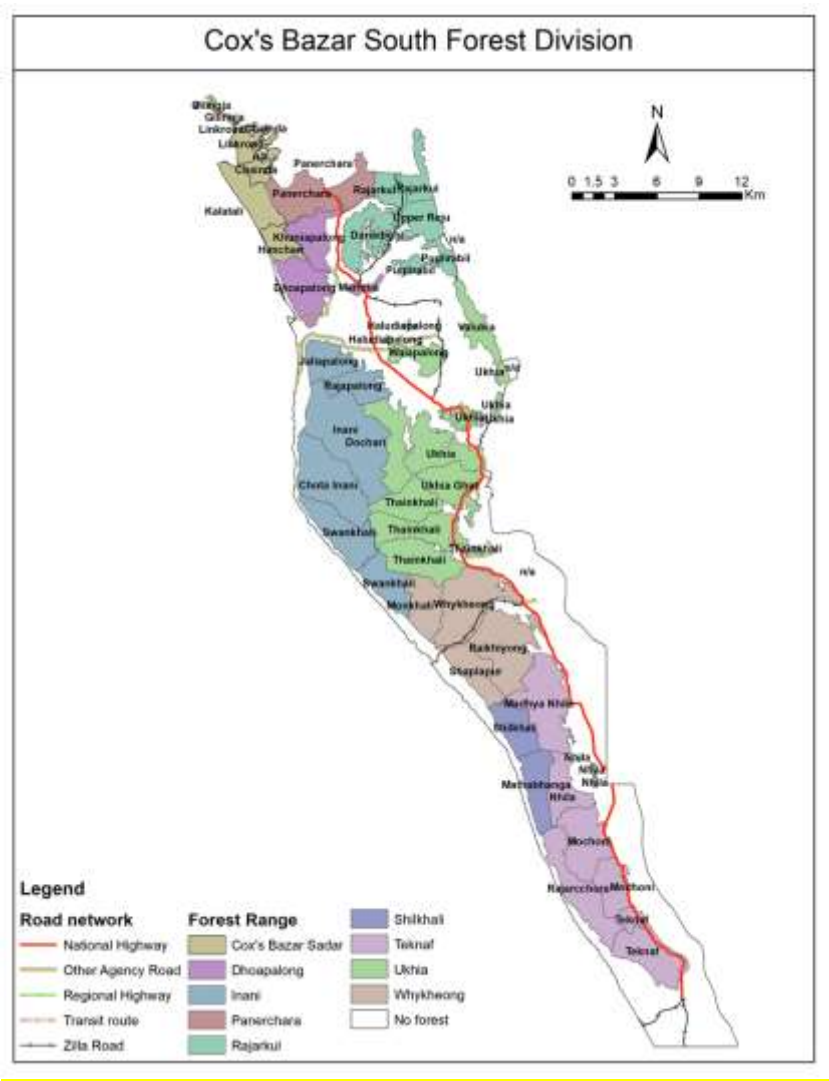


Fig. 6.24: Showing the forest (area and coverage) of Cox's Bazar South Forest Division between 1971 and 2022

6.9 Human-wildlife conflict and mitigation measures in Cox's Bazar

Due to different anthropogenic pressures, including deforestation, forest fragmentation, etc., the natural resources were under pressure. Moreover, the Rohingya influx in 2017 exacerbated the pressure on natural resources. All three recognized elephant corridors of Cox's South Forest Division have been blocked, similarly shrinking other wildlife movements. The combined effect is that the wildlife is suffering food and water scarcity. As a result, human-wildlife conflicts have increased at an alarming rate. As a primary cause of human-elephant conflicts, after the influx in 2017, 13 elephants have died till August 2022. On the other hand, 17 humans, including 12 Rohingya and five local people, died from elephant's attack. At the same time, numerous wildlife have been killed in the locality. Many wildlife were released after being rescued from the locality (Annex 8). Finally, the human-wildlife conflict caused the abolishment of natural and human properties.

The importance of Asian Elephants (*Elephas maximus*) has now been proved unambiguously. Elephants are known as the forest's "keystone", "flagship", "umbrella" and "engineers" because they preserve their habitats in good condition and may change in both positive and negative directions (Wahed et al. 2016). The Asian Elephant has been listed as "Endangered" in Appendix-I of the Convention on International Trade in Endangered Species (CITES) and Critically Endangered in Bangladesh (Khan 2015, IUCN Bangladesh 2015). Elephants are no longer found in Western Asia, Iran, or most of China. Experts believe that Asian Elephants can only be found in mountainous areas of the following countries: The Indian subcontinent includes India, Nepal, Bhutan and Bangladesh; continental Southeast Asia includes China, Myanmar, Thailand, Cambodia, Laos, Vietnam and Malaysia; and islands include the Andaman Islands (India), Sri Lanka, Sumatra (Indonesia), and Borneo (Malaysia and Indonesia) (Wahed et al. 2016).

In Bangladesh, the highest number of elephants can be found in the Chittagong Hill Tracts (CHTs) region, located in the south-eastern part of the country. Elephants are also found in the Sherpur, Sylhet, Chittagong and Cox's Bazar forests under the Bangladesh Forest Divisions (BFD). As habitats have been broken up, elephants in Bangladesh can only live in small areas with one or a few small herds. Some corridors have entirely been transformed, blocked, etc., because of things like the loss of forest cover, the growth of human settlements, the intensification of farming, unsustainable slash-and-burn practices, the construction of roads without planning, the growth of monoculture forests, and other things (Wahed et al. 2016). A

study conducted at the beginning of this century discovered that the number of Asian Elephants in Bangladesh had declined to 228 and 327 due to the abovementioned reasons (IUCN Bangladesh 2004). According to a recent study, only 268 elephants live in Bangladesh's forested areas, where two-thirds live in Cox's Bazar and the Chittagong Hill Tracts (Table 6.13) (Bangladesh Forest Department 2018).

Table 0.13: Status of the Asian elephant in four forest ranges of Cox's Bazar South Forest Division (UNHCR and IUCN 2018)

Forest Range	Area (sq km)	Survey results in 2015		Survey results in 2018		Change of Mean
		Range	Mean	Range	Mean	
Inani	65.80	10-14	12	16-21	18	+6
Teknaf	47.50	6-8	7	8-12	10	+3
Shilkhali	29.42	5-7	6	5-8	7	+1
Whykong	50.97	2-5	3	2-4	3	0
Total	266.45		28		38	+10

In recent years, unplanned development projects in and around elephant habitats have been one of the most serious threats to elephants. Even though people are not permitted to live in the forest, many have permanent and semi-permanent structures, such as protected zones and wildlife sanctuaries (Hanif and Khan 2015). For example, more than 720 ha (1,780 acres) of lands in Cox's Bazar South Forest Division's Rajarkul Reserved Forest have been given to the army for a cantonment. Rajarkul has been a significant crossing point for 30-35 elephants travelling from Bangladesh (Cox's Bazar and Bandarban)-Myanmar-returned. The construction of a cantonment in this area has divided the elephants' habitat into smaller herds. In Cox's Bazar, a new refugee camp called 'Kutupalong' and a TV (Television) relay station were established at Ukhiya in the reserved forests of Cox's Bazar South Forest Division (Bangladesh Forest Department 2018), which is a vital habitat for the Critically Endangered Asian Elephants of Bangladesh. Eventually, these development activities with human population pressure have been shrinkage- in total, eight elephant corridors in the greater Cox's Bazar Forest Division (Fig. 6.25).

Elephants roam the path between the refugee camps. Elephants are most likely to attack forcibly displaced Myanmar citizens/nations, refugees from Kutupalong Camp, and villagers

who live near elephant paths and corridors (UNHCR and IUCN 2018). In addition, developing a single-lane railway line from Chittagong to Cox's Bazar has made it difficult for elephants to move. So, when making decisions about any development, especially in forest areas, it is crucial to consider biodiversity conservation and environmental issues (Bangladesh Forest Department 2018). As a result of the Rohingya influx of 2017, 17 people died, including 12 Rohingyas and 5 locals, and many others were injured. Within 4 months of establishing the Balukhali-Kutopalong Rohingya camps, 12 refugees were killed by elephants. A new project was launched through the IUCN Bangladesh with financial support from UNHCR to save human lives from elephant attacks, and 50 elephant response teams were formed immediately (RRRC 2022) to mitigate human-elephant conflicts.

Fig. 6.25: The elephant corridors of Bangladesh include 8 corridors in Cox's Bazar (Ahmed et al. 2016)

From April 2018 to December 2022, 5 persons died, and the elephant attack wounded 5. One injured person has already received BDT 50,000 as compensation from the Bangladesh Forest Department. The families of two dead people are recommended to receive BDT 300,000, and the three injured people are recommended for compensation by showing a medical certificate. On the contrary, three killed applications were rejected as enclosures. The remaining one has not submitted any application for compensation (Annex 12).

According to a study (e.g., Sarker 2011) of the Teknaf Wildlife Sanctuary (TWS), the significant reasons for human-elephant conflict happen when elephants eat crops and destroy human settlements. Wild elephants are more likely to harm crops in villages near Rohingya refugee camps. Most of the incidents occurred within the forests. This means that both locals and refugees went to the forest in search of forest resources to maintain their livelihoods. According to studies (e.g., UNHCR and IUCN 2018), the number of elephant assaults increased when the Rohingya immigrants arrived in 2017, but it has dropped dramatically. Elephants have lost a lot of their natural habitats, so most of the wild elephants have left the TWS and moved to places like the Chunati Wildlife Sanctuary in the north. Since Rohingya camps, refugees, and local people are becoming increasingly dependent on forest resources, it will be hard to keep wild elephants in the TWS in the near future (Ms et al. 2022).

Over the years, many studies have been done to discover how many elephants live in Bangladesh and where they are. However, none of these studies is comprehensive. When the status of Asian Elephants in Bangladesh changes, it is essential to do in-depth research, like what's done in other countries where Asian Elephants live (Alamgir et al. 2015). To conserve elephants in their native habitats, the Bangladesh Forest Department has established seven wildlife sanctuaries, including Teknaf in Cox's Bazar. They have also mapped elephant movement routes and corridors nationwide and developed elephant response teams with co-management committees and local communities in conflict-prone areas. In conflict-prone areas, they test alternative agricultural practices, bio-fences, solar-powered fences, and early warning systems. Stakeholders have been educated and made more aware through training, street shows, stakeholder engagement events, and community dialogues. The Bangladesh Forest Department has also attempted to enhance elephant habitats and conserve food sources. In 2015, the Forest Departments of Bangladesh and India organized a transboundary conference to facilitate the safe and free movement of wild elephants across international borders (Bangladesh Forest Department 2018).

The Bangladesh Forest Department's Wildlife Crime Control Unit (WCCU) combats illegal wildlife trade and other associated offences. BFD has established the "Wildlife and Nature Conservation Circle" (WNCC) and seven Wildlife Management and Nature Conservation Divisions. These divisions are mainly formed to safeguard biodiversity and animals in the protected areas. These divisions manage national parks, wildlife sanctuaries, and eco-parks (Hossen 2013). To protect elephants in Bangladesh, the Wildlife (Conservation and Security) Act of 2012 provides greater protection for elephants and other flagship species than ever (Anon. 2012b). The statute made elephant slaughter a non-bailable offence punishable by up to seven years in prison and a BDT 1,000,000 (US$ 14,286; 1 US$ = BDT 70) fine. Furthermore, illegally collecting, transporting, and trafficking elephant body parts and merchandise carries a potential three-year prison sentence and a BDT 300,000 (US$ 4,286) fine. Bangladesh's Wildlife Attack Compensation Policy 2010 demonstrates the country's concern for wild elephants. Elephants are prohibited by policy. If an elephant kills someone, the family receives BDT 100,000 (US$ 1,429). If the elephant injures a human, it will be compensated with BDT 50,000 (US$ 715). Claims for crop raiding or resource damage are limited to BDT 25,000 (US$ 357) (Bangladesh Forest Department 2018). The Environment Conservation Act 1995 has been implemented through the Environmental Conservation Rules of 1997 (Anonymous. 2016 (ECA Rules, amended in 2016)) Bangladesh's principal environmental protection law, which establishes (1) accountability for ecosystem damage reparation, (2) stronger punitive measures for fines and imprisonment, and (3) authority to realize infractions. The National Biodiversity and Strategic Action Plan published in 2006 emphasized biodiversity protection, sustainable use and benefit-sharing. The "Perspective Plan of Bangladesh 2010 – 2021," known as "Vision 2021," prioritized biodiversity protection by enhancing the habitats of endangered species. The Bangladesh Constitution's 15th Amendment in 2012 emphasized wildlife, biodiversity, and natural resource conservation.

What if the largest terrestrial mammal in the world perished in Bangladesh's forest? This requires a serious and long-term effort to protect Asian Elephants in Bangladesh. Wild elephants can roam in Bangladesh indefinitely if the Bangladesh Forest Department plans and works diligently.

6.10 Metapopulation of Elephants

The metapopulation is “a population of populations” (Levins 1969). It consists of a group of spatially separated populations of the same species which interact at some level, and it is also

applied to species in naturally or artificially fragmented habitats. Moreover, this has happened in the case of elephants in the study area. Some of the elephants' habitats have been destroyed due to the establishment of camps for the Rohingya refugees. The camps have occupied elephant corridors, and consequently, the human-elephant conflict has increased, resulting in the loss of life of both groups- elephant and human. The subpopulations of the elephants there could meet each other to exchange genetic diversity due to the camps. So, they are facing shelter and corridor problems, food scarcity, and inbreeding depression issues that might eventually result in the extermination of elephants from that area.

6.11 Forest land leased / handover to other institutions

Once, the whole Cox's Bazar area was a continuous forest. Before the 19th century, most of the land in this area was the Forest Department's land (Chowdhury 1993). The forest land was fragmented due to increasing population, followed by urbanization and subsequent causes. After the independence of Bangladesh, 1338.93 ha (3308.56 acres) of forest lands have been leased or handed over to the 33 different government institutions by the Cox's Bazar South Forest Division (Table 6.14).

Table 0.14: List of allocated land through the lease to different government agencies by the Cox's Bazar South Forest Division

Sl. No.	Name of the organization and address	Name of the Mouza (Land)	Amount of land (Acre)
01	Bangladesh Rifles Batallion	Jhilongja	27.99
02	Customs (Postponed lease)	Ukhiya	1.73
03	Divisional Engineer Cyclon	Ukhiya	4.90
04	Kalatoli Light House, Cox's Bazar	Jhilongja	4.63
05	Naval Chief	Jhilongja	30.00
06	Divisional Engineer Cyclon, Teknaf	Teknaf	7.16
07	Divisional Engineer Cyclon, Cox's Bazar	Cox's Bazar	5.60
08	Director, Horticulture	Rajarkul	196.00
09	Military Garrison, Ramu	Rajarkul	86.00
10	Bangladesh Rifles Battalion, Teknaf	Teknaf	0.41
11	Naval Chief, Bangladesh	Jhilongja	38.00

12	BTCL, Microwave Station	Kalatoli	5.60
13	City College	Jhilongja	5.00
14	Executive Engineer, Road and Highway, Cox's Bazar	Cox's Bazar	10.78
15	Bangladesh Naval Port, Dhaka	Teknaf	27.00
16	Bangladesh Television, Cox's Bazar	Jhilongja	3.75
17	Bangladesh Television, Ukhiya	Ukhiya	0.17
18	Bangladesh Tourism Board, Teknaf	Teknaf	2.00
19	Telecom, Teknaf	Teknaf	1.00
20	Meteorological Department, Cox's Bazar	Cox's Bazar	4.09
21	Meteorological Department, Jhilongja	Jhilongja	0.15
22	Silviculture, Ramu	South Mitachari	67.00
23	Radio, Jhilongja	Jhilongja	14.00
24	Bangladesh Oceanography Research Institute, Dhoapalong	Jungle Goaliapalong	35.50
25	Submarine Cable Landing Station	Jhilongja	14.00
26	Ramu Cantonment	Rajarkul	1,788.98
27	Ramu Upazila BGB	Ramu	20.00
28	Coast Guard	Teknaf	6.00
29	Bangladesh Economic Zones Authority (BEZA)	Teknaf	21.12
30	Veterinary and Animal Science University	Kalatoli	5.00
31	Shahid Zafar Alam Cadet College	Khuniapalong	155.00
32	Bangladesh Academy of Public Administration	Jhilongja	700.00
33	Bangladesh Football Federation, Technical Centre	Khuniapalong	20.00
		Total	3,308.56

Source: Cox's Bazar South Forest Division 2022a

For the betterment of the forest and its biodiversity, this type of lease or handover process should be stopped immediately and, if possible, cancel the lease or handover where possible. At the same time, active action is needed to rescue forest land from illegal land encroachers.

6.12 Illegal encroachment of the Cox's Bazar South Forest Division's land

According to the Cox's Bazar South Forest Division (2022d), 12,421.83 ha of forest lands have been occupied by illegal land enclosures, of which 1,816 ha have been freed. Moreover, illegal land enclosures still occupy 10,605.83 ha of forest land.

6.13 Sawmill information of Cox's Bazar South Forest Division

Ninety-three (93) sawmills have been established in the Cox's Bazar South Forest Division area, of which 17 are legal and 72 are illegal, and a case has been filed against the 48 illegal sawmills (Cox's Bazar South Forest Division 2022e).

6.14 Personnel and logistics status of Cox's Bazar South Forest Division

Like other Forest Divisions of Bangladesh, Cox's Bazar South Forest Division is facing some common problems, such as a staff shortage, vehicles, arms and ammunition, residence facilities of staff, etc.

Cox's Bazar South Forest Division has 10 Forest Ranges, 50 Forest Beats or Patrol Posts, one Nursery Centre, one Forestry Extension and Nursery Training Centre (FENTC) at Jhilongja, covering 48,799.42 ha of forest lands. There are 335 government-approved posts in this area, but only 154 people are working, and the rest are vacant. Hence, with limited personnel, managing such a vast forest is very difficult. Patrolling is a crucial activity to protect biodiversity and manage forest resources. It requires 4WD vehicles and is rarely available in the Forest Division. There is also a shortage of arms and ammunition at the Forest Beat level; the available ones are old or non-functional. Furthermore, many Forest Beat Offices do not have adequate personnel and residential facilities for the staff (Cox's Bazar South Forest Division 2022a).

6.15 Environmental threats increased after the Rohingya influx

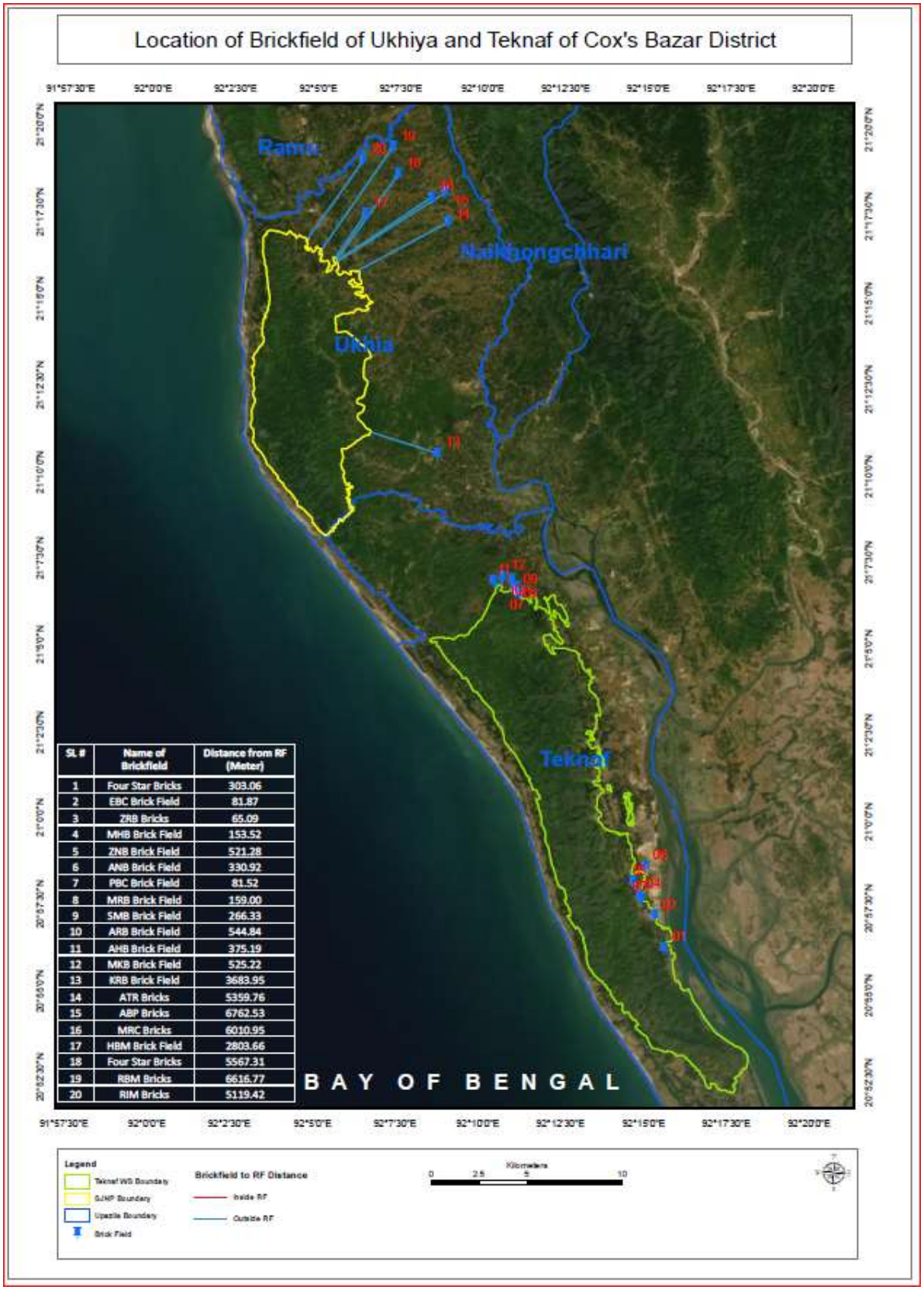
6.15.1 Brickfields

Brick is an important construction material. However, burning brick contributes to environmental pollution, ecosystem damage, and the absorption of greenhouse gasses in the atmosphere in higher quantities (IUSS 2002). Brick kilns have long-term and short-term impacts on the environment. Ukhiya and Teknaf Upazilas of Cox's Bazar District have been adversely affected by the Rohingya influx since 2017. More than a million Rohingya and host

community people are living here. A survey was conducted using a survey format in 20 brickfields of Teknaf, and Ukhiya Upazila (Annex 14).

There are twenty brickfields in these two Upazilas, and the number of brickfields is increasing gradually (Fig. 6.26). The field survey revealed that out of 20 TWS and SJINP landscape brickfields, 12 are located within 2 km of the Protected Area boundary. This violates the Brick Manufacturing and Brick Kilns Establishment (Control) Act, 2013 (GoB, 2013). As per the DoE Office, Cox's Bazar, out of 20 brickfields of Ukhiya and Teknaf, 8 are at Ukhiya Upazila, and 12 are at Teknaf Upazila. Among the 8 brickfields of Ukhiya Upazila, only 5 have the updated licence. Similarly, of 12 brickfields in the Teknaf area, only 4 have the updated licence.

After the Rohingya influx, four brickfields have started and the production of bricks has become higher. Through the deep tube-well, underground water is also used for brick production. People who work in these brickfields use wood for cooking. The brick field authorities collect the brick-making soil from cultivated land, low hills, cutting ponds, etc. Violation of governmental rules is also noticed in some of the kilns.



SL #	Name of Brickfield	Distance from RF (Meter)
1	Four Star Bricks	303.06
2	EBC Brick Field	81.87
3	ZRB Bricks	65.09
4	MHB Brick Field	153.52
5	ZNB Brick Field	521.28
6	ANB Brick Field	330.92
7	PBC Brick Field	81.52
8	MRB Brick Field	159.00
9	SMB Brick Field	266.33
10	ARB Brick Field	544.84
11	AHB Brick Field	375.19
12	MKB Brick Field	525.22
13	KRB Brick Field	3683.95
14	ATR Bricks	5359.76
15	ABP Bricks	6762.53
16	MRC Bricks	6010.95
17	HBM Brick Field	2803.66
18	Four Star Bricks	5567.31
19	RBM Bricks	6616.77
20	RIM Bricks	5119.42

Fig. 6.26: Location of brickfields of Ukhiya and Teknaf of Cox's Bazar District

6.15.1.1 Brick Production in Cox's Bazar (Ukhiya and Teknaf)

Brick production of Teknaf and Ukhuiya Upazila's brickfields has increased from 2016 to 2021 (Fig. 6.27). Fig. 6.27 shows the production of bricks in the twenty brickfields of Ukhiya and Teknaf Upazilla of Cox's Bazar district from 2016 to 2022. The production of bricks increased noticeably in these years. In 2016, the total brick production among the twenty brickfields was 76 million. In 2017, the production jumped to 100 million. From 2018 to 2021, the production increased gradually. However, due to the increase in coal prices, production slightly decreased in 2022.

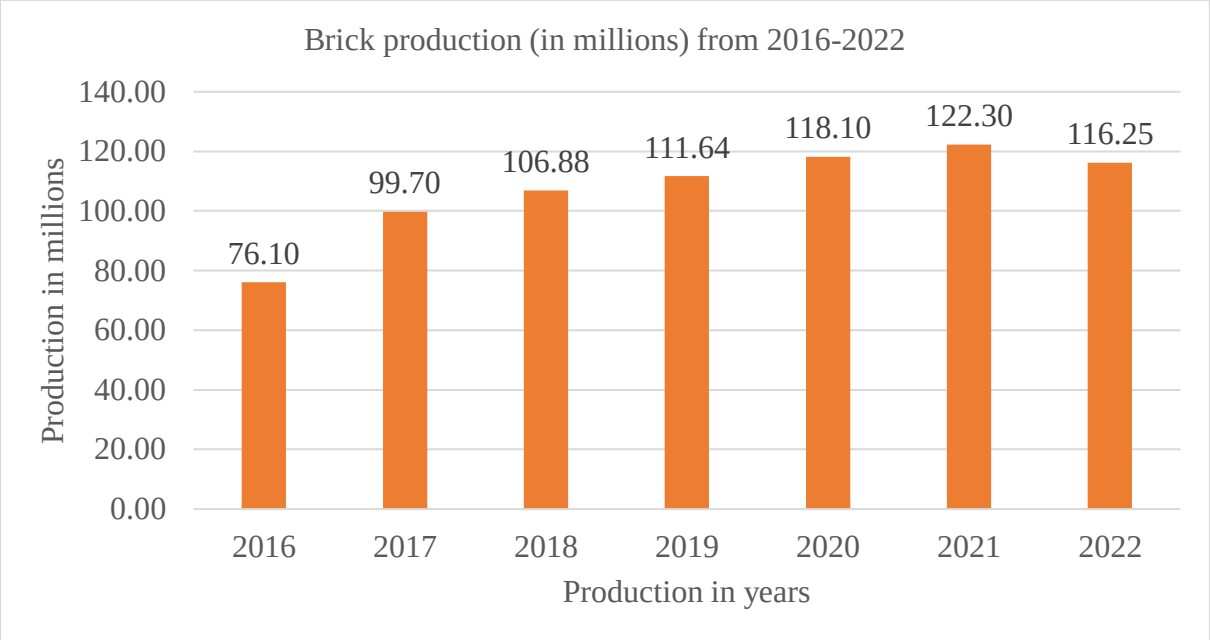


Fig. 6.27: Brick production (in millions) in Teknaf and Ukhiya, Cox's Bazar from 2016 to 2022

After the Rohingya influx, the number of infrastructure constructions increased, so the demand for bricks became higher. It is creating a negative impact on the environment. This has some direct and indirect negative impacts on the environment of Cox's Bazar.

6.15.1.2 Brick price in Cox's Bazar

Over time, the average price per thousand bricks has increased among the twenty brickfields in Ukhiya and Teknaf of Cox's Bazar District (Fig. 6.28). In 2016, the average price per thousand bricks was BDT 5,959 (US$ 63, 1 US$ = BDT 95). The price noticeably increased to BDT 6,458 (US$ 68) in 2017. From 2018 to 2020, the price increase was comparatively less than in 2017. Due to the increase in coal prices, production costs increased, and as a result, the price increased comparatively high in 2022.

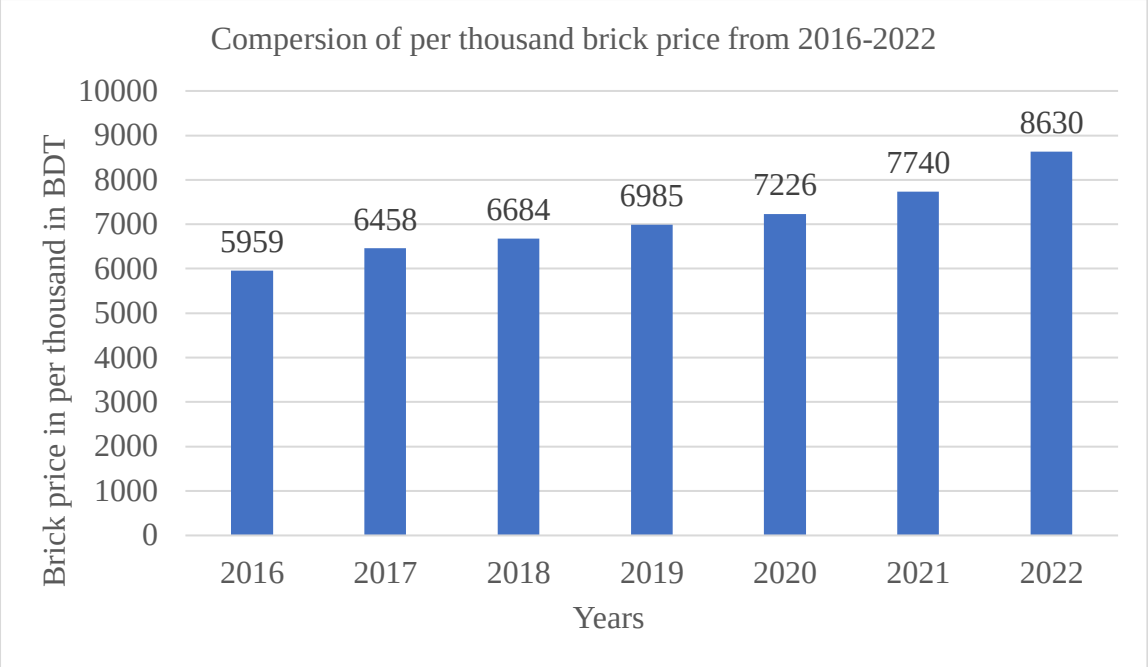


Fig. 6.28: Brick price per thousand in Teknaf and Ukhiya, Cox's Bazar from 2016 to 2022

6.15.1.3 Labourers working in the brickfields in Ukhiya and Teknaf, Cox's Bazar

In the 20 brickfields, only 6% of the labourers come from the local community, while 92% come from other areas of Bangladesh. Most labourers come from Noakhali, Satkhira, Jamalpur and Barishal. Rohingya labourers are also found in 2 of the 20 brickfields, out of 20, which is an average of 2% of the labourers.

6.15.1.4 Actions against Illegal Brickfield Activities

Sometimes, the Upazila administration (Ukhiya and Teknaf) and the Department of Environment jointly take action against the illegal activities of brickfields, even though sometimes they take action separately, and the District Administration, Cox's Bazar, also joins in with them.

Most of the time, the administration takes action on proper licensing, topsoil collection from agricultural land, brickfields set up at the prohibited lands (beside hills, near a school, etc.), etc. When the relevant administration found any illegal matter, they filed a case against the brickfield authority. Even sometimes, the authority fined the brickfield owners through a panel court. Say, for example, the Department of Environment, Cox's Bazar Office fined and collected BDT 3,700,000 (US$ 38,947) on 13 January 2021 from six brickfields (MKB Bricks, AHB Bricks, ARB Bricks, SMB Bricks, MRB Bricks, and PBC Bricks) of Daiyangakata and Laturikhola area of Whykong Teknaf. BDF 1,900,000 (US$ 20,000) was fined from the same

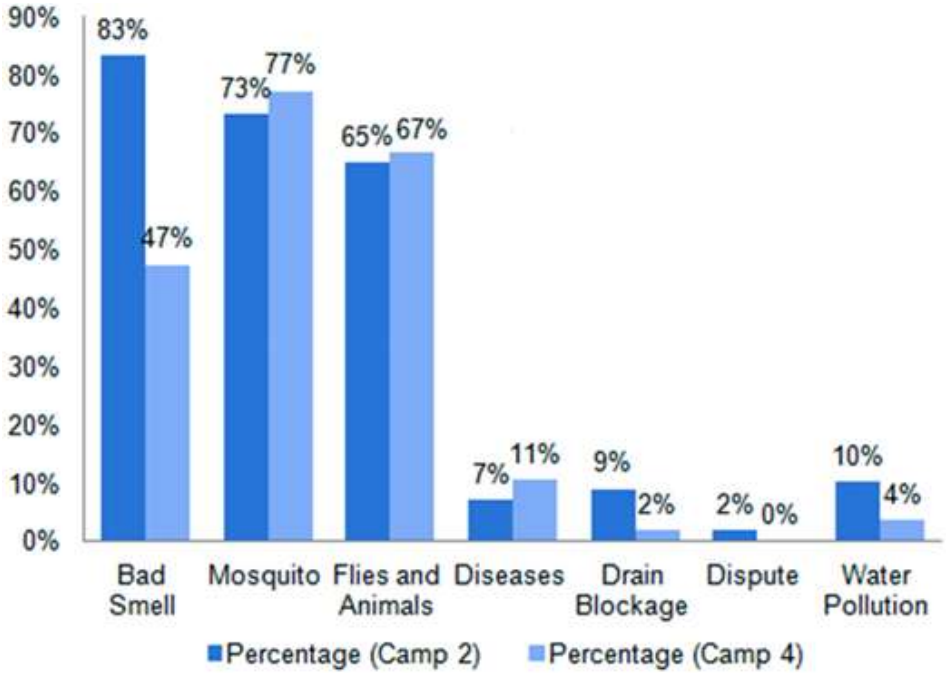
six brickfields on 2 March 2022. On 24 June 2021, cases were filed against AHB Bricks, Daiyangakata, Whykong, Teknaf and MRB Bricks, Daiyangakata, Whykong, Teknaf (Case Number 77/506). On 12 March 2022, BDG 50,000 (US$ 5,263) was fined to ABP Bricks, Holdiapalong Ukhiya. Sometimes, the relevant authorities also destroy the whole brickfield as punishment. All panel courts were directed by the Brick Manufacturing and Brick Kilns Establishment (Control) Act, 2013 (Amendment 2019) and Bangladesh Environment Conservation (Amendment) Act, 2010 (GoB 2013).

6.15.2 Wastage created by the Rohingya community

Cox's Bazar's Rohingya community generates 10,000 tons of waste per month, which harms the environment and health (Bashar 2021). It is unclear how much waste is produced at the camps daily, but a 2018 survey result of Teknaf's Makeshift Leda camp reported that it houses 21,000 displaced Myanmar nationals and provides some insight into the extent of the problem. A significant concern in the camps is polythene bags and plastic bottles clogging the drains. It is essential during the rainy season since that leads to floods, creating significant problems for the local community (Bashar 2021).

According to the United Nations Development Programme (UNDP), the 700,000 refugees living in the Rohingya camps in Bangladesh produce about 10,000 tons of trash per month or 460 grams of trash per person every day. Solid garbage is often gathered by community volunteers in the Rohingya camps and disposed of in public places close to the camps. The lack of proper treatment methods in and around the camps makes burning waste familiar. Due to the dense population of the camps, waste accumulates quickly, and waste bins tend to be overflown. The camps' open disposal practice has severe health-related drawbacks, including odour and water pollution. For instance, the impact of waste pollution has different causes in and around Camps 2 and 4 (Fig. 6.29); lousy smell, mosquitoes, and flies and animals (rats, shrews, etc.) are dominant. Most of the participants in this research also mentioned an increase in mosquito populations. Among the other health threats in the region are malaria, dengue and chikungunya infections, which are spread by mosquitoes due to inadequate water and sanitation infrastructure. These infections have already created a high vulnerability among refugee populations due to inadequate shelter, food and health care. Many participants said they are experiencing rat infestations in the camps due to improper waste disposal. One of the most prevalent re-emerging zoonotic diseases worldwide is leptospirosis, which affects humans and animals (Boey et al. 2019). Many participants reported that rat infestations also result from

waste disposal in the camps. These pathogenic serovars are known to be carried by rats. It is considered one of the world's most widespread re-emerging zoonotic diseases, specifically leptospirosis (Uddin et al., 2022).



Source: Uddin 2022

Fig. 6.29:Impact of waste pollution in Camps 2 and 4

6.15.3 Fire connection with LPG

Day by day, the number of fire incidents has increased in the area after the free distribution of LPG cylinders with gas stoves among the Rohingya households and some local families. It is a beneficial and timely initiative to protect the adjacent forests. Otherwise, the Rohingya and local people would collect fuelwoods from the adjacent forests, even the homestead forests.

In any fire accident, inhabitants feel insecure because there are only two fire stations in the area at the Upazila Headquarters levels, i.e., at Ukhiya and Teknaf. A considerable number of makeshift settlements of the camps, adjacent residents or residents within the camps could lose life in a fire, and many lives could be injured and lots of properties due to settlements being very much overcrowded.

On 9 January 2022, one fire incident happened in Camp-16, where 1,737 individuals were affected, 373 shelters were damaged, and 229 facilities, including a food distribution point, one mosque, and one madrasha, were damaged (ISCG 2022). In the following incident, in Camp-

16, 23.4% of the population lived in two blocks affected by the fire. So, about 30 people died from fire accidents at the Rohingya camps from 2021 to 2022 (Hope Foundation 2021, ISCG 2022).

On 8 March 2022, a six-year-old was burnt and an estimated 2,000 people were left homeless, including 1,000 children by the sixth fire incident in 2022 inside the Rohingya refugee camps in Bangladesh, as reported by Save the Children (Save the Children 2022). This followed a massive fire that demolished 1,200 shelters, leaving more than 5,000 people homeless on January 2022 (Save the Children 2022).

A blaze, which broke out on Sunday, March 5, 2023, engulfed some 2,000 shelters at Block-D of Camp-11 known as Cox's Bazar. It is estimated around 12,000 people, most of whom escaped violence in neighbouring Myanmar, are now homeless. An official said that the blaze started at about 14:45 local time (08 45 GMT) and quickly tore through the bamboo and tarpaulin shelters. "Some 2,000 shelters have been burnt, leaving about 12,000 forcibly displaced Myanmar nationals shelterless," Mijanur Rahman, Bangladesh's refugee commissioner, told AFP news agency. He added that the blaze was brought under control within three hours, but at least 35 mosques and 21 learning centres for the refugees were also destroyed. Many who lived there can be seen picking through the charred area, where only metal struts and singed corrugated roofing remain (BBC 2023).

Moreover, more than 150 fires were reported in 2021, the largest one that killed at least 15 people and destroyed 10,000 shelters (UNHCR 2022c). It was reported that another massive fire had broken out in Kutupalong-Balukhali in Cox's Bazar, Bangladesh, on 22 March 2021. Reports indicated that 13 people died, 563 were injured, and around 400 remained missing (UNHCR 2022d). An estimated 50,000 people had been displaced due to fire incidents. There were about 12,000 shelters destroyed and other facilities damaged, including a hospital and several health centres (Hope Foundation 2021).

Between January 2021 and December 2022, there were 222 fire incidents in the Rohingya camps, including 60 cases of arson, according to a Bangladesh defence ministry report released last month (BBC 2023).

6.15.4 Landslide issues

Of the interviewed respondents, 68.20% of Rohingyas and 67.83% of Local people noticed frequent landslides. After surveying the stakeholders, some reasons that lead to landslides have been identified. These reasons are the cutting of hills, deforestation, illicit felling of hill trees, and heavy rainfall, which leads to surface runoff are the main causes. Due to the landslide gully being formatted, several animals from different forest strata lost their habitats. More than 30% of both communities said they do not yet face landslides (Fig. 6.30).

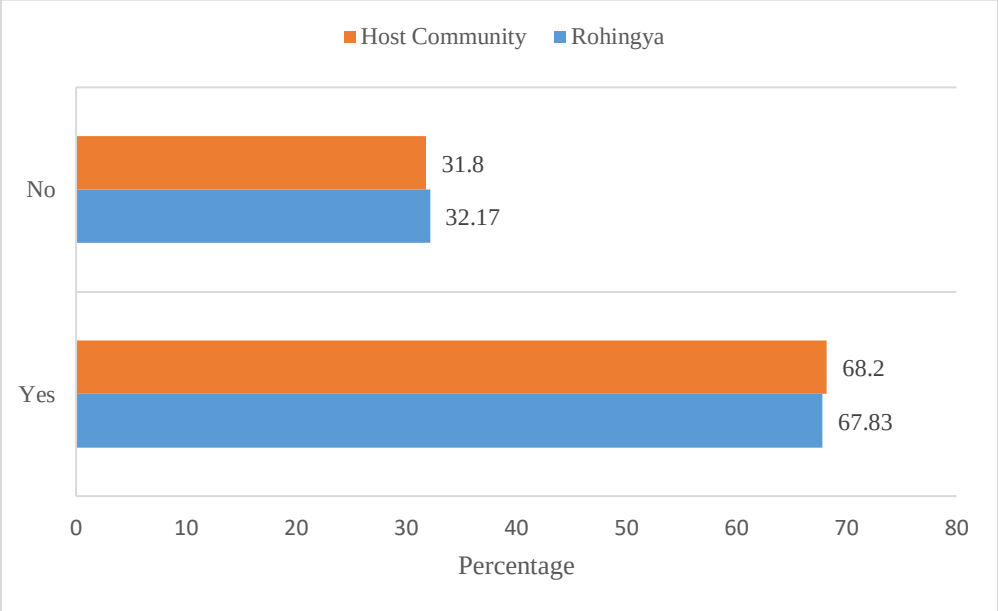


Fig. 6.30: Landslide notice by stakeholders

6.16 Initiative to Support the Environment after Rohingya Influx 2017

6.16.1 CMO and CBO's Efforts

In several countries like India, Nepal, Sri Lanka, Pakistan, Bhutan, etc., co-management has tested tools for protecting the forests and protected areas (PAs) (Sharma et al. 2011). Following the motto of co-management to support the BFD, co-management practices started in TWS during 2005-06 with the financial support of USAID through the Nishorgo Support Project (NSP). Later, these co-management practices were supported by IPAC (2009-2013), CREL (2013-2018), and Nature Conservation through Livelihood Improvements (Nature and Life) Project – Teknaf, Cox's Bazar, Bangladesh, from 2020 to date. For the protection of forests as a co-management initiative, based on Protected Area Co-Management Rules 2017 (earlier followed by Co-management Gazette 2006, which was Amended in 2009), BFD formed Range-based 3 CMGCs (Co-Management General Committee, earlier popularly known as Co-Management Council (CMC), 119 VCFs (Village Conservation Forum), 3 PFs (Peoples'

Forums), 18 CPGs (Community Patrolling Groups) consisting of 415 members including 43 females (2 groups)). The first women-only community patrol group, named Kerontoli Female CPG, in Bangladesh, and the President of this group, Mrs. Khurshida Begum, received the international 'Wangari Mathai Award 2012' for Nature Conservation on 27 September 2012 in Italy, which is a significant recognition of this effort as a pioneering role in co-management in wildlife conservation of forest resources at a village in the south-eastern Cox's Bazar District of Bangladesh (IUFRO 2022). BFD also formed 3 ERTs consisting of 30 members.

Similarly, co-management practices started in the Inani Reserve Forest area from July 2009 to June 2019 with the financial support of USAID through the Inani Protected Forest Area Co-Management Project, which was implemented by SHED (Society for Health Extension and Development) under the supervision of AF (Arannayk Foundation). The first time CMC was formed was on 10 August 2010 by following the Co-Management Gazette (earlier followed by Co-management Gazette 2006, which was amended in 2009) with the support of the mentioned project. Now, at SJINP, Forest Range-based BFD formed a CMGC (Co-Management General Committee), popularly known as Co-Management Council (CMC)), which is working with and under the guidance of BFD with the support of USAID-funded Greening Environment through Livelihood Improvement and Forest Enrichment (GREEN LIFE) Activity, starting from May 2020, which is implemented by Arannayk Foundation (AF) (Arannayk Foundation 2020). At present, Inani CMC is functioning as per Protected Area Management Rules 2017 and working with 23 VCFs, 1 PF, 5 CPGs of 112 members (male 101 and female 11), 4 ERTs of 40 members (all are males), etc. as per the rules.

In TWS areas, under the shade of co-management practices, there are some school-based 'Nishorgo Clubs'. Different awareness-related activities are ongoing to educate the students through different nature-based programmes.

6.16.2 Environment-Friendly Bamboo Treatment Facility: A proven bamboo conservation method was initiated in Cox's Bazar

The influx of Rohingya has caused considerable damage to natural forests in Cox's Bazar area. Most of the Forcefully Displaced Myanmar Nationals (FDMN) residents are placed in the natural forests in Bangladesh. The multidimensional initiatives were taken from the government and donor levels to restore the forest and environment in the Cox's Bazar area.

With about 240,000 displaced Rohingya families having taken shelter in the camps in the Cox's Bazar area of Bangladesh, the demand for bamboo to address urgent humanitarian shelter needs is outpacing supply - putting enormous pressure on the local environment. According to a recent study by the Shelter / NFI sector in Cox's Bazar, over 22 million sticks of bamboo have been used by humanitarian actors for construction (shelter making, Learning Centres, distribution points, etc.) to date. Extensive pest damage can already be seen throughout the camps, particularly in poles harvested while still immature or during the monsoon season. At the same time, using untreated bamboo poles and sticks in direct contact with the ground creates the perfect condition for pests and rot. The estimated average lifecycle of untreated bamboo for shelter is 0 to 20 months, with maintenance and repairs necessary to prepare for monsoon and cyclone seasons. So, bamboo deforestation has spread in Bangladesh due to the Rohingya influx in August 2017. In addition, huge bamboo is used in betel leaf cultivation in the Cox's Bazar, which resulted in the extraction of bamboo significantly occurring in the area.

International Organization for Migration (IOM), over 700,000 bamboo poles have been processed by the IOM's Bamboo Treatment Facility, the largest of its kind in Bangladesh so far. Bamboo is the most commonly used material in the camps. The treatment of bamboo poles reduces pest damage and extends the bamboo's lifespan while minimising forest pressure and maximising cost-effectiveness (IOM 2022).

To reduce the bamboo extraction from the rural and natural forests, IOM, the Danish Refugee Council (DRC), and the Bangladesh Rural & Advancement Committee (BRAC) are working with improved technology in camps and host areas. USAID-funded and CODEC-implemented Nature and Life Project also works with improved technology for the host community.

To decrease bamboo deforestation and improve shelter conditions for Rohingya individuals, IOM began a pilot Bamboo Treatment Facility (BTF) in support of the greater humanitarian response in November 2018 and established 4 treatment tanks located in Hnila of Teknaf Upazila, Cox's Bazar. Bangladesh Forest Research Institute (BFRI) introduced a technology to increase the bamboo lifecycle. During the treatment process of bamboo, two chemicals-Borax and Boric Acid are used in prescribed doses and orders. Daily production of treated Borak bamboo (Borak Bans - *Bambusa balcooa*) is approximately 2,000 poles per day to ramp up operations to reach a peak capacity of 2,500 poles per day soon in 12 tanks. By the end of 2019, the IMO produced over 265,000 treated bamboo poles and used them in the Rohingya

humanitarian response in Cox's Bazar, directly contributing to over half a million individuals through IOM's Shelter programming and working with partners (IOM 2022).

Recent observations reveal that BTF has been completed by the Humanitarian Benchmark Consulting (HBC) Group, confirming that the treatment process is an effective and affordable option for increasing the durability of shelters within the camps. The group has also recognized that bamboo lifecycle and strengthening increase by chemical treatment for 3 to 5 years directly contributed to the minimization of overall bamboo usage, reduced shelter management cost, minimized environmental degradation, and controlled bamboo extraction from nature and the overall improvement of the livelihood of beneficiaries.

To address this problem, UNHCR, in collaboration with BRAC, broke ground on Bangladesh's first large-scale bamboo treatment plant established in Camp 4 Extension at the Kutupalong Camp, Cox's Bazar, in November 2018. The treatment process increases the lifespan of Borak bamboo, which is used for load-bearing support in shelters. Through this process, bamboo longevity increases up to 10-12 years by protecting it from insects, fungi, and other biological and physical elements (BRAC 2019).

Mr. Abul Kalam, Chief of the Refugee Relief and Repatriation Commission, said, "Anyone who visits the camp will notice that bamboo is used as the main material for the construction of everything. By extending the lifespan of the bamboo, this treatment plant will drastically increase the durability of the physical structures in the camps and reduce the environmental impact at the same time. Sustainability is a priority going forward, and the Office of the Refugee Relief and Repatriation Commissioner will continue to work with partners to develop similar projects that care for the environment, the human element, and the necessary rationalization of already scarce natural and financial resources".

BRAC (2019) has estimated that each plant will produce about 2,400 pieces of treated Borak bamboo monthly. Daily, about 20 Rohingya labourers prepare the poles of Borak for treatment in a 1:1 solution of Boric Acid and Borax. The bamboo is soaked in the solution for 10 to 15 days and then dried for 3 to 4 days. Extensive research over many years (e.g., BRAC 2019) shows that the Boric Acid and Borax solution is neither hazardous to humans nor to the environment, including groundwater, soil, plants and animals. UNHCR and BRAC plan to scale up production by constructing five additional plants in Ukhiya and Teknaf. BRAC

estimates that 10,800-12,000 pieces of Borak bamboo will go under treatment by the end of February 2019.

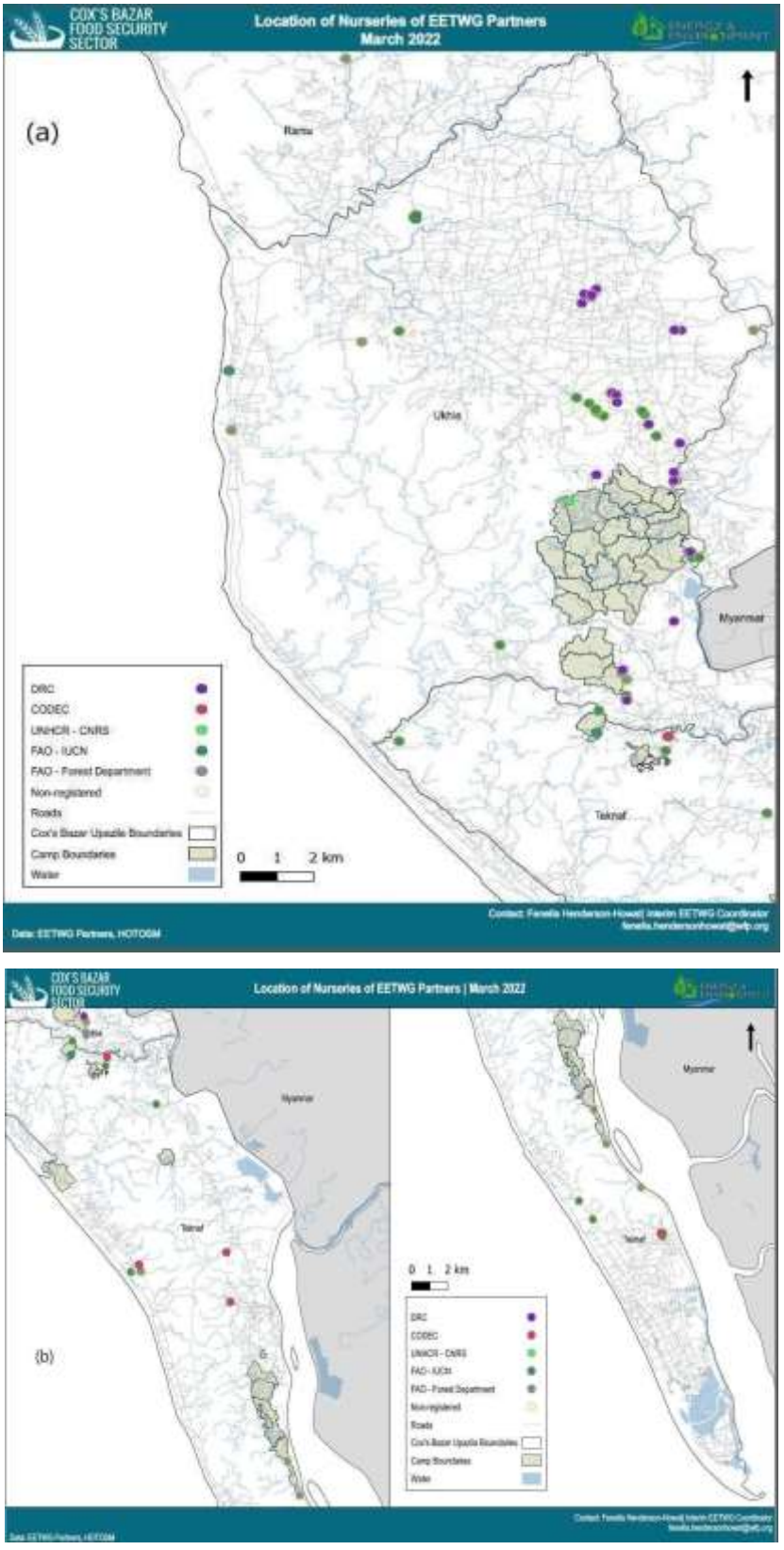
Besides that, CODEC has implemented the Nature and Life Project and is working with the Bangladesh Forest Department and Co-Management Organizations (CMOs) at Teknaf to conserve bamboo in nature under USAID's Local Works Bangladesh Activity.

With the assistance of the BFRI, CODEC has provided technical knowledge to 75 local betel leaf cultivators on how to enhance the service life of bamboo by applying chemical preservatives (Sodium Dichromate, Copper Sulfate, and Boric Acid) in September 2021. It has established 3 bamboo treatment plants in the Teknaf area in December 2021. CODEC conducted many community awareness programmes to spread information about the technology to the farmers.

In the last two years, more than 70,000 treated bamboo particles (fencing sticks, betel leaf sticks, and poles) were produced under 3 plants, and more than 50 farmers used more than 50,000 treated bamboo sticks in their betel leaf cultivation fields accordingly. The farmers are happy about the performance of treated bamboo. Md. Farid Ulla, a Member of Baharchara Union Parishad (also a betel leaf farmer), said, "I have used both types of bamboo particles in my betel leaf cultivation field in the last year (2021). As a result of pests and rot, the normal bamboo poles and sticks were mostly damaged where they directly contacted the ground, but the treated bamboo remained in good shape". CODEC is working to extend the technology locally as a proven method of a bamboo conservation initiative.

6.16.3 Established Nurseries: A New Hope

Many nurseries have been established in Ukhiya and Teknaf of Cox's Bazar District to fulfil the sapling demand to address the Rohingya influx of 2017-related issues, especially for the plantation programmes. After the Rohingya influx in 2017, a working coordination group, EETWG (Energy & Environment Technical Working Group), has been established to address the issues. As per EETWG's information, Fig. 6.31 shows that a there are a notable number of nurseries have been established in Ukhiya and Teknaf by the efforts of DRC, CODEC, UNHCR-CNRS, FAO-IUCN, FAO-BFD, and some non-registered nurseries.



Source: EETWG June 2022

Fig. 6.31: Location of nurseries- (a) Ukhiya (b) Teknaf

6.16.4 List of different project initiatives to support nature

The Rohingya influx of 2017 has destroyed natural resources in the Ukhiya and Teknaf regions in various ways. To mitigate the effect of destruction of natural resources and its restoration, some initiatives/projects/activities have been taken by different NGOs and INGOs. The donor agencies funded different projects are USAID, FAO, WFP, World Bank, FAO Bangladesh, Care Denmark, IRC, UNHCR, Swiss Solidarity and Canton Geneva, Love Army USA, HELVETAS Swiss Interco operation, Dept. of Public Health and Engineering (DPHE), MoEF. Implementation agencies are CODEC, Arannayk Foundation, NACOM, Shushilan, BFD, IUCN Bangladesh, CNRS, Sheba Manab Kallyan Kendra, Helvetas Bangladesh, and Care Bangladesh. Those projects conducted different NRM-related activities in Ukhiya, Teknaf, and Ramu Upazila. Rohingya and Rohingya camps, including the Host community, were beneficiaries of those projects. Three forest areas, TWS, SJINP, and HNP, were also the focus of different conservation activities implemented by the government, NGOs and INGOs. Many projects are still in action, and some are completed.

As a part of the project, as mentioned above, different NGOs and INGOs, UN agencies, etc., provided saplings for homestead gardening, institutional plantation, etc. Government agencies, NGOs and INGOs, UN agencies, etc., also provided fuelwood species to mitigate the fuelwood demand in the area. The agencies mentioned above also provided different seed support with relevant instruments, fertilizer, etc., for round-the-year vegetable production at the homestead level.

6.16.5 Initiatives for waste management by NGO Forum and other organizations

The Rohingya community in Cox's Bazar generates 10,000 tons of waste per month (Bashar 2021), causing environmental and health issues. Solid waste disposal and management services are challenging in the Teknaf Refugee camps, where infrastructure is insufficient and existing landfills are overburdened. Although some waste-related issues, such as contamination of the water-table and radiation, are not particularly serious, the situation that we are currently confronted with cannot be overlooked; otherwise, things could spiral out of control. Solid waste management has traditionally been a low priority in Bangladesh. This is evident in the government's insufficient funding for solid waste management and the quality of public health services and environmental protection services. Improper solid waste management has severe negative environmental impacts, including health and safety issues like diseases linked to many types of pollution. Without a legal or proper waste management system, refugees and internally

displaced individuals are prone to burn or bury their waste uncontrolled. Some persons in refugee camps may be able to make a living by processing and selling recyclable garbage. It can, however, be a source of environmental and health problems if not correctly handled, but it can also be a fantastic opportunity. In a humanitarian crisis, the issue becomes much more apparent. Solid waste generation and its management to reduce social impacts in refugee camps in Cox's Bazar is a prime issue.

In the camps, different WASH agencies, national and international, implement a project on proper solid waste management. Among these agencies, the NGO Forum for Public Health is one of them. Considering solid waste, the NGO Forum always takes different innovation activities to reduce the generation and develop the management process. Here can be described some key activities on the issues.

1. Software activities
2. Hardware support and infrastructure development

Software Activities: To build awareness in the community to reduce the generated solid waste, proper segregation and handling process, conducts different kinds of awareness sessions in the community like meeting with the female group. The group consists of 20 households. One participant from each household, Meeting with the male group, household visit, street songs, drama, block cleaning campaign, etc. are included in software activities.

Hardware Activities: Construction of solid waste composting unit, construction of Community Garbage Pits (two chambers) one is red, other is green, to provide household bins among the households which one is red and another green, etc. are related to the hardware activities.

Solid Waste: The types of solid waste are organic and inorganic. Organic waste we use for composting. The Teknaf camps have two composting units each. The benefit of these composting units is to keep the camps clean, have a safe environment, reduce health hazards, produce fertilizer and organic waste, not waste but wealth, etc.

Composting Unit: Considering the population and generating waste, NGOF (NGO Forum) has constructed the composting unit. The community initially keeps their waste in their household bins, which are marked red and green. The green colour is for organic waste and the red is for inorganic waste.

Finally, the community keeps their waste in communal garbage pits near the living place. Disposing of their waste in the pits takes more than 3-4 minutes. The volunteers collect the waste and carry it to the composting unit in a segregated way that is kept by the community. The waste is measured every day by how much waste comes in and what types of waste. The organic waste is kept in composting units for a time to produce fertilizer without any kinds of pesticides.

There are seven camps (Camp: 04, 05, 26, 27, KTP RC (Kutupalong Registered Camp), KTP TC (Kutupalong Transit Camp) and NYP RC (Nayapara Registered Camp)) funded by UNHCR, one camp (Camp 9) funded by IOM, one camp (Camp 6) funded by UNICEF, one camp (Camp 25) funded by NCA (Norwegian Church Aid). So, 10 Camps WASH activities are being conducted by NGO Forum.

Different components of Solid Waste Management: Solid waste management-related components are as follows:

Household Bin: Temporary storage, located inside a house with a volume commonly of 10-20L with a lid and colour-coded.

Shared Bin: Temporary storage, located at a group of houses level, not fixed to the ground, commonly made from plastic and with a volume expressed in litres normally in the range of 70 – 120L.

Communal Pits: Temporary storage, located at a group of houses level, fixed to the ground, commonly made from concrete/bamboo/metal/hole in the ground and with a volume expressed in a cubic meter, normally in the range of 1 - 2m^3.

Constructed Landfill: Primary disposal site for organic waste. This is a four-chambered disposal unit for organic waste. The total capacity of the facility is 97.96 cum.

Natural Landfill (Dumping Station): This is a single-chambered disposal unit or open (natural) for solid waste. The total capacity of the facility is 1,868.37cum at Camp-26.

Composting Unit: Total capacity of the 2 compost units is 681 cum.

Barrel Composting: Treatment system for organic waste. Total capacity is 1.2 cum/batch.

Incinerator: Inorganic wastes that have no recycle value are incinerated by the incinerator. (Non-operational-as per a decision by UNHCR)

Besides NGOF, different organizations like TDH, Nabalok, Save the Children, UNDP, BRAC, etc., are involved with solid waste management activities at different camps.

NGOF supported several waste segregation spots: two in Camp Number 26, one in Camp Number 4, two in Camp Number 2, and one in Camp Number 5. TDH, Nabalok, Save the Children, UNDP, BRAC, etc., also have segregation points. There is a processing plant in Camp Number 6, which NGOF directs.

6.16.6 Silt-trap / Sediment trap

Sediment traps and basins are settling ponds created by excavation or an embankment that catches and holds runoff that is heavily laden with silts from a building site for long enough for the majority of the sediment to settle out before the site is released (Fig. 6.32). As a result of excavation, runoff from stockpiled materials, and chemical contamination from fuels and lubricants, silt-laden runoff occurs during rainfall, resulting in siltation and reduced water quality. Negative impacts are short-term, localized and reversible by mitigation measures within a relatively small area. Surface water pollution can occur if sediments/silts are not appropriately managed. In hillside roads, hammering may cause localized landslides or accelerate erosion. There is the possibility of erosion due to rainfall runoff at hillside sections. Earthwork activities may cause drainage congestion during construction (ADB 2019).

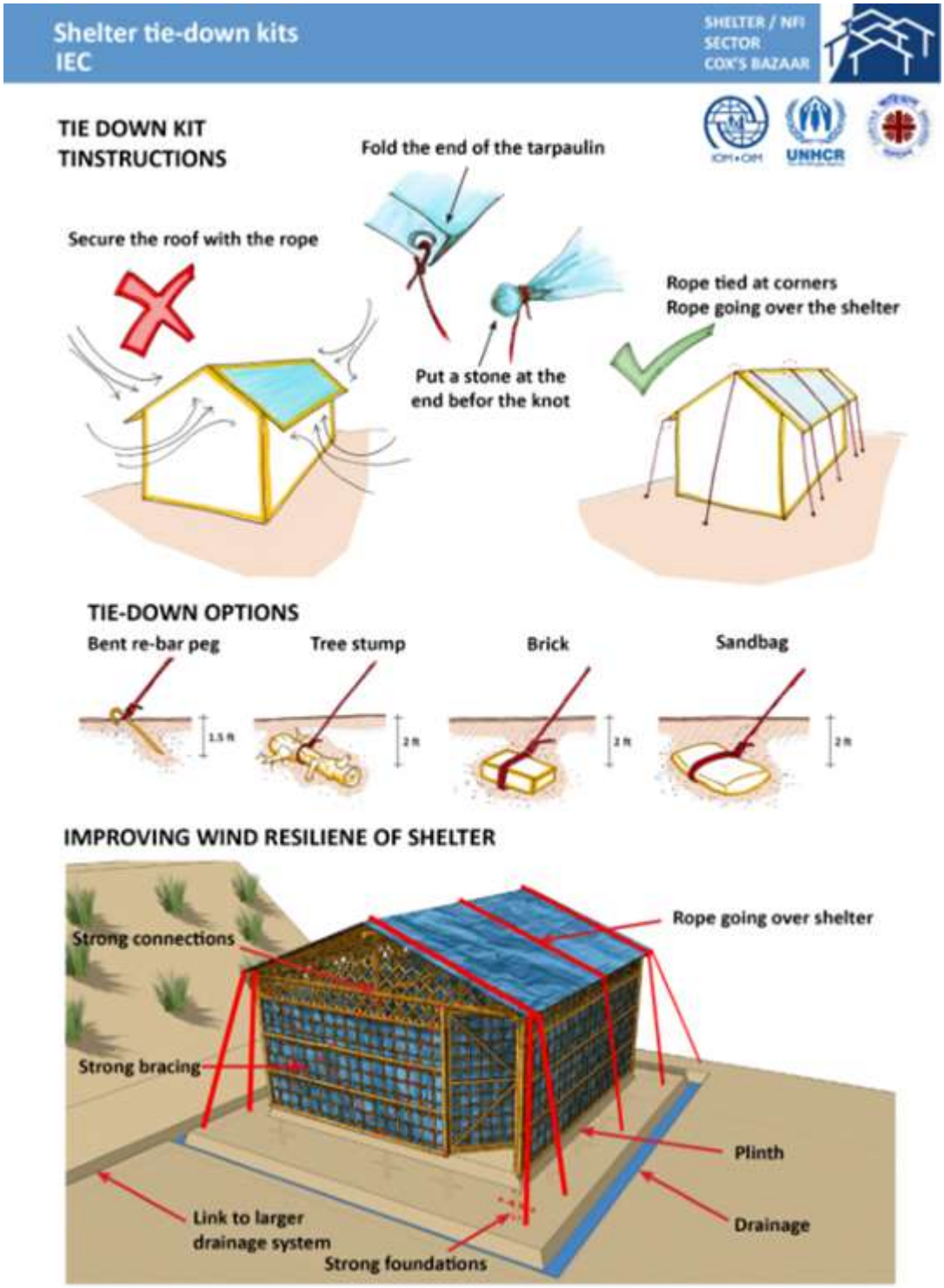
Fig. 6.32: Rohingya volunteer working to make sedimentation trap

Under an ADB-funded project, LGED planned to ensure an eco-friendly waste management system by minimizing waste, reusing materials, and sorting waste accordingly. The following intervention provided measures for waste disposal in appropriate waste bins, enforcing the onsite rule that waste must be disposed of in the bins and storing solid waste separately from hazardous waste so that spills can be contained and excess soils disposed of as soon as possible. To prevent stockpiled soils and fine aggregates from being carried away by wind and rain, hauling trucks were covered and must have a minimum of 0.61 m (2 feet) of freeboard. The sediment traps, sandbags, barrier nets, earth bunds, speed-slowing humps along surface drainage routes, and limiting surface runoff were managed through rerouting away from stockpiles with diversion drains, if appropriate for the site and conditions (ADB 2019).

6.16.7 Tie-down kits

For environmental disaster protection, shelter tie-down kits (TDKs) were distributed by UN agencies through their IPs (implementing partners) on an emergency basis to provide additional strength to the shelters to withstand the strong winds and cyclones. A TDK consists of 60 m of 6 mm rope, steel pegs, 10 sandbags, and an infographic that explains how to use the TDKs to secure shelters (Fig. 6.33). A study by UNHCR found that around 70% of respondents received

shelter TDKs (Zaman et al. 2020). FGDs data from the study also found that some recipients sold their TDKs for some cash, even though most refugees used them (op. cit.). Many people who received TDKs used them to strengthen their shelters differently. Respondents, for example, placed biodegradable sandbags at the edge of the cluster of shacks to prevent them from being blown away by strong winds. To cope with monsoon rains and winds, some people reinforced their shelters with bamboo and plastic bags in the following ways: (a) use of tie-down ropes to protect the roof of shelters from uplifting forces, (b) placement of the sandbags at the edge of fragile shelters to minimize the risk of blowing during a windstorm, (c) use of extra bamboo and plastic bags to reinforce the shelters from the monsoon rain, and (d) construction of drainage system to channelize the flow of rainwater (op. cit.).



Source: IOM 2018

Fig. 6.33: Tied-down kit poster shared for Rohingya refugee

6.16.8 Slope Stabilization and Plantation

Planting trees and legumes helps to restore the land without disrupting the existing vegetation. Planting a combination of grasses, trees and legumes, as well as biological reinforcement

against slopes inside refugee camps, is practiced to stabilize the terraces (Arafat 2109). Furthermore, many hilly slopes were stabilized by terracing and planting vetiver grass (*Chrysopogon zizanioides*) and saplings (Table 6.15). Terracing with leguminous trees and grasses was used in Kutupalong Refugee Camp, Bangladesh (NbS in refugee crisis 2022). The major plants used in Rohingya camps, as decided by UN agencies, are given in Table 6.15.

Table 0.15: Plant species used for land restoration and stabilization

Vetiver (*Chrysopogon zizanioides*)	Bermuda grass (*Cynodon dactylon*)
Pigeon pea (*Cajanus cajan*)	Sesbania (*Sesbania bispinosa*)
Tephrosia (*Tephrosia candida*)	Acacia (*Acacia auriculiformis*)
Gamar (*Gmelina arborea*) - Bokful	Bokful (*Sesbania grandiflora*)
Charcoal Tree (*Trema orientalis*)	Amoloki (*Phylluntus emblica*)
Kadam (*Neolamarckia cadamba*)	Bamboo (*Melocanna baccifera*, *Bambusa nutans*)
Broom grass / Tiger grass (*Thysanolaena maxima*)	

Source: Tallis et al. 2019b

6.16.9 Forest restoration

The Rohingya influx has accelerated deforestation on the Teknaf peninsula. In the areas around Kutupalong-Bulukhali, where refugees have settled, an estimated 2,283 ha (5,640 acres) of forests were lost between December 2016 and December 2017. The camp area expanded by 835% between December 2016 and December 2017. The study concludes by looking at the expansion of camp-sites housing Rohingyas and the degradation of surrounding forest covers. Camps and nearby areas have continued to experience significant deforestation since the end of the development projects by NGOs and INGOs for Rohingya refugees, such as the construction of shelters and site management activities.

Additionally, deforestation threatens the economic and environmental stability of the Rohingya community and the social cohesion between the Rohingya and Bangladeshi communities. There is growing tension as host communities and Rohingya encounter diminished forest resources for fuelwood harvesting. In the mid-term review of the Joint Response Plan (JRP)- the vision of Cox's Bazar's Inter-Sector Coordination Group (ISCG) and Dhaka's Strategic

Executive Group for a coordinated response to refugee needs and host communities- approximately 700 metric tons of fuelwood, nearly equivalent to four football fields of forest, are cut down each day for fuelwoods. There was a dramatic increase in demand for fuelwood in the first year after the influx from 54,451 tons in 2017 to 312,807 tons in 2018, and 91% of refugee households rely on it. They use wood for cooking as their main fuel source (Zaman et al., 2020).

There has been a forest loss in and around the Kutupalong-Bulukhali camp, adjacent to the Sheikh Jamal Inani National Park (SJINP)- a resort for Asian Elephants. Conflicts between humans and animals occur due to the camp's location and increasing habitat degradation in the forest. Elephants use a series of hills as the main migration route in Myanmar and Bangladesh (between TWS and the SJINP). The migration and coexistence of elephants and humans put both at risk for conflict and harm because the natural habitat and corridors for elephants in this area have further been degraded by the settlements (both locals and Rohingyas). Since the most recent Rohingya influx, deadly incidents have been reported between Rohingya and elephants due to this predicament (Tallis et al. 2019b).

According to FAO (2020) estimations based on satellite images, 7,220 ha of forestland had deteriorated, endangering ecosystems, biodiversity, and animal habitats (FAO 2020). FAO and the International Organization for Migration (IOM) examined the availability and demand for food fuels and identified the environmental catastrophe in 2017 (op. cit.). Late in 2018, FAO began supplying liquefied petroleum gas (LPG) to refugees and the host community. The Safe Access to Fuel and Energy (SAFE) project was born out of this, and it is a combined effort by the FAO, IOM, and World Food Programme (WFP) to address the need for sustainable energy, environmental restoration, and resilient livelihoods. The FAO is in charge of forestry efforts and, in collaboration with the Forest Department, created a strategy for stabilising land that encourages planting various native species with rapid growth rates.

Along with the Forest Department, FAO has recovered about 258 ha of land inside the camps and an additional 2,000 ha of forest land surrounding the camps. Millions of trees and elephant protection measures have been planted due to the reforestation activities (FAO 2020). For forest restoration (inside and outside the camps), fast-growing trees (Gamar: *Gmelina arborea*, Kadam: *Neolarmarckia cadamba*, Chikrassi: *Chukrasia tabularis*, Arjun: *Terminalia arjuna*, Bohera: *Terminalia belerica*, Tejbohol: *Cinnamomum glaucescens*, Jarul: *Lagerstroemia speciosa*, Muli bamboo: *Melocanna baccifera*, etc.) were planted. Legumes were planted to

increase fertility (by fixing nitrogen in the atmosphere). To avoid land erosion/slice, terracing with leguminous trees and grasses has been planted in and around Kutupalong Refugee Camp (Fig. 6.34).

Source: https://www.nbsbangladesh.info/case_study/nbs-in-refugee-crisis/2022

Fig. 6.34: Terracing with leguminous trees and grasses in Kutupalong Refugee Camp

6.16.10 Advanced reverse osmosis sea-water desalination plant

Teknaf peninsula is Bangladesh's drinking water crisis-prone area due to its hilly and rocky bed. Due to the uplifting, the underground water level is going down daily, which has created a problem for all inhabitants of the area. After the Rohingya influx in 2017, the problem has become multiple. To mitigate this problem, Nabolok (a Bangladeshi NGO) has established a plant for Sea Water Desalination through Advance Reverse Osmosis.

Background of the project/plant: Teknaf is situated beside the Naf River, and the other side is the hilly area. There lived almost half a million local people. They are suffering a water crisis from the beginning. Their underground water level is minimal, and in the dry season, the water level falls, and they do not get water from the underground water source. The soils of some areas are rocky, where drilling is not possible. There are a few pocket layers/aquifers with

minimal water. Some areas' groundwater is not usable for salinity reasons. Maximum drilling becomes a failure because of the salinity of ground-water. Another side the Naf River water also has high salinity, which is also not usable. After Rohingyas arrived at Teknaf in 2017, both communities (Rohingya and host) faced a horrible situation because of a lack of water. The government and NGOs are trying to work on a common platform to minimise this water crisis. In 2019, Nabolok Parishad planned for a desalination seawater treatment plant through the Advance Reverse Osmosis (ARO) system because groundwater is unavailable. In Teknaf, sea-water is a renewable source, and we can get water throughout all the seasons. After this planning, Nabolok shared the concept with the Donor organization, and they appreciated it and agreed to provide funds for this project. In 2019, Nabolok implemented the ARO Sea-water Desalination Plant in Nayapara (Shalban), Teknaf (Fig. 6.34).

Operation and Maintenance: Now, Nabolok has four Reverse Osmosis Machines for the desalination of raw salt water of the Naf River. At first, Nabolok collects raw salt water from the Naf River through an inlet pump and sends it to the plant. In the plant, this salt-water is treated by two Sediment ponds, and then this water goes to the Ultrafiltration machine for filtration. After Ultrafiltration, water goes to the Multimedia Vessel, which has a three-layer filtration system (Carbon, Green Sand, and Manganese layers). After Multimedia filtration, water is passed into RO (Reverse Osmosis) membrane with 1,000 PSI (Pound Square Inch) high pressure by Danfoss Pump. From the RO machine, sweet water, and salt-water are separated, and the Sweet water goes to the Reservoir tank. Nabolok has ten Reservoir Tanks, which have a capacity of 95 m^3. From this reservoir, water is transported to the distribution tank by centrifugal and booster pumps. Nabolok has seven Distribution Tanks capacity of 70 m^3. Moreover, the Salt-water goes to the Waste Water house. In the distribution Tank, Nabolok again treats water by chlorination at standard level, and Nabolok checks the FRC (Free Residual Chlorine) result. After getting the FRC standard level, we distribute water among Rohingya beneficiaries and host communities. In total, Nabolok has 16 water distribution points (Tap-Stands).

Location of the plant: Nayapara (Mochuni), Hnila, Teknaf, Cox's Bazar

Area of the plant: The total ARO plant area is 1,717.33 sqm**.**

Name of the project proposal with funding source: Humanitarian Assistance in the sector of Protection, WASH, Shelter/NFI (Natural Food Item), and Site Management and Site

Development for Rohingya and Host Communities in Cox's Bazar, Bangladesh. Funded By: Diakonie Katastrophenhilfe, Back Donor: German Federal Foreign Office.

Duration of the project of the treatment plant: August 23, 2019 to November 30, 2024

The overall management system of the project: To ensure ARO Consultant manages technical management. Furthermore, other management is managed by the Project Manager through Project Engineer and two ARO Technical Officers cum Operators. To ensure water distribution properly, Nabolok has six Water Distribution Volunteers.

The plant's present capacity and future endeavour / target: Total Capacity is 150 m^3 per day. Nabolok produces 120 m^3 of sweet-water per day from this ARO Desalination Plant. And it can also distribute 120 m^3 of sweet-water among Rohingya beneficiaries and host communities. But in the dry season, turbidity and salinity increase in the raw water of the Naf River. So that total water production is decreased. In the dry season, total water production is 90-110 m^3 daily.

Distribution area: Nobolok distributes ARO sweet-water among Rohingya beneficiaries and host communities at Camp-26 (Fig. 6.35) and Sub-Block G3, G4, G5, G6, F8, F9, F10, H10 and Muchuni Bazar, Forest Office.

Beneficiaries: The Rohingya beneficiaries' population is 4,999, the Households are 1,104, the Host communities' population is 2,250, and the Households are 500.

Source: Nabolok 2022

Fig. 6.35: A partial view of the ARO Sea-water Desalination Plant and the users collecting the water from an outlet of the plant

Location of the plant: Nayapara (Mochuni), Hnila, Teknaf, Cox's Bazar

6.17 Comments on the Hypothesis

Based on different dimensional discussions of the chapter, it can easily be said that the irreparable loss that has happened to wildlife and their habitats of Ukhiya and Teknaf, especially the two protected areas, SJINP and TWS, due to the Rohingya influx in 2017 and by their makeshift settlements of about one million FDMN (Forcefully Displaced Myanmar Nations, i.e., Rohingya people) and their livelihood dependency of the natural resources especially ecosystem services of the forests. After the Rohingya influx, a significant portion of forest-based habitats have been destroyed by large-scale deforestation, decreased forest coverage, reduced number of wildlife, including indicator birds, increased human-wildlife conflict, especially human-elephant conflict, squeezed the food sources of wildlife, increased illegal encroachment forest lands, operating a notable number of illegal sawmills and brickfields, increased wastages and soil-water-air pollution, increased soil erosion and landslides, etc. On the other hand, some initiatives have been taken to support the environment after the Rohingya influx in 2017, such as CMOs and CBOs efforts, providing environment-friendly treated bamboo facilities, establishing a notable nursery, different projects initiatives to support nature, efforts on waste management, practices for silt-trap / sediment trap, tie-down kits, slope stabilization and plantation, forest restoration, established low-scale advanced reverse osmosis sea-water desalination plant, etc.

CHAPTER 7. IMPACT OF ROHINGYA INFLUX ON LOCAL SOCIETY AND CULTURE

7.1 Introduction

Bangladesh is a densely populated country, and it supports 1,169 persons per square kilometre, the highest in the world, and the growth is 1.03% (UN - World Population Prospects 2023). Many people live under the poverty line here. Meeting the demands of the enormous poor population is already a massive challenge for the government. In this situation, the influx of millions of Rohingya has created a big problem. Regarding geographical proximity, there are some similarities in social and cultural perspectives between Rohingya and the local community of Cox's Bazar District of Bangladesh (Ansar and Khaled 2021). According to previous studies (e.g., Hollowy 2018, UNHCR 2018), a shared historical connection and a Sunni Islamic religious identity were influential in supporting Rohingya refugees. However, cultural proximity is also linked with their physical characteristics, language and beyond simplistic religious connection (Hoffstaedter 2017). Rohingya and Chittagonian accents are almost identical, and both groups speak a dialect of Chittagonian Bangla (Wipperman and Haque 2007).

Rather than that, the sudden influx of millions of Rohingya affected many social and cultural issues in Cox's Bazar (Ullah et al. 2021). A study (op. cit.) found that the local community's socioeconomic status degraded. This chapter focused on social imbalance after the Rohingya influx, social anarchy created after the Rohingya influx, the transmission of disease after the Rohingya influx into the local areas, cultural impacts of the Rohingya influx, child labour and the income of child labour, a tendency to stay in Bangladesh through marriage to a local by a Rohingya, roles of NGOs on the Rohingya issues, roles of NGOs on the local issues, the impact of Rohingya influx on educational institution, impacts on the mental health on coexistence and so on.

7.2 Hypothesis / Research Question

The Rohingya influx in 2017 impacted local society, culture, and related natural resources.

7.3 Methods

A semi-structured questionnaire survey was conducted among the Rohingya and the local community. After the field survey, the data were digitized by using MS Excel. Different

analyses were done by using MS Excel. At last, graphs and charts were generated to visualize the data. Regarding the methodology, a further detailed discussion has been presented in Chapter 4, Section Materials and Methods.

7.4 Results and Discussion

7.4.1 Social Imbalance after the Rohingya Influx

Due to a border area, some drug-related social problems prevail in the host community. After the Rohingya influx, some other social problems have been added with drug-related problems, such as a conflict between Rohingya and local people, drug smuggling by Rohingya and local people, rape incidents between Rohingya and local people, criminal activities by Rohingya children, conflict for land between the Rohingya and the host community, the conflict between the government agencies / NGOs / INGOs and Rohingya and the host community, different types of criminal activities, etc. Dimensions of many social problems have been changed after the Rohingya influx, creating a vast social imbalance in the area.

7.4.1.1 Conflict between Rohingya and local people

A significant part (96.52%) of the Rohingya people said they have no conflict with the host community, whereas 47.09% have a dispute with the Rohingya people. Fig. 7.1 represents host communities with conflict and low positions in a social anarchy.

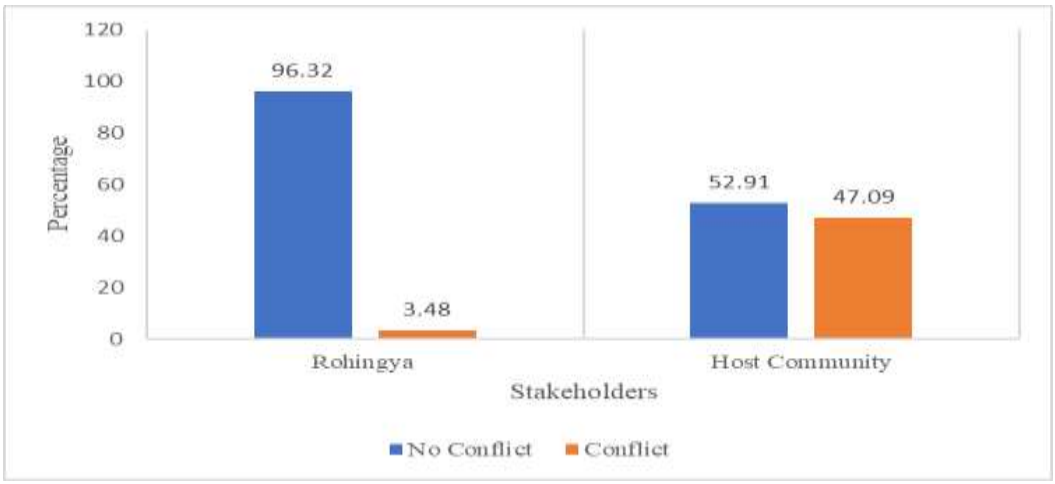


Fig. 7.1: Stakeholders' Perception of Conflict

7.4.1.2 Drug Smuggling by Rohingya People

Most of the Rohingya respondents (95.65%) give an opinion that the situation of drug smuggling by Rohingya is decreasing or remains the same as after the immediate crisis of the Rohingya influx in 2017. However, the host community respondents (82.53%) believe that this

problem is increasing day by day, and the situation has been worsening since the immediate Rohingya influx in 2017, which is shown in Fig. 7.2. According to the field observations during the study period, most of the locals believe that the Rohingya people try to control the drug business by themselves as much as possible.

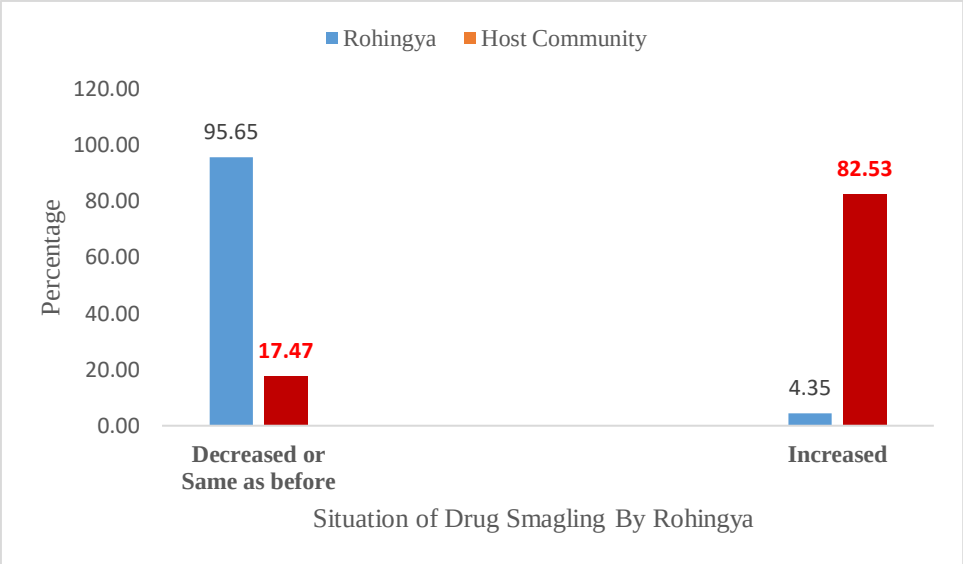


Fig. 7.2: Drug smuggling by Rohingya people

7.4.1.3 Drug Smuggling by the Host Community

More than half (52.4%) of the host community respondents believe that the Rohingya influx harms the host community by influencing drug use and smuggling. They also think that the situation is getting worse day by day. On the other hand, almost all Rohingya respondents (96.52%) believe that local people or the Rohingya do not engage in drug smuggling compared with the immediate drug scenario after the Rohingya influx in 2017, shown in Fig. 7.3.

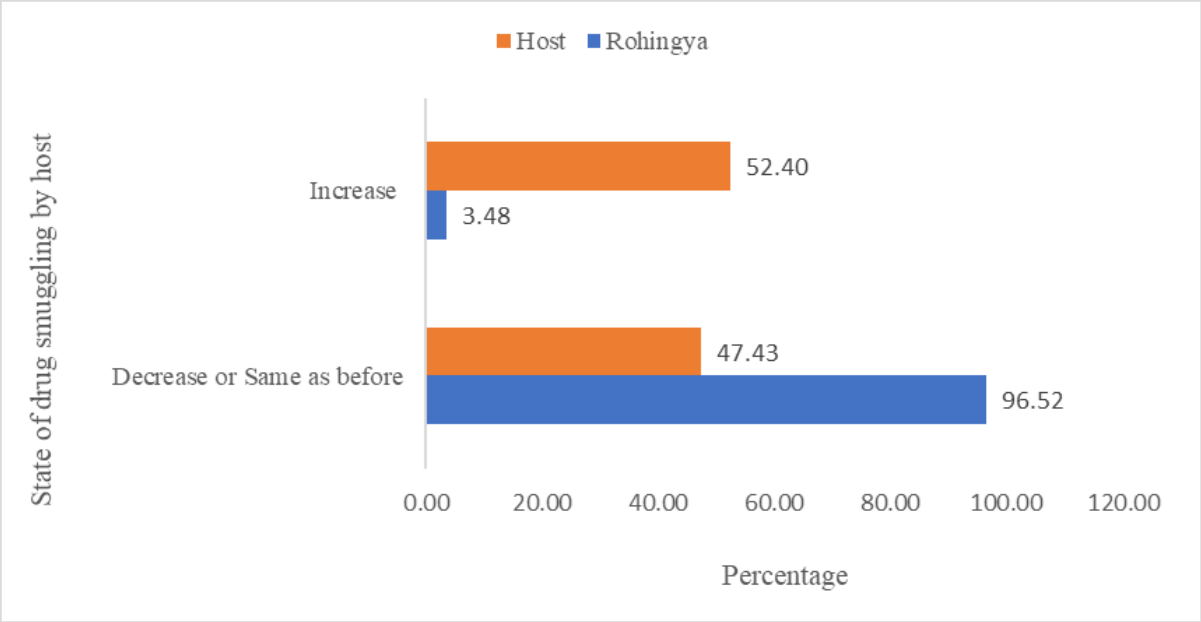


Fig. 7.3: Drug Smuggling by the Host Community

7.4.1.4 Rape Incidents between Rohingya and Local People

According to each community, rape incidents are not reported much. However, Fig. 7.4 shows that 12.67% of the host community said that rape incidents have increased since the Rohingya influx in 2017. In most cases, such types of incidental news do not come to the public burke by the victim or the victim's family.

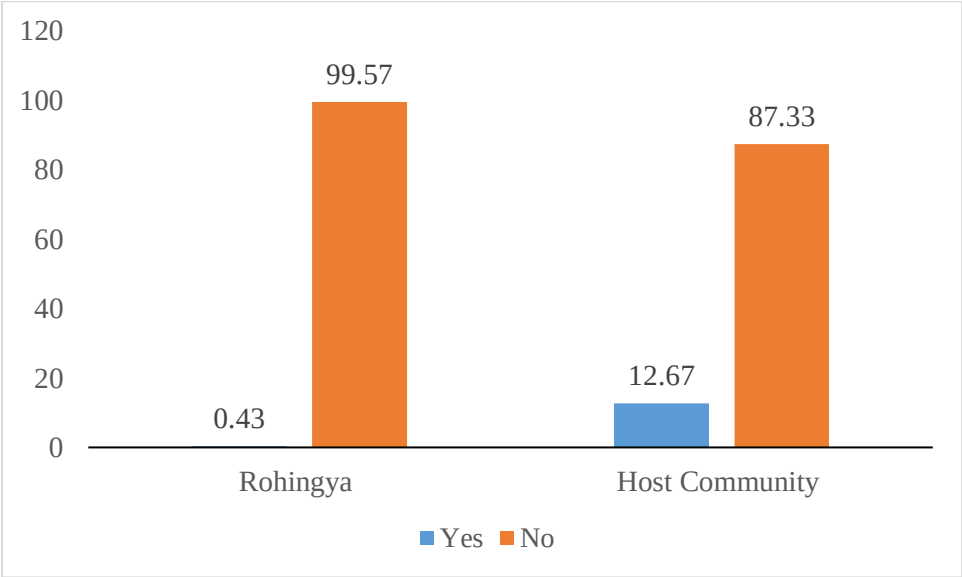


Fig. 7.4: Rape Incident between the Rohingya and Host / Local People

7.4.1.5 Criminal Activities Done by the Rohingya Children

More than half (51.37%) of the host community respondents believe that the Rohingya children's criminal activities are decreasing day by day because they are engaged in education and the actions of law enforcement agencies, as well as social awareness. Fig. 7.5 represents about 97.83% of the Rohingya respondents' opinion that their children are not engaged in this crime. In most cases, the Rohingya children are blamed for stealing mobile-like materials. However, some people (48.63%) in the host community respondents said that illegal activities have increased and the situation is worsening.

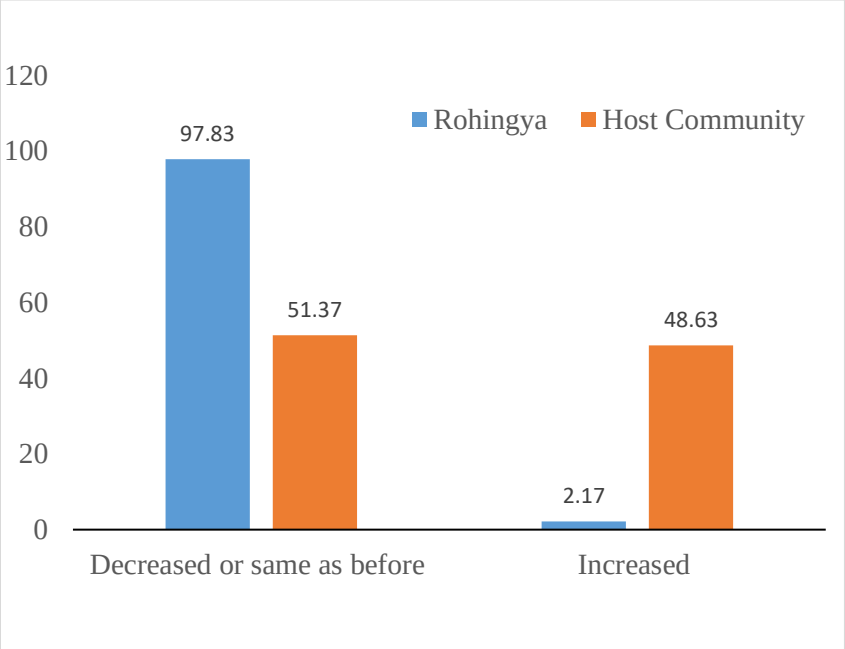


Fig. 7.5: Criminal activities done by the Rohingya children

7.4.1.6 Conflict for land

A very significant portion (97.39%) of Rohingya respondents said that they have no land conflict with the host community. In comparison, 33.73% of host community respondents opined that they have problems or conflicts with the Rohingya, which is plotted in Fig. 7.6. According to the field observations, in some cases, the mutual interests of both communities are involved in land issues.

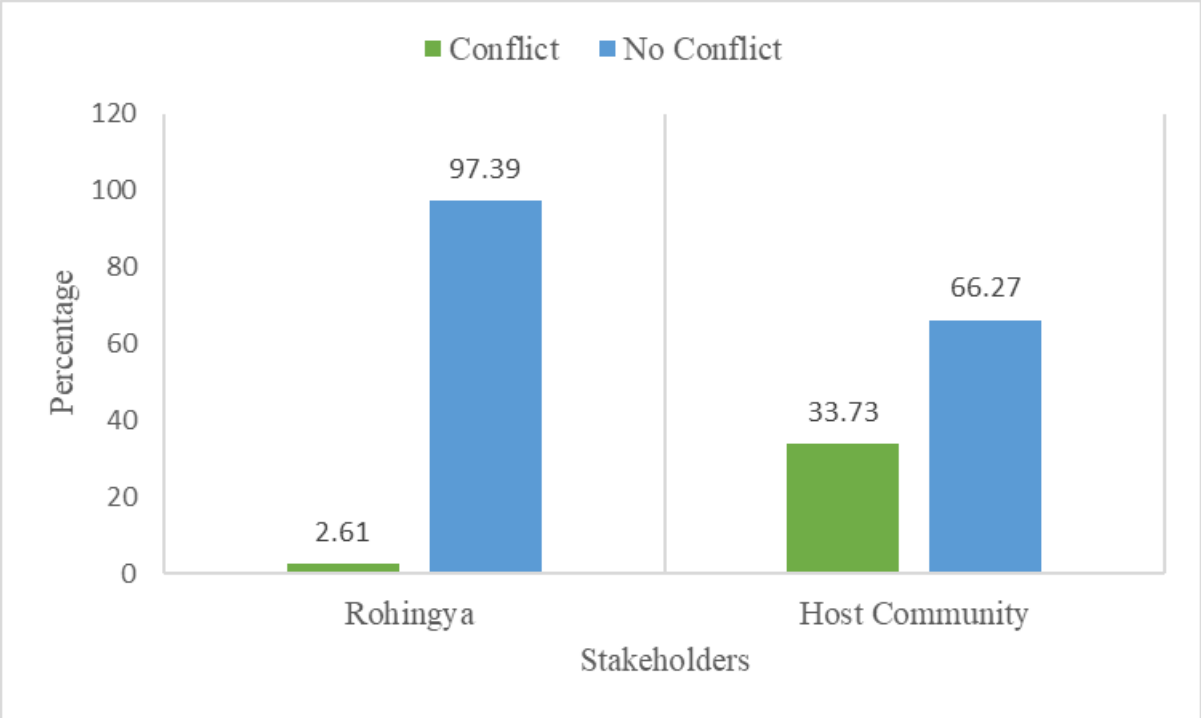


Fig. 7.6: Conflict for land between the Rohingya and the host community

7.4.1.7 Conflict between government agencies / NGOs / INGOs and the camp dwellers

In most cases, both communities, i.e. the Rohingya and the host, stated that they have no disagreements with government agencies, non-governmental organizations (NGOs), or international non-government organizations (INGOs). Fig. 7.7 indicates that only a few respondents from Rohingya (0.43%) and respondents from the host community (1.37%) have mentioned coordinating problems with government agencies, NGOs and INGOs. All types of facilities are coordinated at the camp areas by the CiC Office. Before establishing the CiC Office, there were gaps in delivering or ensuring support to the camp dwellers. Moreover, coordination gaps exist to distribute support among the Rhoingya-infected host communities, most encircled by the camp area, where the CiC Office has no control. The encircled local people get services or support from the local Union Parishad and so on.

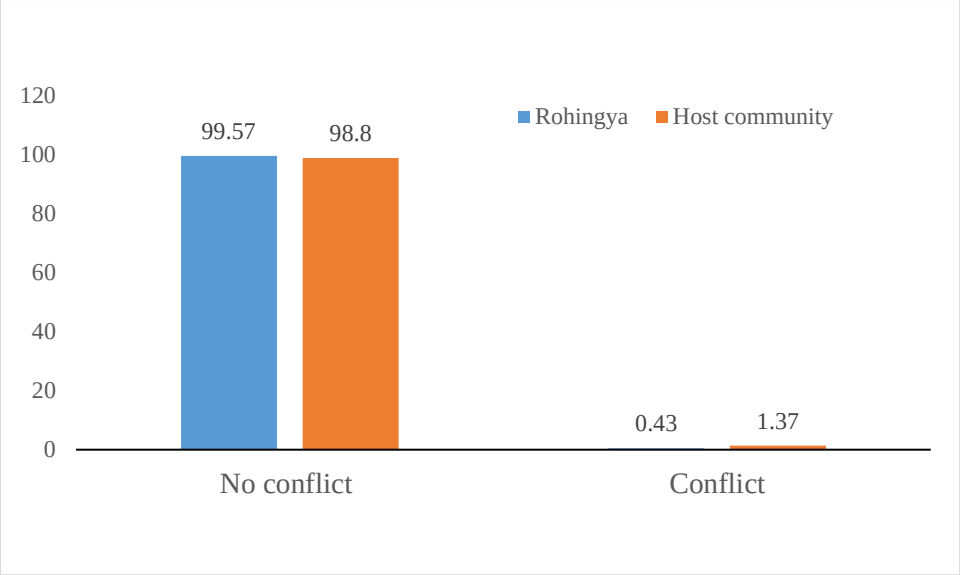


Fig. 7.7: Conflict between government agencies / NGOs / INGOs and camp dwellers

7.4.1.8 Different types of criminal activities by the Rohingya people

Table 7.1 shows that before the influx of 2017, the total number of criminal cases registered in two Thanas (Sub-district level Police Stations) was 1,130 in 2015 and 1,060 in 2016. The number of cases is increasing after the influx. The government has placed different checkposts and increased the number of police stations to control crimes. The number of criminal cases has increased since 2017. Though the number of cases was reduced in 2020, this reduction is insignificant. Immediately after 2020, cases increased by almost 1.5 times (2021). In 2022, the total number of cases was 2,048, less than in 2021 (Table 7.1).

Table 0.1: Total crime cases reported in Ukhiya and Teknaf Thanas from 2015 – 2022

Name of the Upz.	2015	2016	2017	2018	2019	2020	2021	2022	Remarks
Ukhiya	355	323	474	447	634	687	1,159	1,173	Increased the number of police check posts and police stations in the area
Teknaf	775	737	912	716	1,132	1,065	1,157	875	
Total cases	1,130	1,060	1,386	1,163	1,766	1,752	2,316	2,048	

Generally, the Rohingya people are involved in different criminal activities like drug smuggling, concealed kidnapping, terrorism, smuggling goods, robbery, prostitution, rape, human trafficking, murder, contact killing, maintaining a linking activity with terrorist groups

of camps, camps surrounding areas, and Myanmar (Al-Yakin, ARSA, RSO, personnel terrorist groups, etc.), different illegal (unlicensed) weapons dealings, stealing, battery-rickshaw stealing, internal grouping, wildlife hunting, illegally manage Bangladeshi NID, passport, birth certificate, gender-based violence (GBV), illegal migration to other countries from Bangladesh, tout (middleman), etc.

Some Rohingya people use Myanmar's mobile networks to conduct different criminal activities. During the study period, local people reported that at the Bangladesh Ansar Battalion, Check-posts of Jadi Mura and Shalbon under Ward-8 of Hnila Union Parishad were looted by Rohingya miscreants. The miscreants looted a total of 16 ripples from two check-posts. Later, the law enforcement agencies rescued 14 ripples, and 2 are still missing. In June 2022, the Rohingya miscreants attacked the Shalbon Ansar Battalion Check-post beside Camp-27, under Ward-8 of Hnila Union Parishad, and killed one member of the Bangladesh Ansar Battalion. Some local people use Rohingya people as daily labours in betel leaf cultivation, sand collection from natural water flows of the forest area, hill cutting, etc., which are illegal as per Bangladesh Government rules, but they (Rohingya) are not very much aware of in this regard.

7.4.2 Social anarchy created after the Rohingya influx of 2017

Social anarchy can be defined as a chaotic situation or imbalance in society (Dolgoff 1986). Social anarchy emerges when people live in social unrest and the normal system of a society is broken. Social unrest can be induced by many events: war, natural disasters, sudden migration, geopolitics, economic imbalance, etc. (McLean and McMillan 2003). In 2017 around a million Rohingya people suddenly flew from Myanmar to Bangladesh. They were tortured and killed heavily by Manymar’s military (Frontieres-Holland 2002). The Rohingya people came to Bangladesh by crossing the border to save their lives. The sudden influx of huge numbers of Rohingya affected the local people and environment on a large scale.

7.4.2.1 Major sectors of social anarchy according to the Rohingya people

Rohingya camps are overpopulated, leading to a social and economic crisis for locals. Despite limited similarities between local and Rohingya people due to geographical proximity and religion, the sudden influx of Rohingya people created chaos in the local society. This study finds significant sectors affected by social anarchies due to the refugee influx, which includes education, economy, culture, agriculture, etc. Of the 230 Rohingya surveyed in this study, 207 (90%) were general Rohingya refugees, and 23 (10%) were Key Informants of Rohingya.

7.4.2.1.1 Causes of social anarchy according to the general Rohingya community

Fig. 7.8 summarizes the causes of social anarchies according to general Rohingya refugee respondents. According to 32.33% of the general Rohingya people, local people need to show NID cards for movement, which makes local people angry and leads to social anarchy. Another 19.55% of the Rohingya respondents indicated that some Rohingya people are involved in crimes and unethical activities, which cause social agitation, leading to social anarchy. Another 16.54% of Rohingya respondents blamed the need to pay '*Hasil*' whenever they tried to sell anything in the market as a cause of anarchy.

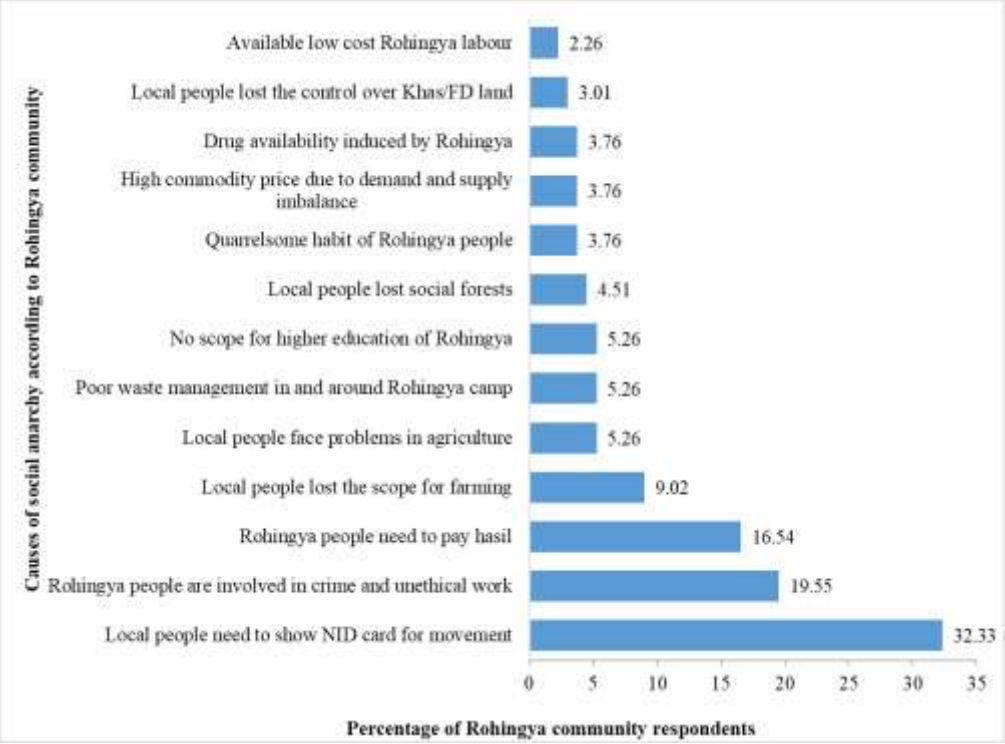


Fig. 7.8: Causes of social anarchy according to general Rohingya respondents

Few of the Rohingya respondents – respectively, 9.02%, 5.26%, 4.51%, and 3.01% identified Local people's restricted scope for farming, Local people's facing problems in agriculture, Local people's losses in social forestry projects, and Local people's loss of control over '*Khas*' or BFD land. A marginal percentage (3.76%) of the Rohingya respondents indicated increasing drug availability due to some Rohingya and the quarrelsome habit of Rohingya people as the causes of social anarchy since the drug addiction, especially among the local young boys and girls. About 2.26% of the general Rohingya community respondents said that available low-cost Rohingya labour is the cause of social anarchy.

7.4.2.1.2 Causes of Social Anarchy According to the Rohingya KII

Fig. 7.9 presents the opinion of Rohingya Key Informants regarding the causes of social anarchy. The availability of low-cost Rohingya labour was indicated as the cause by the majority (54.55%) of the respondents. The need for local people to show NID cards for movement after the influx and refugee-induced elevated high commodity prices has been a cause of local anger and anarchy by 45.45% of the respondents. Respectively, about 36.36%, 18.18%, and 9.09% of the KII respondents indicated Local people's loss of control over '*Khas*' or BFD land, Local people's restricted scope for farming, and Local people's facing problems in agriculture as the causes of social anarchy. Besides, the lack of playgrounds has been indicated as a reason for social agitation by 27.27% of KII respondents. Lastly, increased drug availability due to Rohingya dealers and poor waste management in and around Rohingya camps were identified as causes of social agitation in the host community by 9.09% of the respondents.

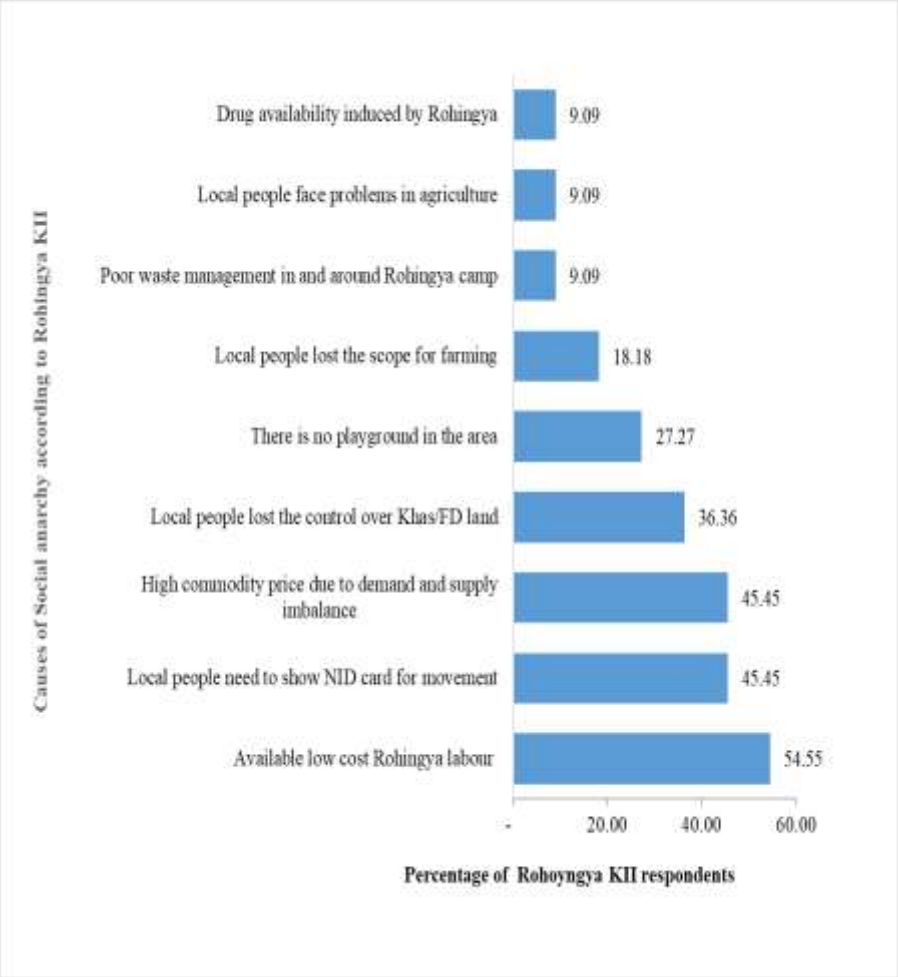


Fig. 7.9: Causes of social anarchy according to Rohingya KII respondents

7.4.2.2 Major Solutions of Social Anarchy According to the Rohingya People

Though the social and cultural shocks of the sudden Rohingya influx for both Rohingya and the local community can not be eliminated quickly, Rohingya respondents of this study suggested some solutions to mitigate the problems provoking social anarchy.

7.4.2.2.1 Solutions of social anarchy according to the general Rohingya People

Fig. 7.10 shows the thoughts on a solution to the social anarchy community by the general Rohingya refugees. One-fifth of them (20.51%) considered that providing appropriate recreation options for daily labourers from refugee and host communities may help address the social anarchy. An almost similar percentage (17.95%), increasing support for local people given to refugees may lessen the social chaos. A similar percentage (17.09%) considered repatriation as the solution to social chaos. Respectively, 12.82%, 11.11%, and 9.4% requested integrated management through actions by concerned authorities; surveillance of law enforcement agencies may lessen social anarchy. Lastly, 6.84% asked for proper solid waste management in and around Rohingya camps to reduce social anarchy. Only a few, respectively, about 3.42% and 2.56%, 2.56% of the respondents considered counselling or awareness of Rohingya people against drug use, increasing education opportunities for the Rohingya children and stopping the '*Hasil*' collection as solutions to the social anarchy.

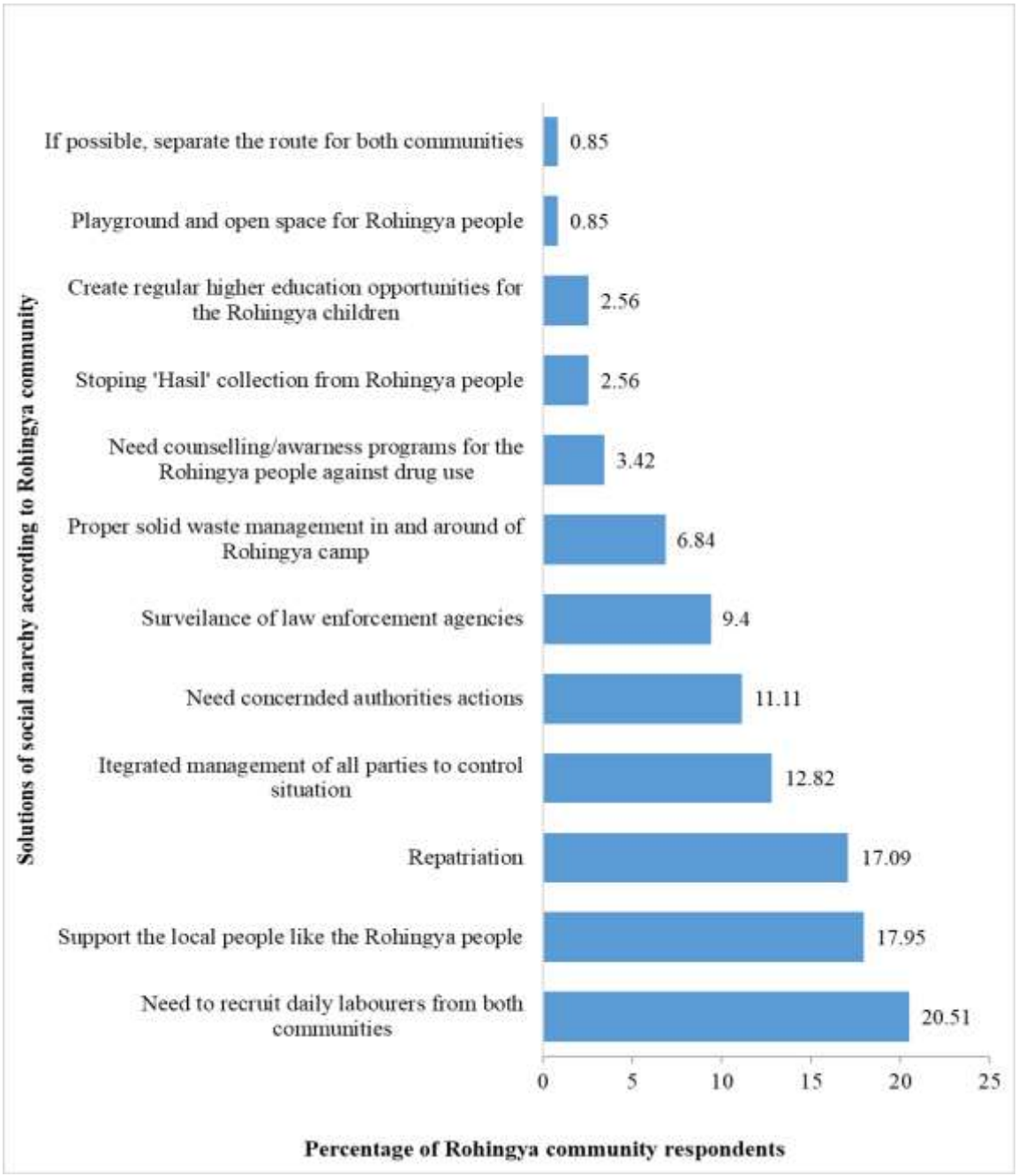


Fig. 7.10: Solutions of social anarchy according to general Rohingya respondents

7.4.2.2.2 Major solutions of social anarchy according to the Rohingya KII Informants

Fig. 7.11 indicates the solution of social anarchy as proposed by Rohingya Key Informants. About 37.5% of them request parallel support for the local people like the Rohingya to solve social anarchy. About 18.75% considered repatriation and concerned authorities' actions as solutions. One-eighth (12.5%) indicated the integrated management of all parties to control situations, playgrounds, and open spaces for Rohingya as the solutions to social anarchy. Lastly, 6.25% of them asked for proper solid waste management in and around the Rohingya camps to solve social anarchy.

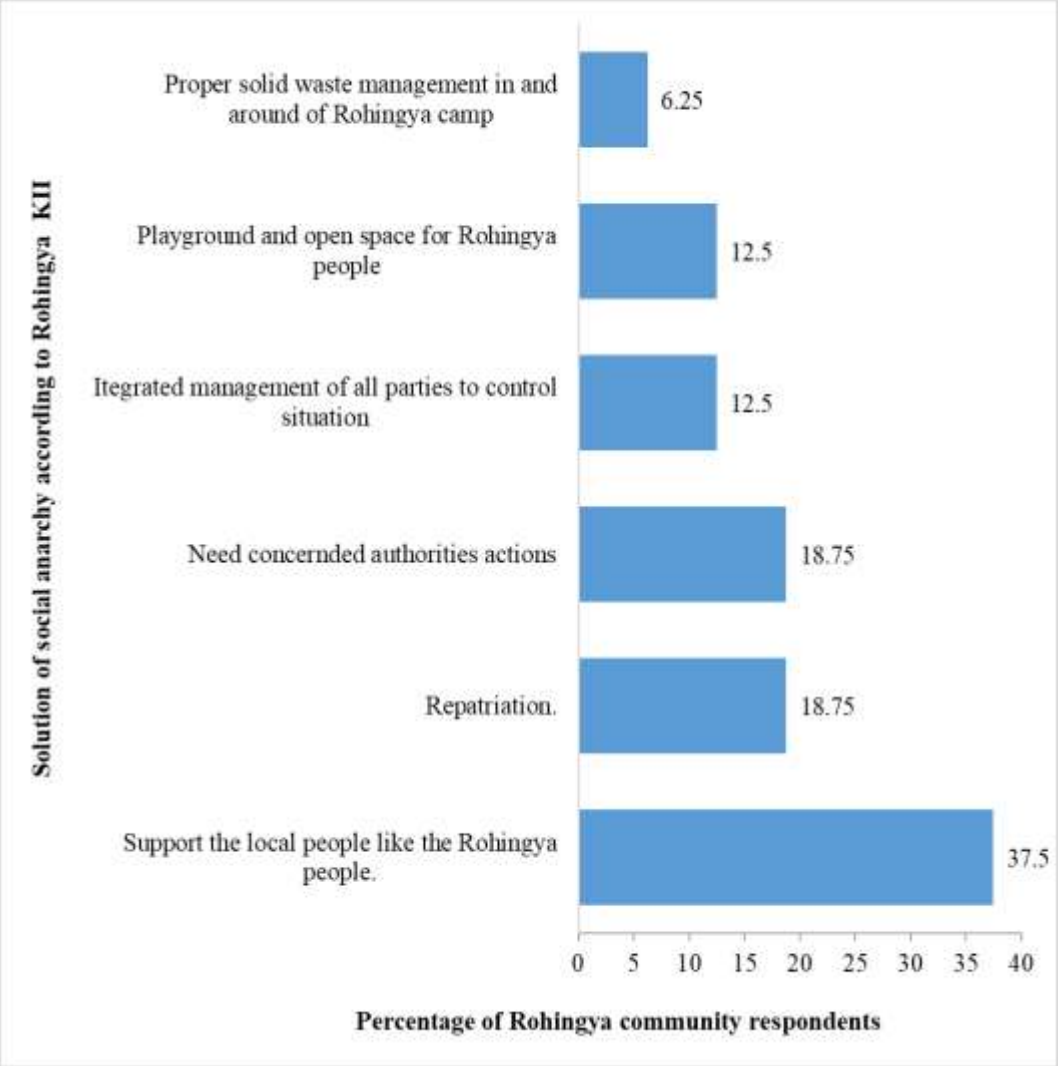


Fig. 7.11: Solutions of social anarchy according to Rohingya KII Informants

7.4.2.3 Major Sectors of social anarchy according to the local community

The communities living in the border area of Cox's Bazar District, where Rohingya camps are situated, face a range of disadvantages compared to communities living in the other parts of the country in different socio-economic and educational aspects. Communities living near the refugee camps depend on agriculture, farming, fishing, natural resources collection, etc., for their livelihood. The sudden refugee influx has created massive pressure on the area's natural resources, leading to a shrinkage in the livelihoods scope for local people, agitations, and social anarchy. In addition, the cultural difference between the locals and refugees exacerbates this social anarchy. Local people identified the major sectors causing social anarchy, which include education, economy, culture, agriculture, etc. This study interviewed 584 local people, including 405 (69.35%) ordinary community people and 179 (30.65%) local Key Informants.

7.4.2.3.1 Causes of social anarchy according to the general host community

Fig. 7.12 indicates the causes of social anarchy according to the general host community respondents. Over one-third of them (35.96%) indicated that increased drug availability due to refugees is causing social anarchy. Islam (2021) also blamed refugee movements that have increased cross-border drug and arms smuggling and insurgent activities. Besides, this study also indicates that host community people think of Rohingya refugees as burdens and troublemakers in their society. Nearly one-third of the general host community (29.56%) indicated that the lack of common spaces for their gathering is a cause of social anarchy. Respectively, 17.24%, 6.9%, and 6.65% of them blamed the involvement of Rohingya in crimes and unethical works such as stealing, robbery, killing, kidnapping, eve-teasing, and the unethical mixing between host and refugee males and females as the causes of social anarchies. Small percentages of respondents, respectively, 5.42% and 5.67%, indicated the need for local people to show NID cards for movement from one place to another place, even sometimes minimum distance movement and the increased pressure on local people in managing government certification, which is responsible for social anarchy in the area. The other factors indicated as a causal element of social anarchy by local community people are joblessness of local people due to the availability of low-cost Rohingya labourers (8.87%), elevated commodity prices caused by increased demand (7.88%), loss of farming scopes (5.17%), local people's loss in social forests (2.96%), increased challenges in agriculture (1.23%), and loss of control over '*Khas*' or BFD land (0.74%). Few other causes of social anarchies have also been indicated by smaller percentages of the local people, as indicated in Fig. 7.12.

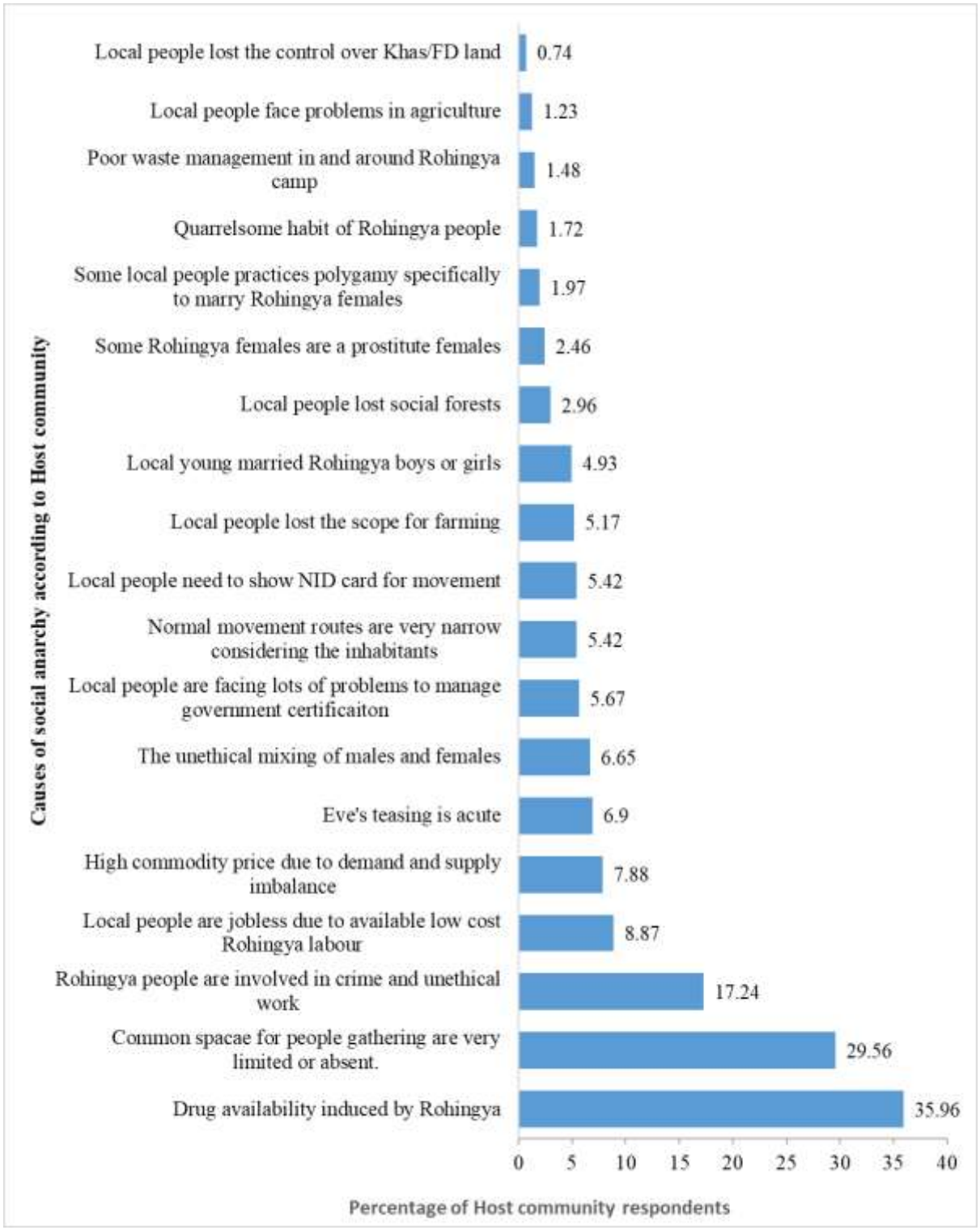


Fig. 7.12: Causes of social anarchy according to the general host community

7.4.2.3.2 Causes of social anarchy according to the host KII Informants

Fig. 7.13 shows the causes of social anarchies, as the host critical informants indicated. More than half of them (52.51%) blamed the involvement of Rohingya in crimes and unethical works as the causes of social anarchies. About 43.02% of them identified local people's joblessness due to the availability of low-cost Rohingya labourers as a causal factor for social anarchy. Respectively, 6.70% and 6.15% of the host KII respondents opined that the problems faced by local community people in agriculture and local people's loss of social forests are the causes of social anarchy. One-fifth of them (19.55%) indicated drug availability due to Rohingya dealers as the cause of social anarchy. Local people's need to show NID cards for movement has been indicated as a cause of anarchy by 16.20% of the host KII respondents.

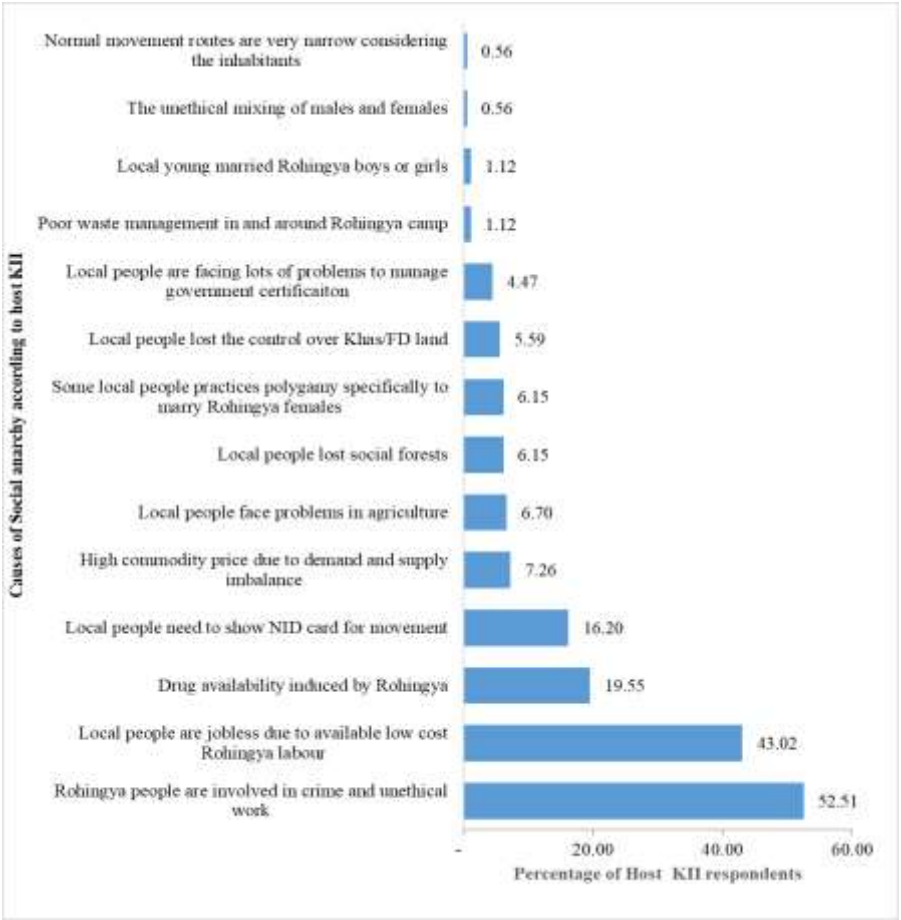


Fig. 7.13: Causes of social anarchy according to the host KII Informants

Other factors behind social anarchy as indicated by host key informants are high commodity prices due to demand and supply imbalance (7.26%), marrying Rohingya girls by polygamous local community people (6.15%), local people loss of social forests (6.15%), local people's loss of control over '*Khas*' or BFD land (5.59%), the marriage of Rohingya boys or girls by local

youths (1.12%), poor waste management in and Rohingya camps (1.12%), unethical mixing of males and females (0.56%), and restricted movement routes for local people (0.56%).

7.4.2.4 Major Solutions of Social Anarchy According to the Local Community

Though many local people initially welcomed Rohingya people on humanitarian and religious grounds, the pressure of the vast Rohingya population has created a deep wound in the local environment, society, and economy. Consequently, local people face various problems leading to profound social anarchy.

7.4.2.4.1 Solutions of social anarchy according to the general host community

Fig. 7.14 represents the proposed solutions to social anarchy by the general host people. Repatriation has been indicated as the solution by the majority (74.88%), and maintaining a solid fence around the Rohingya camps and controlling their movement has been indicated as a solution by only a handful (2.46%). The other solutions proposed included surveillance of law enforcement agencies (45.32%), actions from concerned authorities (36.95%) and making local people aware of drug use, ensuring jobs for local workers (32.76%), polygamy and not mixing with Rohingya (28.33%), and providing AIGA for local poor people (3.45%).

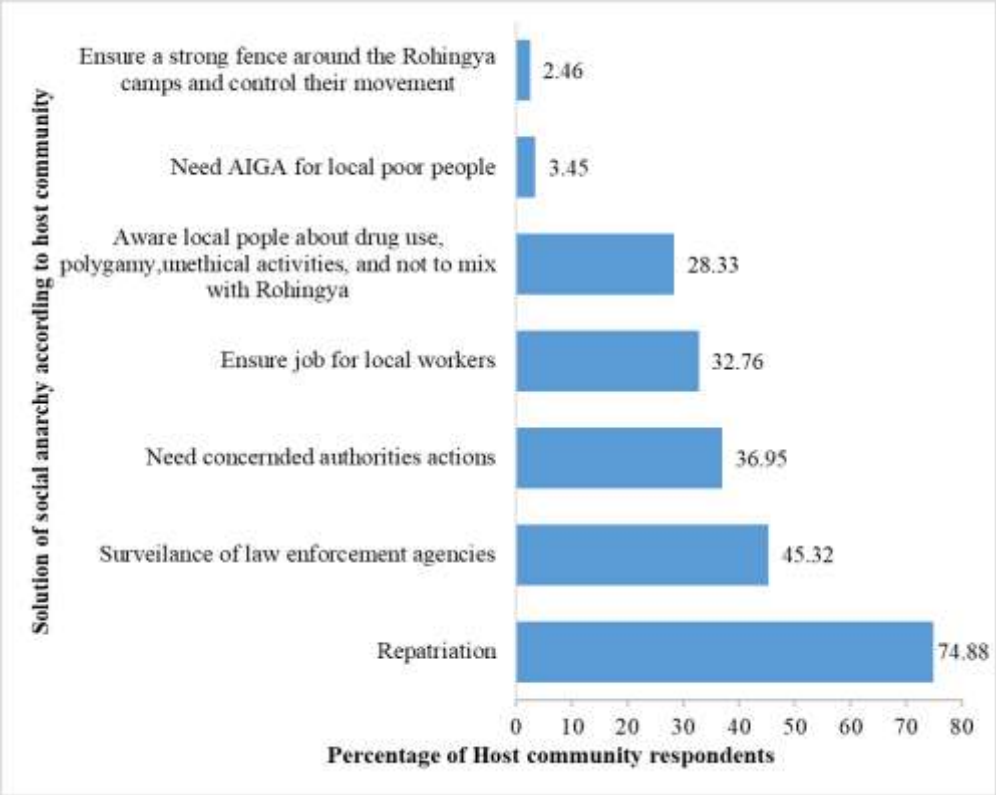


Fig. 7.14: Solutions of social anarchy according to the general host community

7.4.2.4.2 Solutions of social anarchy according to the host KII informants

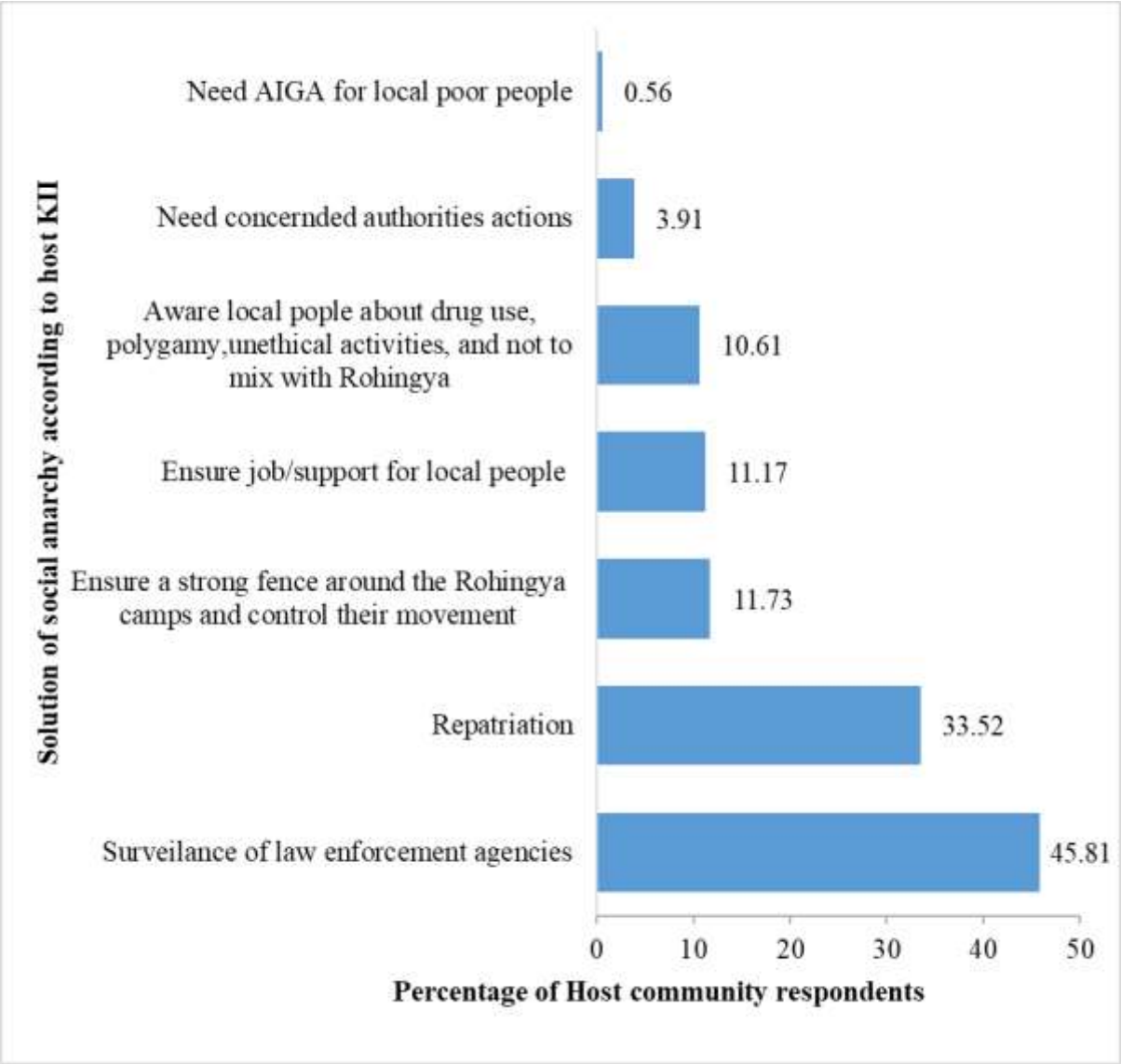


Fig. 7.15: Solutions of social anarchy according to the host KII informants

Fig. 7.15 shows the solution of social anarchy according to host key informants. Most of the host key informants (45.81%) considered surveillance of law enforcement agencies as the solution to social anarchy. Other proposed solutions to social anarchy include repatriation of refugees (33.52%), ensuring a solid fence around the Rohingya camp and controlling their movement (11.73%), ensuring jobs for local people (11.17%), making local people aware of drug use, polygamy, unethical activities and not mixing with Rohingya (10.61%), concerned authorities' actions (3.91%) and AIGA for local poor people (0.56%).

7.4.3 Transmitting disease after the Rohingya influx into the local areas

Health is one of the vital issues for leading a useful life. After the Rohingya influx, several health complications were observed in the host community. Data was collected from 814 hosts and Rohingya families to know their perceptions.

7.4.3.1 People's Perception of transmitting diseases

Fig. 7.16 indicates that a significant portion of the Rohingya community (72.17%) agree that no disease transmission has occurred in the local areas due to the Rohingya influx. On the other hand, a more extensive (55.06%) general host community's opinion is that the Rohingya community has transmitted many diseases to the local community. More than half (58.27%) of the Key Information Interviewers stated that the Rohingya influx is responsible for the disease transmission.

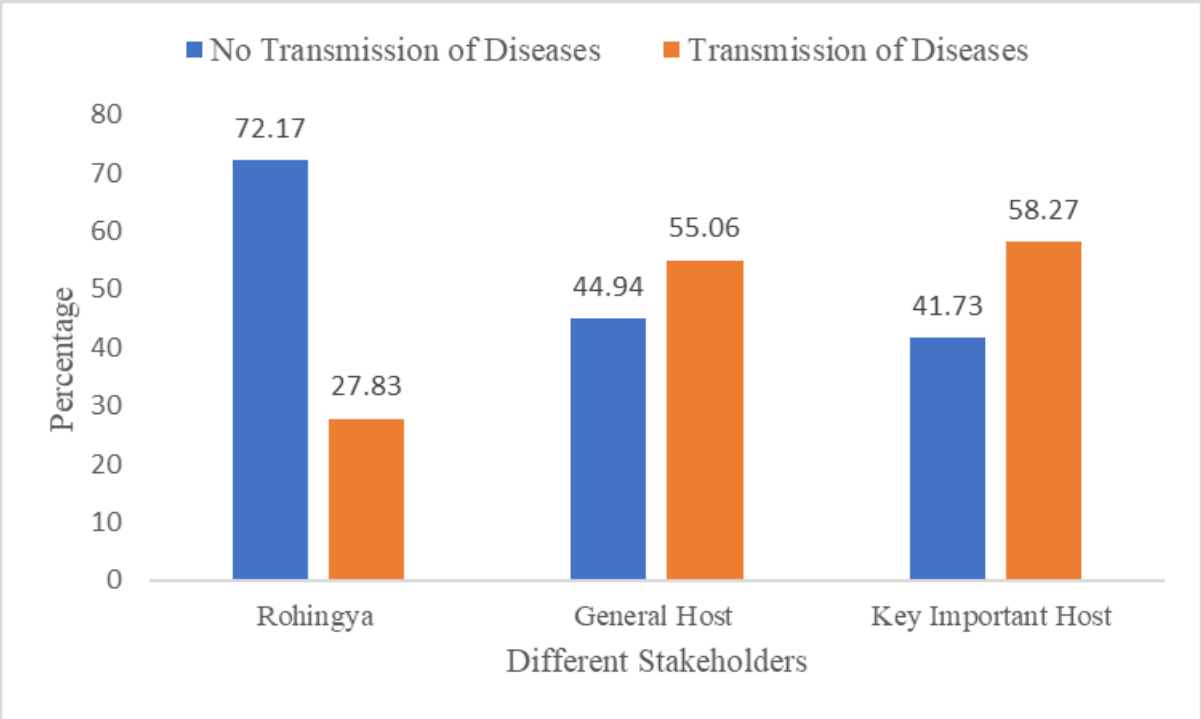


Fig. 7.16: Opinion of the disease transmission by the Rohingya and the host community

7.4.3.2 Diseases Transmitted by the Rohingya and Host Community

Surveys indicate that both communities, i.e., the Rohingya and the host, conclude that Rohingya transmit ten diseases, as shown in Table 7.2. Among those ten diseases, Axima, Skin Diseases and Water-born diseases were observed at 69.3%. However, Locals believe Rohingya people are responsible for different flues, infections, and Hepatitis B and C. The most crucial fact is that the host community faces mental illness in the presence of the Rohingya community. The host community believes that Rohingya do not lead a hygienic and healthy life, and they

live in densely populated areas, so many diseases are transmitted to other Rohingya and the host community.

Table 0.2: Disease transmission by the Rohingya and host community

Agreed by Both Communities	The Rohingya community agreed only	The host community agreed only
Axima	Cough - fever	Allergy
Cholera	HBC	Chicken-pox
Diarrhoea	HCB-DNA	Daud
Diptheria	Ophthalmia	Dengue
Dry Scurvy		Different Flues
HIV (Human Immunodeficiency Virus) / AIDS (Acquired Immunodeficiency Syndrome)		Different Infractions
Jaundice		Hepatitis B
Skin Disease		Hepatitis C
TB (Tuberculosis)		HBS
Other Water-born diseases		HCV
		Mental illness

7.4.3.3 Facts of Transmitting Diseases after Rohingya Influx

Cox's Bazar refugee camps have an average population density of 15 m^2/person. It denotes that Rohingya people are already overcrowded by international standards of 30–45 m^2/person. This also resulted in insufficient space for the mandatory infrastructure, such as water and waste treatment facilities (Akhter et al. 2020). So, a shortage of standard living space is the leading cause of transmitting disease, mainly in the Rohingya community and hosts living in the camp area's encircle.

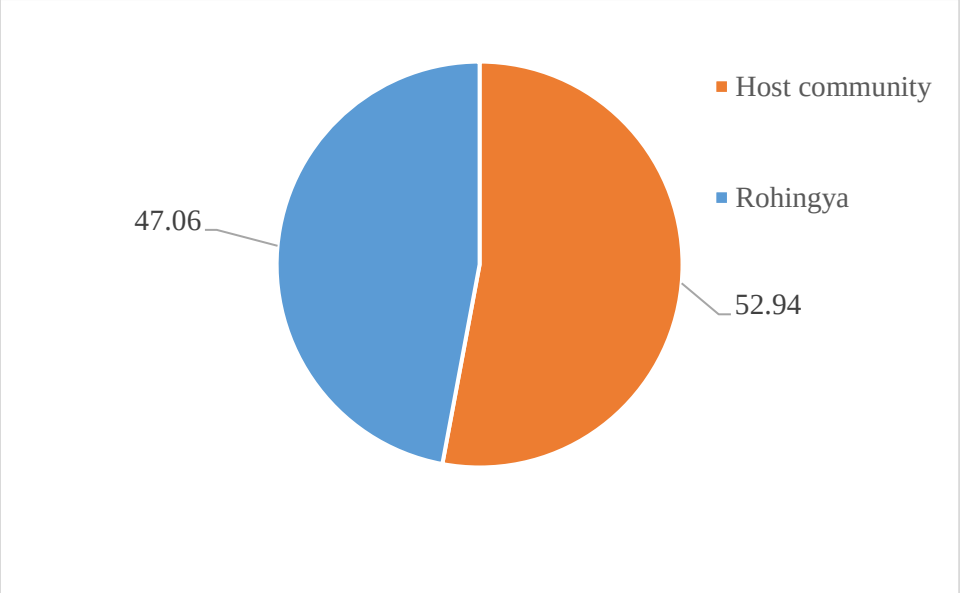
ART (Anti-Retroviral Therapy) Centre and HTC (HIV Testing Centre) Centre, 250 Beds District Sadar Hospital, Cox’s Bazar, reported that they had identified 891 HIV-positive patients, including 772 (86.64%) Rohingyas and 119 (13.36%) locals, from 2015 to August

2022 which is shown in Table 7.3. Moreover, for treatment purposes, currently, it has 1,004 patients, among which the Rohingya are 806 (80.28%) and the locals are 198 (19.72%). Out of 1,004 patients, 372 (37.05%) are adult males, 512 (51%) are females, 55 (5.48%) are male children, 62 (6.18%) are female children, and 3 (0.30%) are the third gender. According to Cox's Bazar health sector, 119 HIV patients died of it, including 63 Rohingya (52.94%) and 56 locals (47.06%), as shown in Fig. 7.17. The HIV infection rate among Rohingya is so high in Cox's Bazar Upazilas Health and Family Planning Officer MR. Ranjan Barua claimed that as they cannot control the mass population of Rohingya refugees, restricting them from mingling with the local population, the risk of HIV transmission is also high.

Table 0.3: Identified HIV-positive patients, including Rohingya and the locals, from 2015 to August 2022

Sl. No.	Year	Identified the number of Rohingya HIV-positive individuals	Identified the number of local HIV-positive individuals	Identified the total number of HIV-positive individuals
1	2015	1	13	14
2	2016	10	10	20
3	2017	150	16	166
4	2018	117	14	131
5	2019	126	19	145
6	2020	110	18	128
7	2021	175	14	189
8	2022 (August)	83	15	98
Total		**772**	**119**	**891**

Source: ART and HTC Centre, 250 Beds District Sadar Hospital, Cox's Bazar on Sep. 06, 2022



Source: ART and HTC Centre, 250 Beds Dist. Sadar Hospital, Cox's Bazar on Sep. 6, 2022

Fig. 7.17: Comparison of Rohingya and host community died due to HIV from 2015 - 2022

Moreover, in Cox's Bazar district, dengue cases are soaring among Rohingya refugees / Forcibly Displaced Myanmar Nationals (FDMNs). Since the beginning of the surge at the end of May, there have been 7,687 confirmed cases and 6 deaths, with 93% (7,178) of the cumulative cases reported (WHO 2022). Among Rohingya refugees, the most common health problems are unexplained fever (227,928), acute respiratory infection (223,651), and diarrhoea (192,560). In November 2017, there was a rapid diphtheria outbreak in the Rohingya camps, and from December 2017 to April 2018, there was a measles outbreak. Being one of the top 30 nations with the most significant TB burden, Myanmar is expected to have a significant prevalence of TB cases among Rohingya refugees. The Early Warning, Alert and Response System (EWARS) monitored 82,382 consultations with children under five between August 25 and November 18, 2017. Of these, respiratory infections (ARIs, Acute respiratory infections) made up almost one-third (32%) and slightly more than one-fourth (27%) of the cases, respectively. This group of kids also had cases of malaria, skin conditions, bruises, eye infections, and severe watery diarrhoea.

The main ways that respiratory droplets and direct contact with lesion exudates are used to convey the highly infectious illness of diphtheria from one person to another. One of the worst prolonged epidemics in recent memory, diphtheria, has been rising in Rohingya refugee camps since late 2017.

Of the 8,179 instances of diphtheria, including 271 (3.31%) confirmed infections, 2,700 (33.01%) probable cases, and 5,208 (67.68%) suspected cases, had been reported through the Early Warning and Response System as of the end of August 2018. Between the start of the pandemic and the end of September 2018, 44 confirmed and suspected diphtheria patients died (case fatality rate: 1%). There have been 183 instances overall, but no facilities in the host community (Rahman and Islam 2019).

As per Table 7.4, several donor-based WASH projects are ongoing to support the Rohingya and the host community in the Ukhiya and Teknaf areas.

Table 0.4: Description/identification of local and international organizations already working/well placed to conduct interventions on WASH in the Ukhiya and Teknaf areas.

Sl. No.	Name of the Donor	Name of the Program	Implementing agency
1	Al- Furkan FOUNDATION	Emergency Hygiene Kits and Healthcare Services for the Rohingya Refugees	Association for Socio-Economic Advancement of Bangladesh (ASEAB)
2	Muslim Charity	Safe Water and Water Sanitation for the Host Community. Area, Ukhiya**.**	NONGOR
3	ACF	Water, Sanitation & Hygiene (WASH) Project. Kutupalong Camp, Ukhiya.	Society For Health Extension and Development (SHED)
4	IOM	WASH project, Kutupalong, Balokhali and Shamlapur, Teknaf, Ukhiya, Cox's Bazar.	
5	A K Foundation, UK	WASH Activities (tubule & Sanitation) Balokhali.	
6	UNICEF	Safe Water Supply and Sanitation, WASH Project, Teknaf	Jalalabad Foundation
7	BPRM, ECHO, SDC, CDC, UNHCR, WFP and IOM	WASH Project, Cox`s Bazar and Teknaf	Solidarities International
8	German RED CROSS	WASH Project, Cox`s Bazar, Teknaf	Bangladesh RED CRESCENT Society

9	UNHCR, UNICEF, Australian AID	Water & Sanitation Program	NGO Forum

7.4.4 Cultural impacts

Both communities' cultures are influenced by each other, mostly negatively. These negative impacts influence local people. Cultural mixing results in changing trends of dress sense, behaviour patterns with seniors, aggressive behaviour, and a mixing of both communities' languages. With the influence of the Rohingya community nowadays, the host community does more early marriage, polygamy and so on. Cultural change is happening slowly in both communities.

7.4.4.1 Cultural Impacts on the Rohingya Community

Almost 54.78% of the Rohingya people believe that cultural adulteration happened due to co-existence, which is plotted in Fig. 7.18. According to the Rohingya people, currently, a similar dress sense in both communities, a mixing of words in both languages, increased '*Hijjab*' use among Rohingya women instead of '*Borkha*', Knowing Bangla by NGO workers among the Rohingya, and eating '*Dal*' as a common meal is the evidence of cultural adulteration. Rohingya men and children are accustomed to wearing pants instead of 'Lungi' after their migration. The Rohingya male wore a shirt tucked in a 'Lungi' earlier.

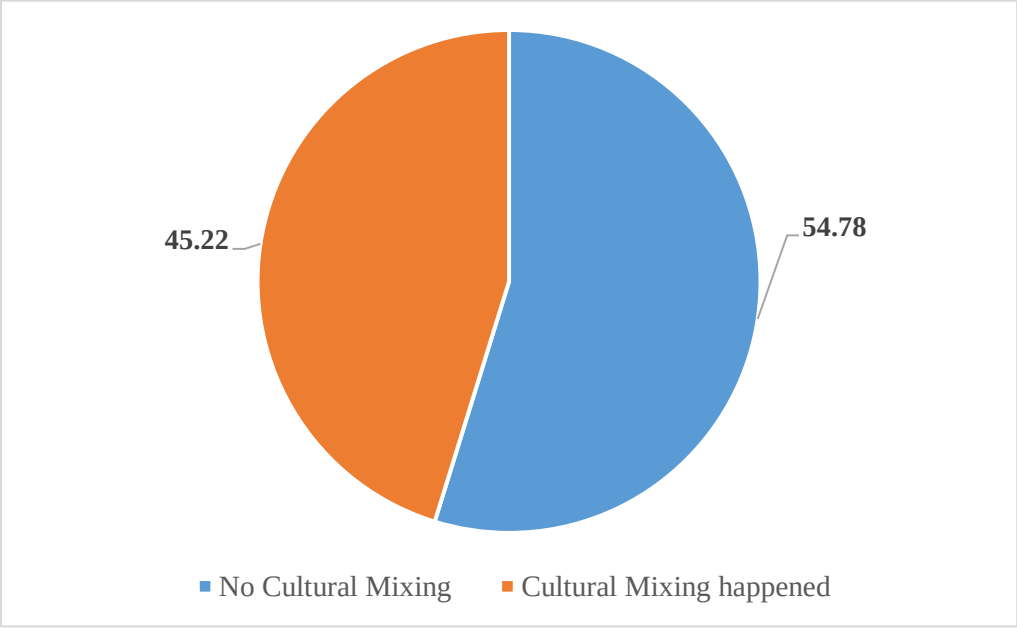


Fig. 7.18: Rohingya's perception of their cultural adulteration after the influx

7.4.4.2 Cultural Impacts on the Host People

Fig. 7.19 shows that about 62.5% of the host community believes cultural adulteration is occurring due to the Rohingya influx in 2017, especially in dress up, language, etc. Respondents from the host community said that some children from the Rohingya learn abusive words (‘Gali’). The young teenage boys and girls from that area are getting aggressive and do not respect the seniors. The tendency toward polygamy and child marriage has increased in the host community. The rate of divorce among the host community is also increasing. Some people think those boys who attend camp are becoming dissolute or characterless. Marge of language and customs of both communities is a common phenomenon. This is all the evidence of cultural adulteration in the host community’s culture. Currently, locals are wearing ‘Romor Shoe’ by following the Rohingya. Besides, the Rohingya have gotten used to eating ‘*Dal*’ (pulses) like the locals.

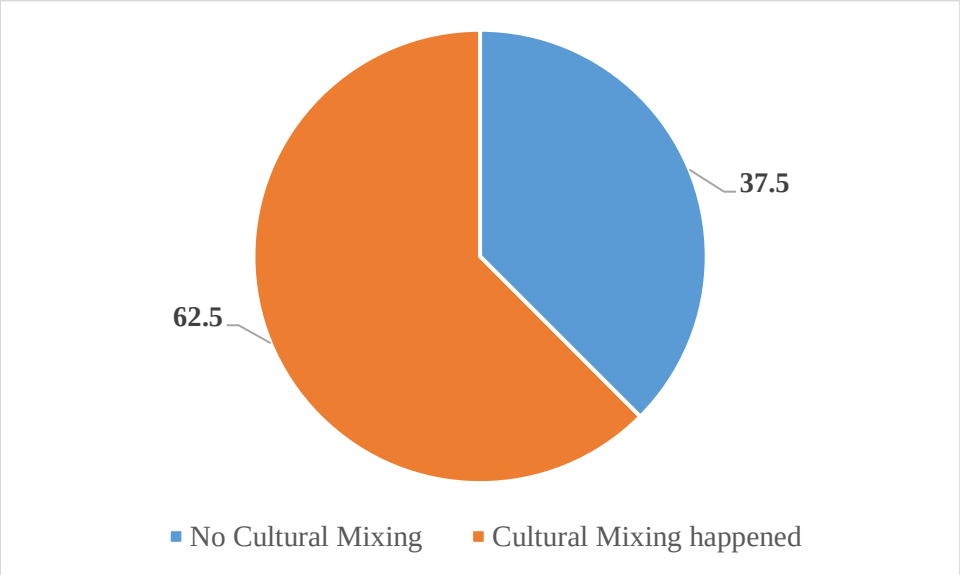


Fig. 7.19: The host community's perception of their cultural adulteration after the influx

Local has adopted some Rohingya language, mainly words: 'Mitu Kara' means 'Photocopy', 'Akkayansa' means 'Application', 'Long Kara' means 'Laminating', 'Lobbi' means 'Yes' / 'Yes Present', and so on. Locals have learnt some abusive words from Rohingya as …. (should not write).

7.4.5 Child Labour and the Income of Child Labour

Approximately 814 people, including Rohingya people, Rohingya Key Informant personnel, host community people, host community Key Informant personnel, including Bangladesh Forest Department (BFD) personnel, law enforcement agencies personnel, NGO / INGO workers in Cox’s Bazar participated in this survey. Among 230 Rohingya respondents, 60.9%

confirmed the involvement of their or their neighbours' boys and girls in different workforces. Besides, out of 584 host community respondents, 68.3% ensured the involvement of Rohingya children in their households or their neighbours' households and different employment sectors, as shown in Fig. 7.20.

Out of 230 Rohingya respondents, 207 general Rohingya people and 23 Rohingya key personnel participated in this survey. Moreover, among 584 host community people, 405 general people and 179 Key personnel, including CMO and CBO members, UP members, UP chairpersons, Upazila level government officials, college teachers, NGO / INGO representatives, CiC, medical officers, BFD and law enforcement agencies representatives, etc. Four personnel from law enforcement agencies, 14 from NGO / INGOs, government line agencies and 22 from BFD participated in this survey.

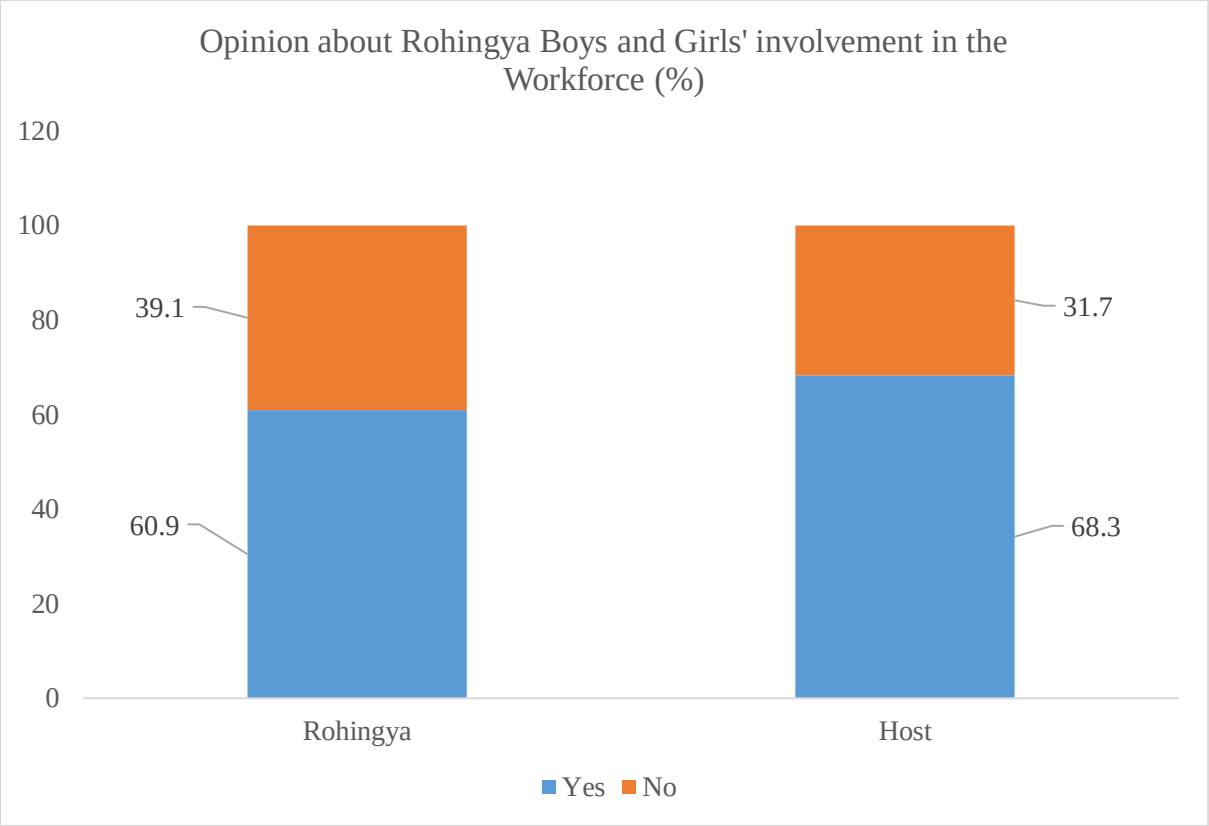


Fig. 7.20: Respondents' opinion about Rohingya Boys and Girls' involvement in the Workforce

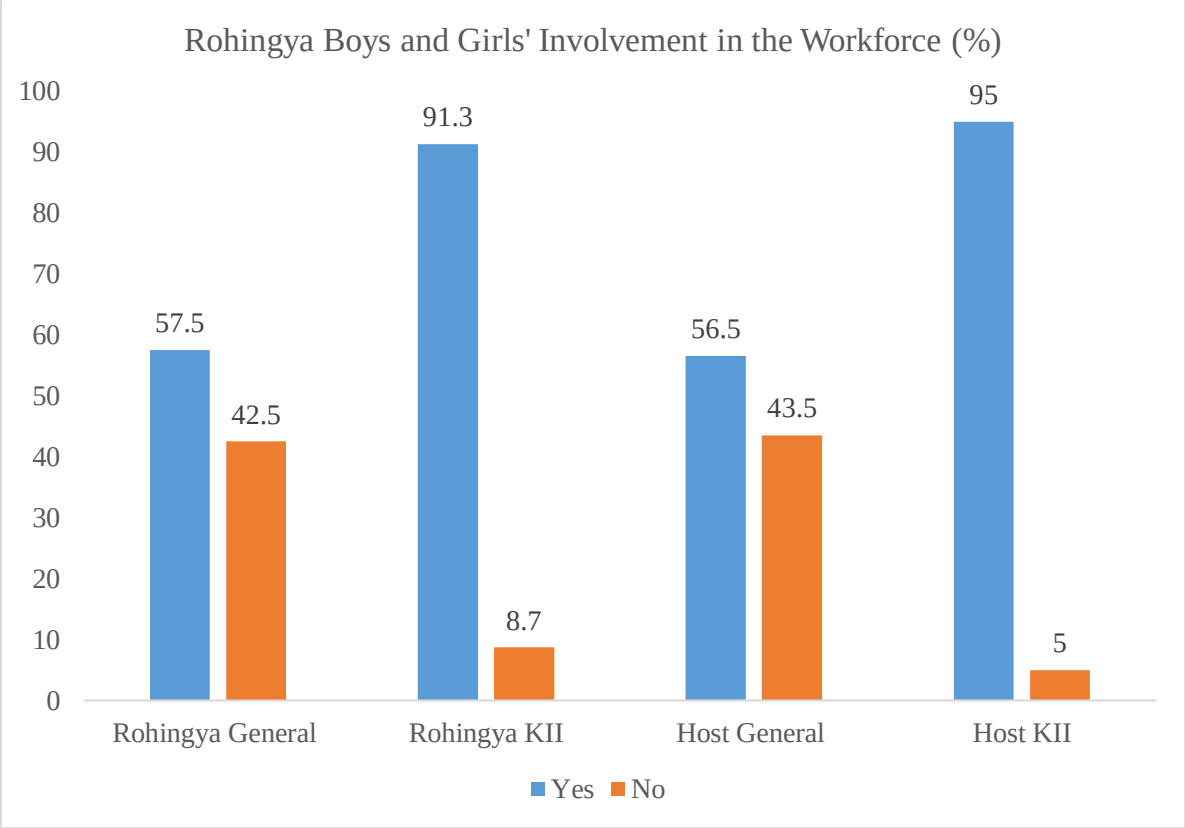


Fig. 7.21: Respondents segregated opinions about Rohingya Boys and Girls' Involvement in the Workforce

Among Rohingya respondents, 57.5% reported that their children were in the workforce. Besides, 91.3% of key informants from the Rohingya respondents shared that Rohingya children engaged in the workforce which is shown in Fig. 7.21. Fig. 7.21 also indicates that among the host community, 56.5% of the respondents were general people and 95% among key informants were assured about the engagement of Rohingya boys and girls in the workforce.

Fig. 7.22 plotted about 86.4% of the respondents from the BFD, and 75% of the law enforcement agencies quoted that Rohingya children are involved in different workforces. However, 100% of respondents among NGO / INGOs, government line agencies and other sector personnel reported the engagement of Rohingya children in household work. Besides, 100% of respondents in this survey reported that all the boys and girls are above 10 years of age. Based on the results of this survey, none of the Rohingya boys or girls was younger than 10 years old.

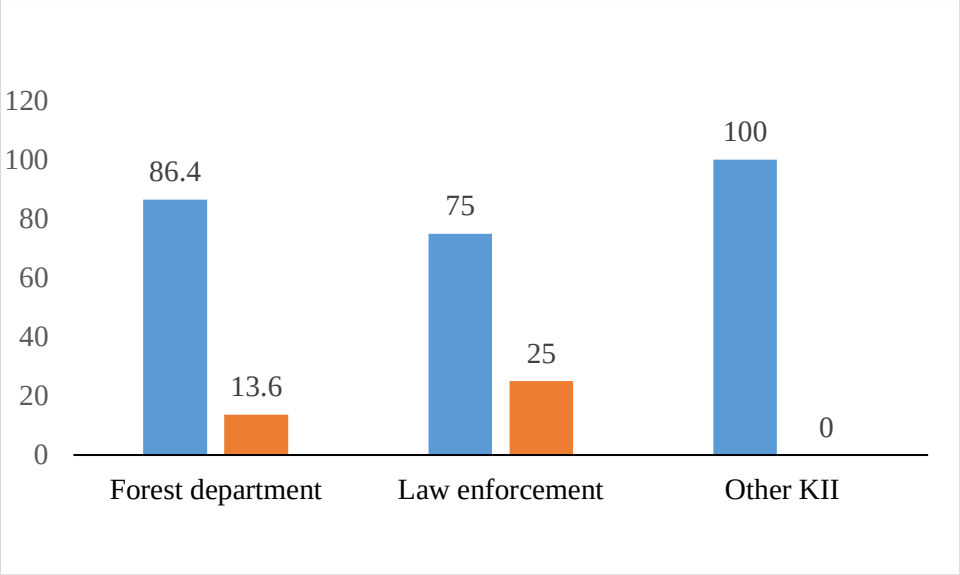


Fig. 7.22: Host KII response about Rohingya Boys and Girls involved in the workforce

According to all the respondents, the average income of boys is BDT 2,252 (US$ 26.50; 1 US$ = BDT 85) compared to the average income of girls BDT 2,119 (US$ 24.93). The highest income of Rohingya boys and girls is BDT 8,000 (US$ 94.12), in contrast to the minimum earning of BDT 1,000. However, some Rohingya boys and girls work without pay and only receive food and residence support from their employers or hosts.

According to Rohingya respondents, the average income of boys is BDT 3,310 (US$ 38.95); on the contrary, the average income of girls is BDT 2,714 (US$ 31.93). Based on Rohingya key personnel including *Head-Majhi*, *Sub-Majhi*, *Block-Majhi*, camp secretary, Burmese language teacher, and community leaders' responses, the average monthly income of boys is BDT 3,284 (US$ 38.64) as opposed to the girls' average monthly income of BDT 1,800 (US$ 21.18).

Based on law enforcement agency personnel, the average income of Rohingya boys and girls is BDT 2,667 (US$ 31.38). Moreover, respondents among NGO / INGOs, government line agencies personnel, etc., reported that the average income is BDT 3,333 (US$ 39.22); in contrast, the average monthly income of girls is BDT 2,500 (US$ 29.42). However, most respondents quoted that the average monthly income of Rohingya boys and girls is lower than the average monthly income of the locals in their respective areas. Alongside, Rohingya girls earn less than Rohingya boys, indicating the prevalence of gender disparity in this area.

Rohingya boys receive a monthly remuneration ranging from BDT 1,000 to BDT 8,000. They mainly work in local shops such as grocery, carpenter, tailoring, tea stalls, hotels, restaurants, and agricultural farms, including poultry, dairy, fishery, and duck farms. Besides, they also

work in a saloon, motor / car garages, car painting garages, fishing boats, storehouses, rod-cement shops, welding shops, bakeries, salt beds, construction sites, etc. Their principal role in these jobs is usually very primary level such as assistant of an electrician, helper of a mason, helper in a furniture shop, assistant of a carpenter, helper of a tube-well installer, helper of a battery operated tomtom (three-wheelers), assistant in salt beds, helper of a sanitary mason, salesman of a shop, day-labourer in the tourism sector, guard of a shop or market and so on. They also work in Domdomia Ghat / Saint Martin Jetty, BGB Check Post, and Teknaf as a tourist helper, etc.

Most girls engage in any work at the homestead level, such as cooking, baby caring, cloth washing, etc. Their salary is comparatively lower than the Rohingya boys in this survey. Moreover, because of the low average pay scale of Rohingya boys and girls, many local people enrol Rohingya boys and girls instead of enrolling local people. Therefore, local low- and middle-income people, including day labourers, shop assistants, etc., have lost their job scopes. Consequently, the living standard of most local people has fallen in the last few years.

7.4.6 Tendency to stay in Bangladesh through marriage to a local by a Rohingya

Fig. 7.23 indicates that a significant portion (88.97%) of the host community believes that Rohingya people want to marry local people to get a solid shelter in this country, which is the fundamental reason. On the other hand, 26.52% of Rohingya believe the host community wants to marry them. According to their opinions, the host community wants to marry them (Rohingya) because of the relief they get from the Government of Bangladesh, different NGOs and INGOs, or donor agencies.

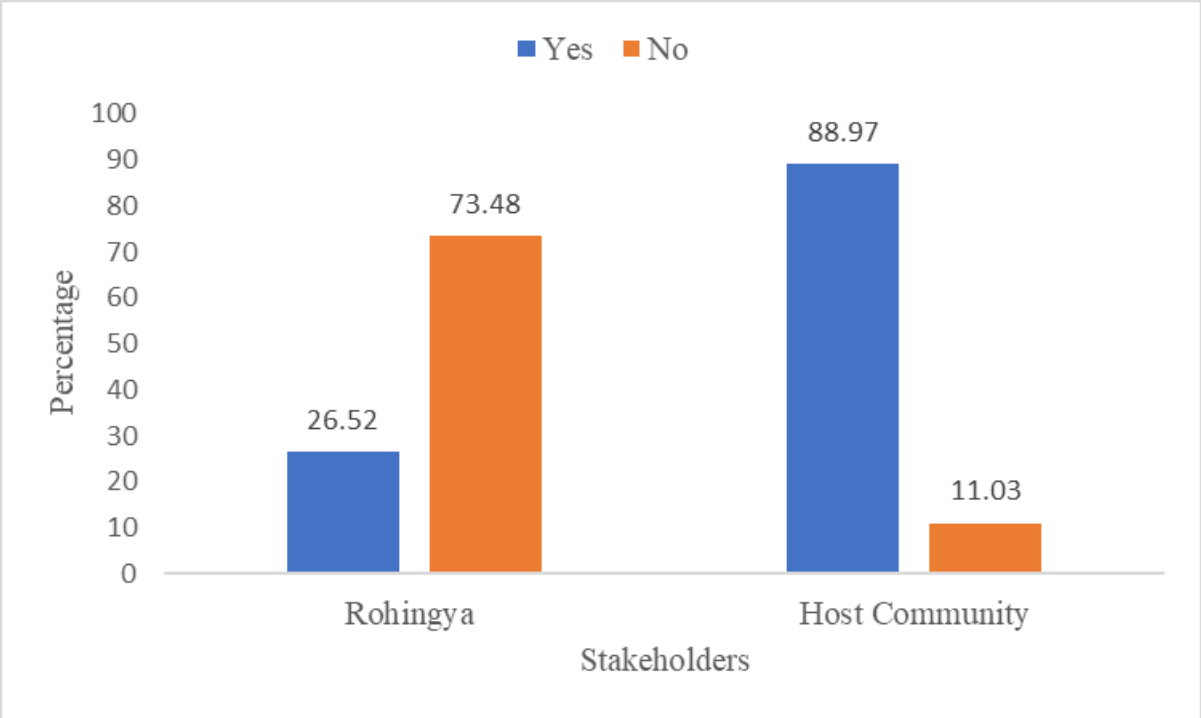


Fig. 7.23: Tendency to stay in Bangladesh through marriage

7.4.7 Roles of NGOs on the Rohingya Issues

Since September 2018, to meet refugees' basic needs and mitigate climate change, UNHCR and IOM have distributed LPG as cooking fuel. IOM has distributed LPG in 17 camps, and UNHCR has distributed it in the rest of the camps (UNHCR 2022a).

IOM assists in delivering alternative cooking fuels to more than 96,000 households each month, contributing to food security and reducing environmental impact. The IOM's Bamboo Treatment Facility has processed over 700,000 bamboo poles, the largest of its kind. Bamboo is the most commonly used material in the camps. The treatment of bamboo poles reduces pest damage and extends the bamboo's lifespan while minimizing forest pressure and maximizing cost-effectiveness (IOM 2022).

Through 21 operational e-voucher outlets, the WFP provided food assistance to 8,92,000 Rohingya refugees. 196,000 people received US$ 3 more to increase the diversity of their diets through Fresh Food Corners (FFCs). Approximately 40 food items were available to refugees. Twelve Bangladeshi retailers contracted by the WFP sold food worth US$ 11.8 million (WFP 2022).

There is a food package for the Rohingya people from WFP. The package per person is US$ 11.00 from January to September 2022, US$ 12.00 from October 2022 to February 2023, US$

10.00 from March 2023, which was decided by a process meeting between the RRRC Office and WFP. The dollar rate varies from time to time, but the amount supported remains the same. By that amount, a person can take 26 items from the outlet. However, the person is bound to buy 13 kg of rice monthly.

The Head of the household used to get the amount through his/her card (which is like a credit/debit card). As per the number of household members, the monthly cash for food distributed to the Heads of the Rohingya households is listed below in Table 7.5. After receiving the amount, the person goes to the selective outlet where his/her name is listed.

Table 0.5: Basket breakdown- September 2022

Basket Breakdown- September 2022		
US$ Exchange Rate: 1$ = 94.936 BDT		
Per individual allocation in US$	13	US$
Voucher Values in BDT	1,234.17	BDT
Rice Capping Quantity Max	13 KGs	
Agreed rice price per KG	51.5	BDT
Rice Capping Value Max (with rice) BDT	669.50	BDT
Flexible basket value (without rice) BDT	564.67	BDT
FFC Voucher per head 3 US$ = BDT	284.81	BDT

Source: WFP Basket breakdown chart September 2022

Fresh Food Corner (FFC) Voucher Eligibility Criteria

1. Elderly-headed household HHs aged 60 and above
2. Child headed 1-17 years
3. HH with disabled people
4. Women headed (18-59 Yrs), without abled Male member

After going to the outlet, the person produces the list of products with the help of Outlet Personnel and prepares the bill. After getting the bill, the same person goes to the POS (Point of Sale) Terminal, where the person pays the bill from the card and receives vouchers/coupons for purchasing items. Then, the person goes to the respective shop and takes the product(s) by paying for the vouchers. Every day, there remained these types of fresh food items. Sometimes, one or two items become not available. Nevertheless, the WFP Bazar Monitoring Team determines the price of these items for one week. However, the prices are determined for one month for fixed food items.

Out of regular food supply (Table 7.6), festival-wise additional food and clothing supplies to the camp-wise Rohingya families (Tables 7.7, 7.8 and 7.9).

Table 0.6: Daily FCC Stock List for Fresh Food Corner

NAME of ITEMs		
Ash gourd	Bean long	Broiler chicken
Gourd bitter	Gourd ribbed	Gourd ridge
Green chillies	Green papaya	Lemon
Lentil pylon	Live fish koi	Okra
Potato	Pumpkin	Sonali chicken
Taro small	Tassel gourd	Telapia live fish
Cucumber	Yard long	Tomato
Banana	Teasel gourd	Taro
Cowpea	Brinjal	Brinjal

Source: Local store food list for FFC in Rohingya camp, September 2022

Table 0.7: Name of Fixed Food Items for Grocery

Name of Fixed Food Item		
Sugar	Rice	Salt
Red Chilli	Turmeric root	Garlic
Red lentil	Soybean oil	Egg
Lemon		

Source: Local store fixed food list for FFC in Rohingya camp, September 2022

Table 0.8: Name of Flexible food items

Wheat flour	Mug Bean	Potato
Pumpkin	Dry fish	Onion
Brinjal	Chickpea	Lachcha Semai
Shemai	Bean	Malta
Apple	Ginger	Turmeric powder
Dry chilli powder	Dry chillies	Turmeric powder
Mustard oil	Puffed rice	Flattened rice

Source: Local store flexible food list for FFC in Rohingya camp, September 2022

Out of regular food, additional food and clothing supplies to the Rohingya families of Camp 8E during April 2022 (‘Ramadan’). Moreover, similar types of support to the Rohingya camps in other festivals.

Table 0.9: Camp 8E's Rohingya people received additional support from different agencies or organizations during 'Ramadan' in 2021

Date	Name of the organization	Number of families who received a food package
April 3, 2022	SADAKA TAGI	400 families received a food package
April 10, 2022	AL-IHASAN	110 families received a food package
April 12, 2022	RPN	150 families received a food package
April 13, 2022	HRF	50 families received a food package
April 17, 2022	RPN	130 families received a food package
April 20, 2022	Human Appeal Australia	1100 families received a food package
April 20, 2022	Human Appeal Australia	400 families received a cloth package
April 21, 2022	Muslim Hands	300 families received a food package
April 25, 2022	Moonlight	100 families received a food package
April 27, 2022	Pulse Bangladesh	300 families received a food package
April 28, 2022	Shafollomoy	300 families received a food package

Source: CiC Office, Camp 8E, May 2022

Besides regular food support from WFP, some other INGOs and NGOs support Rohingya people at camps on different issues, such as education, health, WASH, nutrition, child protection, shelter and non-food items (NFI), food security and livelihoods, disaster management, etc. With permission of the RRRC Office, 258 UN organizations, INGOs, NGOs, and other organizations are working on the Rohingya issue at Ukhiya and Teknaf of Cox's Bazar District. Out of that, 162 INGOs, NGOs, UN organizations / agencies, and other organizations / agencies are working on Rohingya issues at Ukhiya Upazila and 46 INGOs, NGOs, UN Organizations and other organizations are working on Rohingya issues at Teknaf Upazila in Table 7.10.

Table 0.10: Summary of working UN organizations / agencies, NGOs, INGOs and other organisations / agencies in Ukhiya and Teknaf, Cox's Bazar

Total No. of UN organizations / agencies, INGOs, NGOs, and other organizations / agencies received approval from RRRC Office	258*
UN organizations / agencies	7
INGOs	62
NGOs	188
GoB	1
UN organizations / agencies, INGOs and NGOs, and other organizations / agencies working in Ukhiya	162
UN Organizations / agencies, INGOs and NGOs, and other organizations / agencies working in Teknaf	46

Source: RRRC Office, UNO Office Ukhiya, and UNO Office Teknaf

* 50 INGOs and NGOs are working at RRRC (Refugee Relief and Repatriation Commission) Office-level

7.4.8 Women's market: A unique initiative to support Rohingya women

BRAC is the global leader in creating opportunities for the world's poor. In the current humanitarian crisis in Cox's Bazar, BRAC has a comprehensive multi-sectoral approach, with interventions in the areas of Ultra Poor Graduation, Skills development, CBI, Health, Nutrition, Shelter, WASH, Protection, Education, Site Management, communication with communities, through which it is capable of meeting the needs of the Rohingya and holistically host population.

BRAC has successfully implemented a women empowerment project with UN Women. The Project has initiated a community protection mechanism to address SGBV by establishing Women Leadership Groups and Adolescent Girl Groups in the catchment areas of MPWCs. BRAC has managed and runs the 2 Multi-purpose Women Centers (MPWCs) and one Women's Market with required human resources under this project, where 3,400 Rohingya women and girls from the refugee camps are receiving skill development training, primary health support, and soft skill training. As a result, they increase their knowledge of domestic violence, trafficking, civil rights (especially women's rights), nutrition, health and sanitation, trafficking, child marriage, sexual and reproductive health information and protection from sexual exploitation and abuse (PSEA), basic literacy to women empowerment.

Background / Context: Congested and overpopulated, the camp's economy has been growing, with daily and other necessities readily available in the makeshift shops, at the road-side or in specific market areas. However, these markets are primarily frequented by men. Women and girls who face mobility restrictions due to cultural norms normally do not access these markets, where shop vendors are also male. This is a specific problem for women who head their households (16% are women-headed households) or women whose non-disabled members are sick. Recent research found that markets are one of the top three areas where females feel unsafe and are not accessed by married and unmarried women unless accompanied by a husband or a male sibling. Therefore, UN Women, during its consultation with women in the Rohingya community, concluded that dedicated market space for women is necessary.

As such, under the leadership of RRRC and CIC Camps 3 and 5, UN Women and BRAC set up a Women's Market. The market is only accessible to women and children below 10 years of age, and it will be a safe, gender-responsive marketplace for women and girls. For social cohesion, women from the Host community are also welcome to keep shop or do shopping in this market.

The Women's Market is designed as inclusive, friendly and accessible facilities such as a breast-feeding corner, kid's zone, waiting for space, one Bathroom, and four toilets (One is for disabled people, one for guests), which are available to cater for special needs of women and PWD. Women can run shops while caring for their children at the same time.

Objectives of the market are to provide a safe, inclusive and accessible gender-responsive marketplace and on-site services; to increase self-reliance and broader economic opportunities for host communities' women and Rohingyas women and thereby contribute to promoting gender equality and women's empowerment, etc.

At a Glance Women's Market Activities: BRAC has managed and runs a Women's Market in Camp 5, Ukhiya, Cox's Bazar, where Rohingya women can easily access and conduct their trade safely under this project. The market started on January 18, 2021. A good relationship with the respective CiC, Site Management, RRRC, and the community will help the project manage the market efficiently. The project has identified training needs for Rohingya women and adolescent girls and designed the training module on financial and numerical literacy, household budgeting, savings, book-keeping, inventory management, business planning, empowerment and leadership, entrepreneurship skills and other soft skills. More than 3,647 women have received various trade-related training. Considering the project design, the

training sessions have been conducted following an interactive classroom-based hands-on approach, and each class is 2 hours, held six times a month for a total of 3 months. Learners/participants per batch are limited to 17 women. During the project period, 50 women will be trained in entrepreneurship according to the plan and are expected to be among 24 women's shops, where two women will run each shop. These shops have been assigned to specific women. There have also been 2 women shopkeepers using 5 shop spaces in rotation. This ensures that the 50 women trained have been able to continue women's market activities by the end of the project.

Existing status: Women's Market has been established to create a platform for the beneficiaries to enhance economic resiliency. The project has so far engaged more than 30 women supported by different organizations, including UNDP, BRAC, SBSKS, ActionAid Bangladesh (AAB), UNITED PURPOSE, HELVETAS, GUK-UNFPR, FAO (Shushilan), PRANTIC, WFP, FAO, MOKTI COX'S BAZAR, RELIEF, RWEAN and NGO FORUM.

In summary, snacks and tailor shops have been the most popular, with 55% of gross income, followed by beauty parlours and handicrafts. Vegetable selling brings a small revenue of 1.7%. Clothes selling brought 15% of the total (gross) income to women sellers.

There are 27 shops for different products like Tailoring, Handicraft, Stationery, Beauty parlour, Dry food, Super shop/ Grocery, Tea stall, Display corner, Cosmetics, Fresh vegetables, Meat and open space as floating trade/shop, etc. Among these, 24 permanent shops are active by women from the Rohingya community (14) and the Host community (10). Four floating shops are open to women who want to display or sell their products. Out of 27, three shops have provided primary health support, GBV awareness/psychological support, and a breast-feeding corner. In addition, the market has managed one training Center room. Women shopkeepers are given capacity development training in small business management, market linkages, and customer care. The number of women engaged in different shops is growing.

So, we need to increase the number of these types of women's markets in the area for the betterment of women and society.

7.4.9 Roles of NGOs on local issues

Generally, the host community people are getting minimal support in contrast to Rohingya community people, even not regularly, as some families received rice (some families received a certain amount of rice for a certain period), pulse, biscuits, energy biscuits, etc. Besides, some

families received ‘Iftar’ and new dress support during ‘Ramadan’. However, few families received mats (Triple), buckets, umbrellas, house construction support, and so on.

In the WASH support category, some families received soap, water filters, COVID-19 hygiene kits, tubewell, washroom and bathroom construction support, and so on. Moreover, few families received livelihood or AIGA support, including poultry and cattle rearing with feed, dairy (cow and goat) with feed, etc.

Based on a selective basis, an NGO provided BDT 1,050 (US$ 12.35) per head as livelihood support. It was also found that some families received BDT 2,500 (US$ 29.41) as livelihood support.

In some areas, NGOs / INGOs constructed or repaired roads, small bridges, culverts, mosques, school buildings, drainage systems, and so on. A few families received gas stoves and cylinder support as alternative fuel support. If one family had 3 members, they got 1 LPG in 1.5 months; if more than 7 members, they got 1 LPG in 1 month. The cylinder support didn’t prolong after December 2021.

Among those affected by the Rohingya influx in 2017, 14.57% of them (59 of 405 locals, many of whom live within the camp area) said they did not receive any support from INGOs or NGOs.

Generally, the locals are getting minimal support in comparison with the Rohingya. Recently, as per UN instruction, Rohingya are getting 70% support, and locals are getting 30% support from any project, but locals are not getting proper and regular support for their portion. Foreign Donation (Voluntary Activities) Regulation Ordinance, 1978 (Law Number 43 of 2016) violates any project's 20% administrative costs.

A list of INGOs and NGOs has been prepared and presented in Table 7.11 based on field visits during the study period, which have been provided to local people on livelihood issues of the affected people of Ukhiya and Teknaf after the Rohingya influx of 2017.

Table 0.11: Description / identification of local and international organizations already working / well placed to conduct livelihood interventions in the Cox's Bazar area.

Sl. No.	Name of the Donor	Name of the Program	Implementing agency
1	Al- Furkan FOUNDATION	Emergency Hygiene Kits and Healthcare Services for the Rohingya Refugees	Association for Socio-Economic Advancement of Bangladesh (ASEAB)
2	Muslim Charity	Safe Water and Water Sanitation for the Host Community. Area, Ukhiya**.**	NONGOR
3	ACF	Water, Sanitation & Hygiene (WASH) Project. Kutupalong Camp, Ukhiya.	Society For Health Extension and Development (SHED)
4	IOM	WASH project, Kutupalong, Balokhali and Shamlapur, Teknaf, Ukhiya, Cox's Bazar.	
5	A K Foundation, UK	WASH Activities (tubule & Sanitation) Balokhali.	
6	UNICEF	Safe Water Supply and Sanitation, WASH Project, Teknaf	Jalalabad Foundation
7	BPRM, ECHO, SDC, CDC, UNHCR, WFP and IOM	WASH Project, Cox`s Bazar and Teknaf	Solidarity International
8	German RED CROSS	WASH Project, Cox`s Bazar, Teknaf	Bangladesh RED CRESCENT Society
9	UNHCR, UNICEF, Australian AID	Water & Sanitation Program	NGO Forum
10	GIZ	Livelihood (Agriculture, Poultry, Small Business, etc	Sushilan
11	WFP, Plan Int.	Livelihood (Agriculture, Poultry, Small Business, etc	FIVDB
12	WFP	Market linkage & Fresh food Corner	ECCO Cooperation
13	WFP	Market linkage, Agriculture, Poultry, Small Business	BRAC
14	World Vision	Livelihood (Agriculture, Poultry, Small Business, Small Grants, etc	RIC

15	World Vision	Livelihood (Agriculture, Poultry, Small Business, Small Grants etc.) Project	SHED
16	USAID	Livelihood (Agriculture, Poultry, Small Business, Small Grants, etc.) Project	NACOM
17	Red Crescent Society	Cash Payment for Small Grants	ECOSEC
18	IOM	Livelihood Support under Social Cohesion	United Purpose
19	RELIEF Int.	Cash for Work	RELIEF Int.
20	USAID	Livelihood (Agriculture, Poultry, Small Business, Small Grants, etc.) Project	Arannayk Foundation
21	DANIDA	Livelihood (Agriculture, Poultry, Small Business, Small Grants, etc.) Project	DCA (Dan Church Aid)
22	ECHO, DFID	Livelihood (Agriculture, Poultry, Small Business, Small Grants etc.	Solidarities Int.
23	PKSF and IFAD	Promoting Agricultural Commercialization and Enterprise (PACE) project in Cox's Bazar Sadar, Moheshkhali, e.g., Pesticide Free Dry Fish Production and Marketing	COAST Trust (Coastal Association for Social Transformation Trust)
24	STROMME Foundation, Norway	Socio-Economic Empowerment with Dignity and Sustainability (SEEDS) program in Sadar, Ramu and Pekua Upazila, Cox's Bazar	COAST Trust (Coastal Association for Social Transformation Trust)
25	Arronnayak Foundation	Forest Communities Livelihood Strengthening Project (FCLSP), Cox's Bazar	YPSA (Young Power in Social Action)
26	WFP	Self-Reliance Project	CODEC
27	JICA	Livelihood Improvement for Enhancing Resilience in Host Communities in Cox's Bazar (LIFE)	CNRS

7.4.10 Impact on education

The education sector of Cox's Bazar District has been severely affected by the Rohingya influx of 2017. Local people, Rohingya who came to Bangladesh after 1990 and Rohingya who came after 2017, experience the effects differently.

7.4.10.1 Effects on the Rohingya who came to Bangladesh after 1990

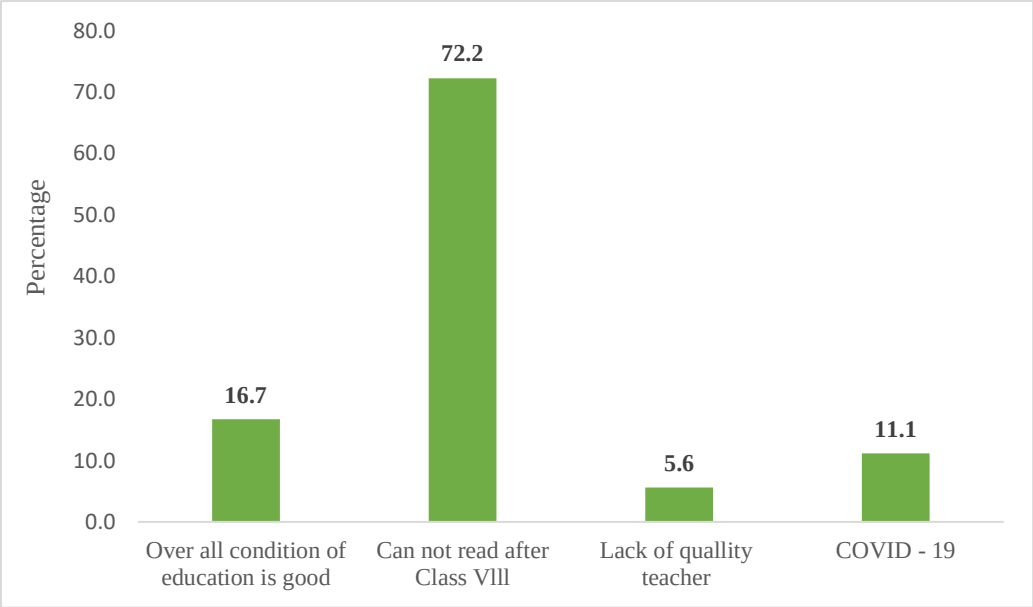


Fig. 7.24: Effects of Rohingya Influx 2017 on Rohingya who came after 1990

Rohingya who came to Bangladesh after 1990 experienced several impacts on the education sector after the Rohingya influx in 2017. According to the survey analysis, 32 Rohingyas interviewed 72.22% of Rohingya respondents who came to Bangladesh in 1990 or immediately later gave their opinions that they were deprived of higher study and got a chance to educate their children up to Class VIII only. Even now, according to the Bangladesh Government's instruction, their children can not study after Class V to make it equivalent to the education facility of the Rohingyas influx in 2017. The Camp Secretary of the Rohingya of KPRC said, "*Now (After the Rohingya influx in 2017), our children's education is restricted to the primary level.*". They do not have quality teachers, according to the opinions of 5.56% of respondents. The Head of the Rohingya community NPRC said, "*In camp, they have no quality teacher to teach effective education to their children*.". The respondents (11.11%) indicated that the COVID-19 pandemic also hampered their education system and tendency. However, 16.67% agreed that overall educational conditions are good, as shown in Fig. 7.24. A Rohingya of KPRC said, "*Our education system is better than the new Rohingya people's camps*". Their main desire is to create scope for higher education at least SSC level or more by providing quality teachers, including Bengali language teachers. Rohingya committee block leader of

KPRC said, *"Earlier, our children could learn the Bengali language in the school's curriculum, but this is not taught nowadays. We want teachers to teach this language to our children.*"

7.4.10.2 Effects on the Rohingya who came to Bangladesh after 2017

198 Rohingyas were interviewed to find out the root cause of the effects of education on the Rohingya who came to Bangladesh after 2017. Fig. 7.25 shows that 67.20% of Rohingya who came to Bangladesh after 2017 said that they can only read up to Class V. Block Mazi of Camp 1E said, "*The Rohingya children can read up to Class V. It would be better if they get a chance to read the upper classes*". Some of them (16.93%) believe that the Myanmar Curriculum is not followed to educate their children's education. A Sub-Mazi from Camp 8W said, "*According to the present situation, children's education will create no impact if they return to Myanmar*". The COVID-19 pandemic has hampered their schools and education facilities mentioned by 6.35% of respondents. The education process that is followed now is ineffective and casual, as reported by 6.88% of respondents. A Rohingya of Camp 9 said, "*Education is ineffective as it is casual*". They (1.59% of Rohingya people) are also reported to have a lack of quality teachers. They want higher education at least SSC level, Myanmar Standard Curriculum, quality teachers for all subjects, etc. They even want to learn Bengali language through their present education system.

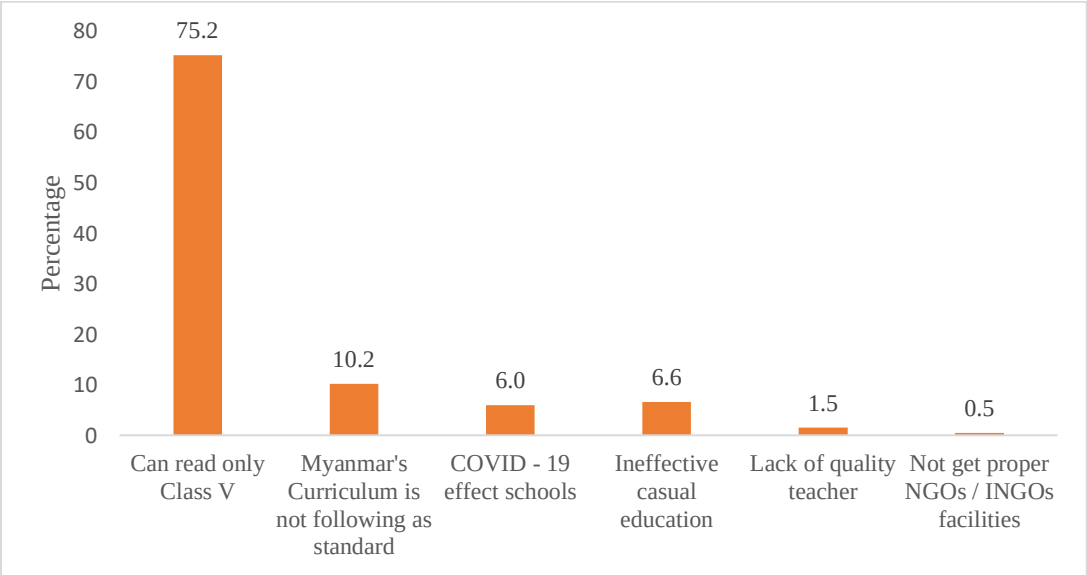


Fig. 7.25: Effects of the Rohingya Influx 2017 on Rohingya who came after 2017

7.4.10.3 Effect on the Locals

Five hundred eighty-four (584) locals were interviewed to find out the root cause of the effects of education on the locals following the Rohingya influx in 2017. Fig. 7.26 shows that the

effects on education are decreasing the overall rate of education receiving, decreasing the rate of higher study receiving, massive traffic jams, the COVID-19 pandemic, and so on. The overall education rate of receiving has decreased after the Rohingya influx in 2017, according to 15.7% of respondents. UNO of Ukhiya said, "*After the influx, people's economic condition is getting poor; that is why dropout from school happened.*" 79.3% of respondents said that only the higher education rate is decreasing. People get SSC and HSC degrees and then join NGOs and other minor works for livelihood. So, poor economic conditions after the influx in 2017 are the main reason for the dropout. UNO Teknaf said, "*People have less income after influx, so SSC or HSC passed students engaged with NGO-related jobs and other minor works; thus, dropout happened*". About 3.1% of respondents reported the COVID-19 pandemic, and 1.9% indicated massive traffic jams affected the education system after the Rohingya influx in 2017. Senior Program office of IUCN, Cox's Bazar, said, "*After influx, the rate of traffic jams increased, and it difficult to find private tutors for students*".

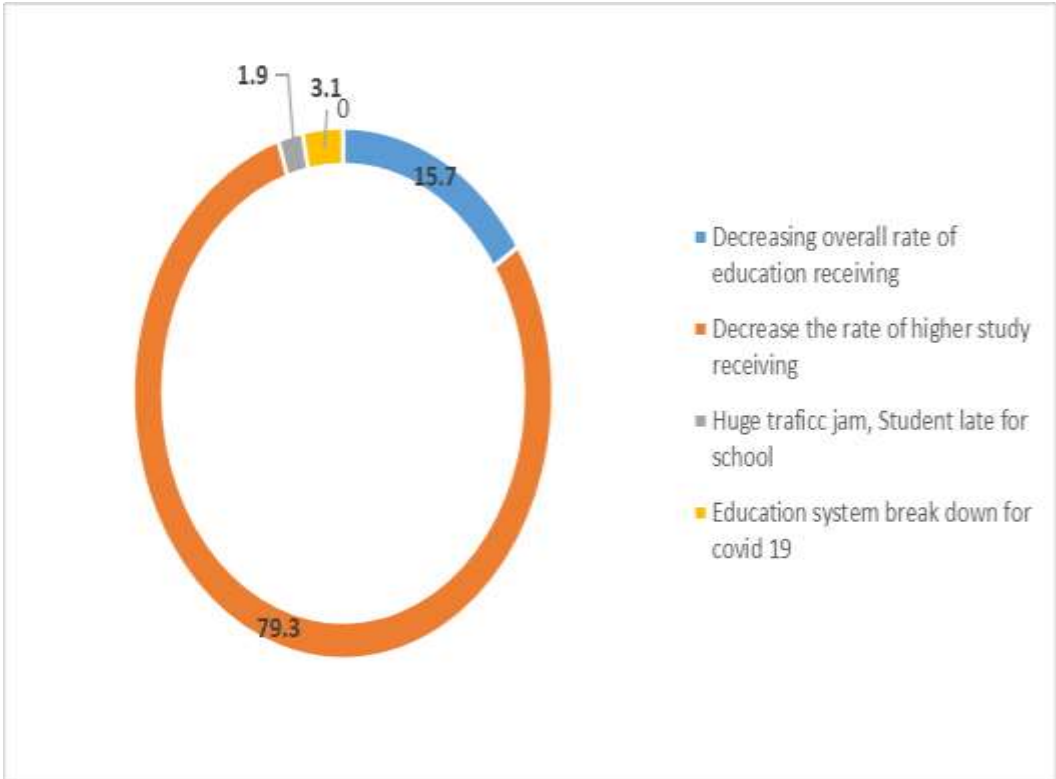


Fig. 7.26: Education of Host Community Affected by Rohingya Influx

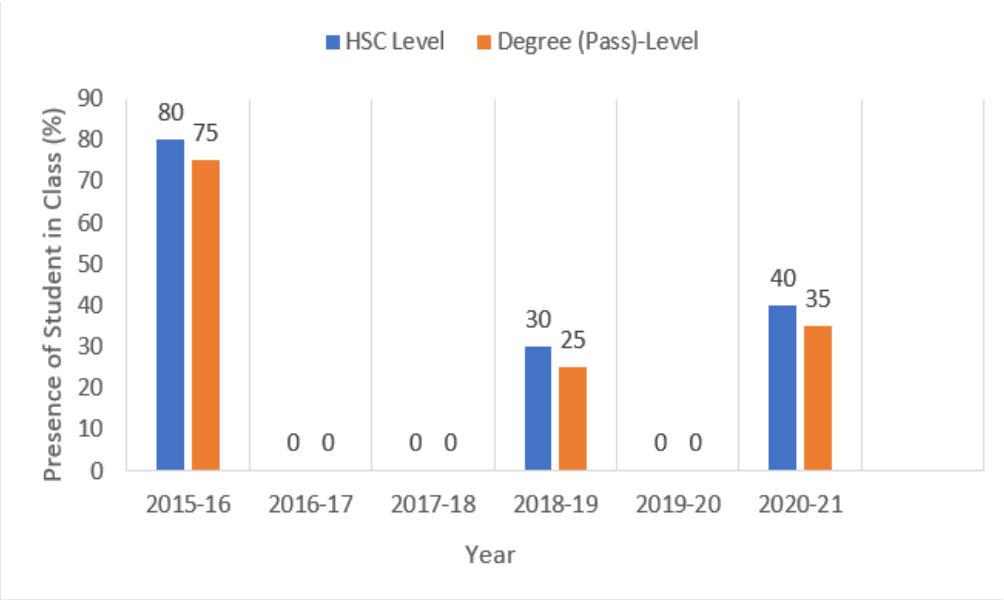


Fig. 7.27: Presence of students in the class (%) in Ukhiya College (based on Table 7.12)

An investigation was carried out to crosscheck the host community's perception. For cross-checking, Ukhiya College, Ukhiya, Cox's Bazar was selected as a higher educational institute in the Teknaf Peninsula, and data was collected about the presence of students. As per Fig. 7.27, before the Rohingya influx in 2017 (2015 – 2016), the rate of student presence in class was 80% and 75%, respectively, at HSC and Degree (Pass) - Levels. The rate decreased from 2016 - 2017 to 2020 - 2021 after the influx. In fact, after the influx of 2017, not around 50% of students were present in the HSC and Degree (Pass) - Levels class because most HSC and Degree-level students managed jobs in NGOs, mostly Rohingya camp-based services. Local students got the advantage in job sectors for the local dialect, similar to Rohingya communities.

Moreover, almost all government and non-government even registered schools, colleges, madrashas, community centres etc. of Rohingya-impacted areas of Ukhiya and Teknaf were used as godowns / storehouses, temporary shelters for law enforcement agencies, etc. to support the Rohingya that's why regular education has been affected severely. The teachers and staff of those institutions were also involved in supporting the Rohingya rehabilitation process. Simultaneously, most 'Para Teachers' of the educational institutes' got a chance to enter new Rohingya-related jobs, which were financially lucrative. So, the education of the area has been hampered in various ways.

Table 0.12: Year-wise Admission vs. % of Students' Presence in the class of HSC and Degree-level students of Ukhiya College

Sl. No.	HSC-level			Degree (Pass)-level		
	Year of Education	# of the admitted students	% of student's presence in the class	Year of Education	# of the admitted students	% of students present in class
01	2015-16	353	80%	2015-16	116	75%
02	2016-17	440	0%*	2016-17	123	0%*
03	2017-18	481	0%*	2017-18	88	0%*
04	2018-19	472	30%	2018-19	115	25%
05	2019-20	546	0%**	2019-20	70	0%**
06	2020-21	616	40%	2020-21	189	35%
07	2021-22	836	60%			

* The college was closed because it was used as a BGB-Army-Police Camp and WFP's godown / storehouse.

** College was closed due to the COVID-19 pandemic.

7.4.11 Impact on the Mental Health of Co-existence

The co-existence of the Rohingya and the host community causes some mental problems. These mental issues create different types of mental health problems. In this segment of our analysis, we have tried to find all the problems from the point of view of both the Rohingya and the host community.

Fig. 7.28 shows that a significant portion (98.7%) of the host community faces much mental stress due to co-existence, whereas only 26.09% of the Rohingya community faces this mental stress. Some of the reasons for this mental illness have been identified in Table 7.13.

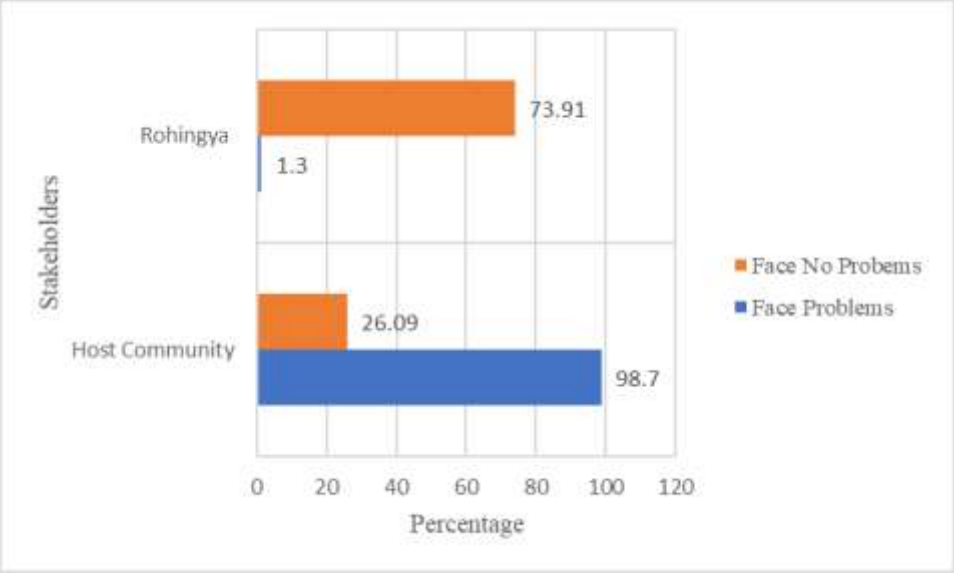


Fig. 7.28: Stakeholders' Perceptions of the Mental Issues Causing Coexistence

Table 0.13: Causes of Mental Problems due to Coexistence

Rohingya's causes of mental problems	**Host community's causes of mental problems**
Living in a traumatized condition on the fence.	The unpeaceful mind.
Lives in stress, fear, and tension.	Always be afraid to trust each other.
Worried about returning to Myanmar or repatriating.	Fear of assuming the unknown future of the area and the next generation.
They still live in trauma, fear, and uncertainty about life.	Some local people were kidnapped and killed by Rohingya terrorists.
Unpeaceful mind.	There is always an unstable condition in the area.
	Always live in fear.
	They couldn't find any place for cultivation. Most of the occupied forest land is now used as camps.
	They have lost their property rights and live in anxious conditions.
	In the afternoon, they can't go outside freely.
	They feel frightened due to the unexpected behaviour of the Rohingya people.

7.5 Comments on the Hypothesis

Based on different dimensional discussions of the chapter, it is challenging to say the significant impacts observed on the local society and culture of Ukhiya and Teknaf Upazilas after the Rohingya influx in 2017. Changing society and culture takes a long time. After the Rohingya influx, local society and culture have been impacted in various ways, such as drug use-smuggling-transportation, local labourers being jobless due to low-cost Rohingya labourers, shared space for people gathering being very limited or absent, conflicts between the locals and Rohingya people, criminal activities by Rohingya people, sharing the natural-resource-based livelihood options, free movement, loss of control over '*Khas*' or BFD land, high commodity price due to demand and supply imbalance, eve-teasing, excessive transportation fare than other parts of Bangladesh, etc.

CHAPTER 8: CONCLUSION AND RECOMMENDATIONS

8.1 Conclusion

Bangladesh is a small country, one of the world's most dense, populous countries. The country's natural resources are already under pressure. The socio-economic and ecological impacts of the Rohingya influx is not only limited to the Cox's Bazar District but also spreading all over the country. Consequently, the existence of an extra 1.2 million Rohingya people is fueling the crisis. This study found that in 2023 the Rohingya population size will be 1.5 times higher than the total host population of Teknaf, and Ukhiya Upazila. It has been predicted that, in 2040, the total population size of the Rohingya people will be three times larger than the host population if the situation continues as it is now. This study found that the Rohingya influx has a massive impact on wildlife and local society in Cox's Bazar District. It reflects that the worst issue is digesting the refugees in Bangladesh, as the historical evidence reveals that refugees never backed to their motherland, Myanmar, from Bangladesh's part in the past. However, the situation may change at any time as the diplomatic discussion is ongoing from the Government of Bangladesh. As a result, the Rohingya people are now in a dead-lock situation. Whether they can return to their homeland or lead a normal-productive life here in Bangladesh is uncertain. On the other hand, the international donations for the Rohingya people are also squizzing, which will lead to intensified local and national socio-economic crises.

Moreover, the loss of wildlife and their habitats are not reparable if the situation continues as it is now. This study revealed that all of the elephant corridors have been blocked due to Rohingya settlement and related activities. Furthermore, forests have been fragmented and squished seriously compared with any time. Ecosystem services are going to be limited day by day in the area. So, to restore wildlife and their habitats, the remedy may be to build a small city with multistoried buildings somewhere else, like the Bhasanchar area, for Rohingya refugees apart from the reserve forests and protected forestland areas. The influx has introduced, to some extent, some unethical issues like low-cost Rohingya labourers making locals jobless, enculturation with some of their negative social customs such slang and words, polygamy, and increase of drug use-smuggling-transportation, abduction, disease (AIDS, skin diseases, waterborne diseases, etc.) transmission, and in local society. There is a scope for further research to quantify the prospects of every component of the local environment as a response to the over-exploitation of natural resources.

8.2 Recommendations

The following recommendations have been made based on the findings of this study. Various policies may apply by the different agencies individually or jointly.

- UN (The United Nations) agencies and RRRC (The Refugee Relief And Repatriation Commissioner) Office can take the lead in the repatriation of the Rohingya, replace some people to other camps, shift some people to another area, say Bashanchar, need strong fencing around the Rohingya camps; need proper steps to supply liquid petroleum gas (LPG) /gas cylinders, ICSs (Improve Cooking Stoves), RHCs (Retained Heat Cookers) in the area to reduce the pressure on fuel wood; ensure the supply of treated housing materials (bamboo, wood, etc.) to increase the longevity of the materials, ensure proper and integrated management plan of the camp area, etc.
- UN agencies and RRRC Office can ensure a proper education system for the Rohingya children, recognition of BLI (Burmese Language Instructor) (recognition can more ensure their services, they think if they can return to Myanmar, they can continue their same profession), recruit daily labourers for locals especially from encircled host communities, emphasize creating job opportunities for the host communities who are affected by the Rohingya influx, aware the Rohingya people about environment-related rules and regulations of Bangladesh, ensure female-participation among the Rohingya communities, mass awareness programs against drug use-smuggling-transportation, etc.
- The RRRC Office can ensure that Rohingya have a minimum amount of living space, increase security at the camp area at night, regulate Rohingya birth rates, keep an eye on commodity prices at the camps' distribution points, enhance the various facilities to address basic needs at the camps, install the necessary light posts, take steps to control rats in the camp areas, take steps to prevent Rohingya people from congregating, and need to create some common spaces for both communities, stop relevant fee / token money / 'Hasil' collection, fix the transport fare within the camp areas, etc.
- GoB (Government of Bangladesh) agencies and the RRRC Office can resolve the land conflict with the locals versus Rohingyas, make the locals and Rohingyas aware of Eve teasing, ensure the free movement of locals, control the dissemination of different misinformation to the Rohingya community, etc.
- GoB agencies, BFD (Bangladesh Forest Department), different donor-funded NRM (Natural Resource Management)-related projects, etc., need to take the initiative for

biodiversity conservation, aware of the mass people, including the Rohingya community, in this regard. A proper waterbodies (i.e., waterfall, stream, canal, marshland, etc.) integrated management plan emphasizing excavation and embankment build as necessary. Establish more bamboo treatment plants, plant nurseries, etc., in the area for mass people to use.

- GoB and BFD should ensure sufficient staff and logistics and increase organizational capacity to protect the forests.
- GoB agencies and BFD should take proper action against illegal encroachers from forest lands and illegal sawmills from the area.
- BFD, RRRC Office, and other donor agencies should take restoration programmes as far as possible through indigenous species and properly terracing practices for landscape management.
- BFD should stop handing over the BFD lands to other GoB agencies, take steps to reopen the elephant corridors of the area, increase the capacities of CPGs (Community Patrolling Groups), ERTs (Elephant Response Teams), regain social forestry (most of the social forestry have been destroyed due to the Rohingya influx 2017), strengthen co-management activities, etc.
- Other GoB agencies (rather than BFD) can take the lead to control the illegal spreading of the Rohingya people to other parts of Bangladesh or from Bangladesh to other countries, take proper steps to control traffic jams, resolve water crises for the locals, ensure preservation of natural and rainwater by creating water reservoirs, rain water harvesting by using roof of the house, repair the ring-wells of the British regim in the area, ensure proper drainage system, provide sanitation support for the locals, educate the locals about family and societal bonding, control the commodity price with availability, take measures to control floods in the area, take steps for the registration of mobile SIMs, create scope to use the Rohingya people as a workforce, monitor NGO support for the locals, and take steps to ensure the business-friendly environment in the area, need a standard policy for an office space or house rent and rental system in the area; need to control the transport fare at the local routes; need separate routes for both community (need-based), actions need to be taken to control road accidents; need to make mass people aware of AIDS, HIV, and other STDs; restrict Rohingya people from managing Bangladeshi NID cards, passports, birth certificates, driving licences, etc.

- Other GoB agencies and the DoF (Department of Fisheries) need to make a particular plan to support the Naf River-based fisheries community, as fishing has been banned in the Naf River after the Rohingya influx of 2017.
- Other GoB agencies and the DoE (Department of Environment) should take the lead to control environmental pollution through a waste management master plan, ensure SOP (Standard Operation Protocol) for all brickfields in the area, etc. Furthermore, DoE should apply ECA (Ecological Critical Area) Rules 2015 along the coastline of Cox's Bazar to Teknaf, which will enhance the restoration of the natural resources of the Teknaf Peninsula.
- Other GoB agencies and donors should help the hosts who are being affected by the Rohingya influx in 2017, ensure AIGA for locals who are being affected by the Rohingya, pay special attention to the education sector in Ukhiya and Teknaf areas, cultivate fodder for cattle and poultry rearing in the area, expand the affected area after the Rohingya influx rather than Ukhiya and Teknaf, etc.
- PDB (Power Development Board) and REB (Rural Electrification Board) should remove illegal electric lines from the forest landscape areas of Ukhiya and Teknaf. Simultaneously, both organizations should stop providing any electric connection in the area in the future without consultation with BFD to avoid electrification accidents of wildlife.
- PDB, REB, and different donor agencies should take the lead in using solar energy as much as possible in the area to avoid electrification of wildlife.
- Bangladesh Fire Service and Civil Defense (BFSCD) must set up more fire stations in the suitable areas of Tenkaf and Ukhiya. BFSCD also has to be aware of both communities to protect the landslides.
- Law enforcement agencies in Bangladesh should enforce strict border crossings except for legal trade, strictly control the law-and-order situation in the area, etc.
- Law enforcement agencies in Bangladesh should take rapid action against smuggling, illegal weapons, and other illegal activities in and around camp areas.

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ANNEXURE

Annex 1: List of Union-wise Rohingya camps at Ukhiya and Teknaf Upazila in Cox's Bazar District

Sl. No.	Name of Camp	Union and Upazila	Rohingya people Living from
1	Kutupalong Registered Camp	Rajapalong, Ukhiya	The Rohingya people living from @ 1991
2	Camp- 1E	Rajapalong, Ukhiya	The Rohingya people living from and later August 25, 2017
3	Camp -1W	Rajapalong, Ukhiya	
4	Camp -2E	Rajapalong, Ukhiya	
5	Camp -2W (Kutupalong Paschim Para)	Rajapalong, Ukhiya	
6	Camp -3	Rajapalong, Ukhiya	
7	Camp -4	Rajapalong, Ukhiya	
8	Camp -4 (Extension)	Rajapalong, Ukhiya	
9	Camp -5	Rajapalong, Ukhiya	
10	Camp -6	Rajapalong, Ukhiya	
11	Camp -7	Rajapalong and Palongkhali, Ukhiya	
12	Camp -8E	Palongkhali, Ukhiya	
13	Camp -8W	Palongkhali, Ukhiya	
14	Camp -9	Palongkhali, Ukhiya	
15	Camp -10	Palongkhali, Ukhya	
16	Camp -11	Palongkhali, Ukhiya	
17	Camp -12	Palongkhali, Ukhiya	
18	Camp -13	Palongkhali, Ukhiya	
19	Camp -14	Palongkhali, Ukhiya	
20	Camp -15	Palongkhali, Ukhiya	
21	Camp -16	Palongkhali, Ukhiya	
22	Camp -17	Palongkhali, Ukhiya	
23	Camp -18	Palongkhali, Ukhiya	
24	Camp -19	Palongkhali, Ukhiya	
25	Camp -20	Palongkhali, Ukhiya	
26	Camp -20 (Extension)	Palongkhali, Ukhiya	
27	Camp -21 (Cakmar Kul)	Whykong, Teknaf	
28	Camp -22 (Unchiprang)	Whykong, Teknaf	
29	Noyapara Registered Camp	Hnila, Teknaf	The Rohingya people living from @ 1991
30	Camp -24 (Leda)	Hnila, Teknaf	The Rohingya people living from and later August 25, 2017
31	Camp -25 (Alikhali)	Hnila, Teknaf	
32	Camp -26 (Shalbon)	Hnila, Teknaf	
33	Camp -27 (Jadimora)	Hnila, Teknaf	

N.B.: Camp -23 (Shamlapur) was under Bhaharchara Union of Teknaf Upazila has closed from January 2022, inhabitants of this camp have merged with other camps and Bashanchar, Hatia Upazila, Noakahali District.

Annex 2: Questionnaire for surveying general and KII for local people

Questionnaire for surveying general/KII for local people Date: Related to Camp No.

Impacts of Rohingya Refugees on Wildlife and Society in Teknaf Peninsula, Cox's Bazar, Bangladesh

Name: GPS Coordi.: Edu.: Illiterate/Below SSC/SSC/HSC/Graduate

Occu./Desig.: Organi.: Age: Sex: M / F

Living Duration: Engaged in refugee-related job: Y / N Upazila: Union:
Ward no.: Vill.: Mobile: NID/ID:

Monthly income: Distance from a refugee camp: ≤ 1 km/ 2-3 km/ 3-5 k

1. Have you seen any wildlife in your area? If yes, please mention the name please:

2. Wildlife movement/presence after Rohingya influx… decreased/ same as before/ increased

3. Please answer the following questions regarding the impact of Rohingya refugees on the wildlife movement:

Parameters	**Last presence**	**Increased**	**Decreased**	**Comment**
Elephant movement				
Movement of other wildlife				
Human-wildlife conflict Level of Conflict : a. WL damages human property b. Human damage to WL habitat c. Human killed/hunted WL d. WL killed/wounded human e. WL killed/wounded domestic animals f. Other				
Food source of wildlife				
Suitable habitat of wildlife				
Scope of wildlife reproduction				
Wildlife population				
Species diversity				
Do Rohingya people kill/ hunt wildlife? If yes, name please:				

4. Please answer the following questions regarding the impact of Rohingya refugees on natural resources:

Parameters	**The legal status of forest**	**Increased**	**Decreased**	**Comment**
Collection of forest trees by refugee				
Collection of sapling / pole by refugee				
Collection of fuel wood by refugee				

Collection of non-wood forest products by refugee				

5. Do you think that Rohingya people are a threat to nature and the environment? Yes / No
5.1. If yes, how?
5.2 What are your suggestions to overcome the existing problems?

6. Please answer the following questions regarding the social imbalance created by Rohingya refugees in your area:

Parameters	**Increased**	**Decreased**	**Comment**
Conflict between Rohingya and local people			
Drug smuggling by Rohingya refugees			
Drug smuggling by local people			
Rape incident between Rohingya and local people			
Criminal activities by Rohingya child			
Conflict for land			
Conflict between govt. agencies/NGOs and Rohingya people			
Different types of criminal activities by Rohingya people			

7. Do you think that Rohingya people are creating social anarchy in this area? Yes / No
7.1 If yes, how?
7.2. What are your suggestions to resolve these problems?

8. Do you think Refugees are transmitting diseases to local people? Y / N
8.1. If yes, mention the types:

9. Is there any cultural impact of Refugees on local people? Y / N

10. Are Rohingya children bought for household work/workers? Y / N
10.1. If yes, please fill-up the format:

Boy	Age below 10	Wages:	Age above 10	Wages:
Girl	Age below 10	Wages:	Age above 10	Wages:

11. Does Rohingya refugee has a tendency to stay in Bangladesh through marriage? Y / N
12. What are the roles of NGOs on the Rohingya issues?

13. What are the roles of NGOs in the local peoples' issues?

14. What are the roles of NGOs or programs on Forest issues?

15. What are the impact on educational institutes?

16. What is the impact on your mental health of co-existence with Rohingya?
17. (a) Do you notice any landslides in your locality? Y/ N (If Y then answer from b to d)
(b) What are the causes of landslides?
(c) What damages are caused by landslides?
(d) What are the negative impacts of landslides on wildlife?
18. Other (If any):

Annex 3: Questionnaire for surveying general and KII for Rohingya people

Questionnaire for surveying general/KII for Rohingya people Date: Related to Camp No.

Impacts of Rohingya Refugees on Wildlife and Society in Teknaf Peninsula, Cox's Bazar, Bangladesh

Name: GPS Coordi.: Edu.: Illiterate/Below SSC/SSC/HSC/Graduate

Occupation: Organization: Age: Sex: M / F

Living Duration: Engaged in refugee-related job: Y / N

Monthly income: Mobile: ID:

1. When you arrived in Bangladesh, had you seen any wildlife in the first month? If yes, please mention the name:
2. Currently, the presence/movement of wildlife has decreased / same as before / increased
3. Please answer the following questions regarding the impact of Rohingya refugees on the wildlife movement:

Parameters	**Last presence**	**Increased**	**Decreased**	**Comment**
Elephant movement				
Movement of other wildlife				
Human-wildlife conflict Level of Conflict: a. WL damages human property b. Human damage to WL habitat c. Human killed/hunted WL d. WL killed/wounded human e. WL killed/wounded domestic animals f. Other				
Food source of wildlife				
Suitable habitat of wildlife				
Scope of wildlife reproduction				
Wildlife population				
Species diversity				
Do Rohingya people kill/ hunt wildlife? If yes, name please:				

4. Please answer the following questions regarding the impact of Rohingya refugees on natural resources:

Parameters	**The legal status of forest**	**Increased**	**Decreased**	**Comment**
Collection of forest trees by refugee				
Collection of sapling/pole by refugee				
Collection of fuel wood by refugee				

Collection of non-wood forest products by refugee				

5. Do you think that Rohingya people are a threat to nature and the environment? Yes / No

5.1. If yes, how?

5.2 What are your suggestions to overcome the existing problems?

6. Please answer the following questions regarding the social imbalance created by Rohingya refugees in your area:

Parameters	**Increased**	**Decreased**	**Comment**
The conflict between Rohingya and local people			
Drug smuggling by Rohingya refugees			
Drug smuggling by local people			
Rape incidents between Rohingya and local people			
Criminal activities by Rohingya child			
Conflict for land			
The conflict between govt. agencies/NGOs and Rohingya people			
Different types of criminal activities by Rohingya people			

7. Do you think that Rohingya people are creating social anarchy in this area? Yes / No

7.1 If yes, how?

7.2. What are your suggestions to resolve these problems?

8. Do you think Refugees are transmitting diseases to local people? Y / N

8.1. If yes, mention the types:

9. Is there any cultural impact of Refugees on local people? Y / N

10. Are Rohingya children bought for household work/workers? Y / N

10.1. If yes, please fill-up the format:

Boy	Age below 10	Wages:	Age above 10	Wages:
Girl	Age below 10	Wages:	Age above 10	Wages:

11. Does Rohingya refugee has a tendency to stay in Bangladesh through marriage? Y / N

12. What are the roles of NGOs in the Rohingya issues?

13. What are the roles of NGOs on the local peoples' issues?

14. What are the roles of NGOs or programs on Forest issues?

15. What are the impacts on educational institutes?

16. What is the impact on your mental health of co-existence with Bangladeshi?

17. (a) Do you notice any landslides in your locality? Y/ N (If Y then answer from b to d)
    (b) What are the causes of landslides?
    (c) What damages are caused by a landslide?
    (d) What are the negative impacts of landslides on wildlife?

18. Other (If any):

Annex 4: Data Sheet for Resident Indicator Forest Bird Survey of TWS

Impact of Rohingya Influx on Wildlife and Society in Teknaf Peninsula in Cox's Bazar of Bangladesh

Forest Resident Bird Survey 2019, 2020, 2021, 2022

Name of the Site: **Teknaf Wildlife Sanctuary**
Name of the Transect:
Date: **Time Start:** **End:**

Name of Survey Participants (FG/CPG/Local) :
1. **2.** **3.**

Name of Survey Supervisor (s):
1. **2.** **3.**

Indicator Bird Count			**Notes**
SL. No.	**Name**	**Number**	
1.	Greater Racket-tailed Drongo		
2.	White-Crested Laughing Thrush		
3.	Red Jungle fowl		
4.	Green-billed Malkoha		
5.	White-rumped Shama		
6.	Hill Myna		
7.	Puff-throated Babbler		
8.	Scarlet Minivet		
9.	Oriental Pied Hornbill		
10.	Red-headed Trogon		

Other Bird Species :

1.

2.

3.

4.

5.

6.

Annex 5: Data Sheet for Resident Indicator Forest Bird Survey of SJINP

Impact of Rohingya Influx on Wildlife and Society in Teknaf Peninsula in Cox's Bazar of Bangladesh

Forest Resident Bird Survey 2019, 2020, 2021, 2022

Name of the Site: **Inani National Park**
Name of the Transect:
Date: **Time Start:** **End:**

Name of Survey Participants (FG/CPG/Local) :
2. **2.** **3.**

Name of Survey Supervisor (s):
2. **2.** **3.**

Indicator Bird Count			**Notes**
SL. No.	**Name**	**Number**	
1.	Greater Racket-tailed Drongo		
2.	Red Jungle-Fowl		
3.	Green-billed Malkoha		
4.	White-rumped Shama		
5.	Hill Myna		
6.	Puff-throated Babbler		
7.	Abbott's Babbler		
8.	Scarlet Minivet		
9.	Crimson Sunbird		
10.	Oriental Pied Hornbill		
11.	Red-headed Trogon		

Other Bird Species :

1.
2.
3.
4.
5.
6.

Annex 6: List of 16 indicator birds of PAs of Bangladesh*

SL	Indicator Birds	Scientific Name	Resident in forest strata
1	Oriental Pied Hornbill	*Anthracoceros albirostris*	Upper
2	Hill Myna	*Gracula religiosa*	Upper
3	Scarlet Minivet	*Pericrocotus flammeus*	Upper
4	Black-crested Bulbul	*Pycnonotus melanicterus*	Upper
5	Green-billed Malkoha	*Phaenicophaeus tristis*	Middle
6	Red-headed Trogon	*Harpactes erythrocephalus*	Middle
7	Greater Racquet-tailed Drongo	*Dicrurus paradiseus*	Middle
8	Hair-crested Drongo	*Dicrurus hottentottus*	Middle
9	White-rumped Shama	*Copsychus malabaricus*	Middle
10	Crimson Sunbird	*Aethopyga siparaja*	Middle
11	Red Junglefowl	*Gallus gallus*	Lower
12	Puff-throated Babbler	*Pellorneum ruficeps*	Lower
13	Abbott's Babbler	*Malacocincla abbotti*	Lower
14	White-crested Laughingthrush	*Garrulax leucolophus*	Lower
15	Orange-headed Thrush	*Zoothera citrina*	Lower
16	Crested Serpent Eagle	*Spilornis cheela*	Mixture of strata

* Chunati Wildlife Sanctuary, Kaptai National Park, Dudpukuria-Dhopachari Wildlife Sanctuary, Hazarikhil Wildlife Sanctuary, Baroiyadhala National Park, Fashiakhali Wildlife Sanctuary, Medakacchapia National Park, Himchari National Park, Sheikh Jamal Inani National Park (earlier Inani Reserve Forest), Teknaf Wildlife Sanctuary, Lawachara National Park, Satchari National Park, Rema-Kalenga Wildlife Sanctuary, Khadimnagar National Park, and Madhupur National Park (Haque et al. 2018)

Annex 7. Summary sheet stakeholders survey

Camp No.	Rohingya	KII Rohingya	Local	KII Host	Remarks
KTRC	9	3	53		Host within the camp
1E	5	1	10		Host within the camp
1W	6	1	5		Host within the camp
2E	5	1	0		No host in the camp
2W	5	1	0		No host in the camp
3	5	1	4		Host within the camp
4	6	2	2		Host within the camp
4 Ext	6	0	0		No host in the camp
5	6	1	0		No host in the camp
6	4	1	0		No host in the camp
7	4	1	42		Host within the camp
8E	6	0	12		Host within the camp
8W	4	1	0		No host in the camp
9	5	1	7		Host within the camp
10	6	1	0		No host in the camp
11	7	0	19		Host within the camp
12	7	0	14		Host within the camp
13	6	0	27		No host in the camp
14	11	0	27		Host within the camp
15	6	0	16		Host within the camp
16	6	0	17		Host within the camp
17	6	0	0		No host in the camp
18	7	0	0		No host in the camp
19	6	0	17		Host within the camp
20	6	0	0		No host in the camp
20 Ext	8	0	0		No host in the camp
21	6	0	15		No host in the camp
22	6	0	17		Host within the camp
23	9	2	26		Host & Rohingya mixing; Now the camp is closed
24	6	0	15		Host within the camp
25	6	0	15		Host within the camp
26	5	2	15		Host within the camp
27	5	2	15		Host within the camp
NRC	6	1	15		Host within the camp
Total	**207**	**23**	**405**		
	KII Host	Baharchara Union, Teknaf		25	
		Hnila, Teknaf		14	
		Whykong, Teknaf		47	
		Palongkhali, Ukhiya		11	
		Rajapaling, Ukhiya		16	
		Gundum, Naikkongchari		1	
		Jaliapalong, Ukhiya		1	
		Others (Teknaf Sadar, FD, Law enforcement agencies, Cox'sBazar)		64	
		Total		**179**	
				In total	**814**

Annex 8: List of released wild animals in the wild habitat after being captured from September 2019 to August 2022

"শেখ হাসিনার নির্দেশ
জলবায়ু সহিষ্ণু বাংলাদেশ।"

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
বিভাগীয় বন কর্মকর্তার কার্যালয়
কক্সবাজার দক্ষিণ বন বিভাগ।

বিষয় ঃ উদ্ধারকৃত বন্যপ্রাণী সংক্রান্ত তথ্যাদি
হালনাগাদের তারিখ: ১ সেপ্টেম্বর, ২০২২

ক্র. নং	বন্যপ্রাণীরনাম	উদ্ধারকালীন সময়	সংখ্যা	ঘটনাস্থলের বিবরন	মৃত্যুর কারন	গৃহিত ব্যবস্থা
০১	ডলফিন (মৃত)	১৬/০৯/২০১৯	১ টি	কলাতলী বিট কক্সবাজার রেঞ্জ এর আওতাধীন কলাতলীস্থ দরিয়ানগর এলাকায় সাগরপাড় হইতে উদ্ধার করা হয়।	প্রাকৃতিক কারনে মৃত্যু	ময়না তদন্ত করতঃ ঘটনাস্থলে বালুচরে মাটি চাপা দেয়া হয়েছে।
০২	ডলফিন (মৃত)	০৪/০৪/২০২০	১ টি	শাপলাপুর বিট, হোয়াইক্যং রেঞ্জ এর আওতাধীন শাপলাপুরস্থ মেরিন ড্রাইভ সড়কের পশ্চিম পার্শ্বে চর এলাকা।	পাকস্থলীতে আলসার জনিত কারণে মৃত্যু	ময়না তদন্ত করতঃ ঘটনাস্থলে মাটিচাপা দেয়া হয়েছে।
০৩	ডলফিন (মৃত)	০৮/০৪/২০২০	১ টি	মাথাভাঙ্গা বিট, শিলখালী রেঞ্জ এর আওতাধীন হাজমপাড়া নামক স্থানে মেরিন ড্রাইভ সড়কে পশ্চিম পার্শ্বে ঝাউবাগানে	ঢেউয়ের আঘাতে মৃত্যু	ময়না তদন্ত করত ঘটনাস্থলে মাটিচাপা দেয়া হয়েছে।
০৪	সাদা বক (জীবিত)	১৯/১১/২০২০ ভোর ৭.০০ ঘটিকা	২ টি	ওয়ালাপালং বিট, উখিয়া রেঞ্জ এর আওতাধীন মাসকারিয়াবিল এলাকায়	---	উখিয়া রেঞ্জ কার্যালয়ে প্রাকৃতিক পরিবেশে অবমুক্ত করা হয়।
০৫	সাদা বক (জীবিত)	২০/১১/২০২০	১২ টি	ওয়ালাপালং বিট, উখিয়া রেঞ্জ এর মাসকারিয়া বিল এলাকা	----	উখিয়া রেঞ্জ কার্যালয়ে প্রাকৃতিক পরিবেশে অবমুক্ত করা হয়।
০৬	অজগর সাপ (জীবিত)	২৮/১১/২০২০ বেলা ১১.০ ঘটিকা	১ টি	থাইংখালি বিট, উখিয়া রেঞ্জ এর আওতাধীন রহমতের বিল এলাকায় ধানক্ষেত		নির্বাহী কর্মকর্তা, উখিয়া এবং সহকারী কমিশনার ভূমি উপস্থিতিতে দোছড়ি বনবিটের প্রাকৃতিক পরিবেশে অবমুক্ত করা হয়।
০৭	বানর (জীবিত)	২৯/০৭/২০২০	১ টি	হিমছড়ি টহলফাড়ি, কক্সবাজার রেঞ্জ এর আওতাধীন পেচারদ্বীপ এলাকায় খাঁচাবন্দী পরিত্যক্ত অবস্থায় উদ্ধার করা হয়।		কলাতলী পিকনিক স্পটে গণ্যমাণ্য ব্যক্তিবর্গে ও সিপিজি সদস্যদের উপস্থিতিতে অবমুক্ত করা হয়।
০৮	বানর (জীবিত)	১১/০৮/২০২০	১ টি	ইনানী বিট, ইনানী রেঞ্জ এর আওতাধীন স্থানীয় জুবায়রা রিসোর্ট এর পার্শ্ববর্তী একটি গাছ থেকে উদ্ধার করা হয়।		ইনানী রেঞ্জ অফিসে আনয়ন করতঃ পরের দিন সোয়ানখালী সংরক্ষিত বনে অবমুক্ত করা হয়।
০৯	মেছো বাঘ (জীবিত)	০১/১১/২০১৯	১ টি	টেকনাফ উপজেলাধীন টেকনাফ পৌরসভার চৌধুরী নামক এলাকা হতে মেছো বাঘটি স্থানীয় লোকজন উদ্ধার করতঃ টেকনাফ মডেল থানায় হস্তান্তর		

				করে এবং পরবর্তীতে মডেল থানা কতৃপক্ষ মেছো বাঘটিকে রেঞ্জ কর্মকর্তা, টেকনাফকে হস্তান্তর করলে রিজার্ভ টেকনাফ মৌজার টেকনাফ বন্দও নামক স্থানে প্রাকৃতিক বনে বাঘটি অবমুক্ত করা হয়।		
১০	ইন্ডিয়ান রোলার (জীবিত)	১৯/১১/২০২০	১ টি	কক্সবাজার রেঞ্জের কলাতলী বিটের ওয়ার্ল্ড বিচ রিসোর্ট হতে উদ্ধার করতঃ কলাতলী বিটের দরিয়ানগর পিকনিক স্পটে অবমুক্ত করাহয় ।		কক্সবাজার রেঞ্জের কলাতলী বিটের দরিয়ানগর পিকনিক স্পটে অবমুক্ত করাহয় ।
১১	বাচ্চা হাতি (জীবিত)	১০/০৩/২০২১	১ টি	হোয়াইক্যং রেঞ্জের শাপলাপুর বিটের কৈখালী খালের পশ্চিমপার্শ্ব হতে উদ্ধার করতঃ ভারপ্রাপ্ত কর্মকর্তা, ডুলাহাজরা সাফারী পার্ক, বন্যপ্রাণী ব্যবস্থাপনা ও প্রকৃতি সংরক্ষণ অজল বিভাগ, চট্টগ্রাম এর নিকট হস্তান্তর করা হয় ।		ভারপ্রাপ্ত কর্মকর্তা, ডুলাহাজরা সাফারী পার্ক, বন্যপ্রাণী ব্যবস্থাপনা ও প্রকৃতি সংরক্ষণ অজল বিভাগ, চট্টগ্রাম এর নিকট হস্তান্তর করা হয়।
১২	মায়া হরিন (জীবিত)	২৪/০৩/২০২১	১ টি	কক্সবাজার রেঞ্জের কলাতলী বিটের দরিয়ানগর পিকনিক স্পট হতে উদ্ধার করতঃ ভারপ্রাপ্ত কর্মকর্তা, ডুলাহাজরা সাফারী পার্ক, বন্যপ্রাণী ব্যবস্থাপনা ও প্রকৃতি সংরক্ষণ অজল বিভাগ, চট্টগ্রাম এর নিকট হস্তান্তর করা হয় ।		ভারপ্রাপ্ত কর্মকর্তা, ডুলাহাজরা সাফারী পার্ক, বন্যপ্রাণী ব্যবস্থাপনা ও প্রকৃতি সংরক্ষণ অজল বিভাগ, চট্টগ্রাম এর নিকট হস্তান্তর করা হয়।
১৩	মৃত তিমি	০৯/০৪/২০২১	১ টি	কক্সবাজার সমুদ্র সৈকতের দরিয়ানগর এলাকায়		ময়না তদন্ত করতঃ ঘটনাস্থলে মাটিতে পুঁতে দেয়া হয়।
১৪	মৃত তিমি	১০/০৪/২০২১	১ টি	কক্সবাজার সমুদ্র সৈকতের দরিয়ানগর এলাকায়		ময়না তদন্ত করতঃ ঘটনাস্থলে মাটিতে পুঁতে দেয়া হয়।
১৫	বন্য হাতি (জীবিত)	২৮/০৬/২০২১	১ টি	শাহপরীর দ্বীপের পূর্বে এবং নাফ নদীর সংলগ্ন পশ্চিম পার্শ্বে প্যারাবনে		টেকনাফের সংরক্ষিত বনাঞ্চলে অবমুক্ত করা হয়।
১৬	বিষধর সাপ (২টি কিং কোবরা, ১টি দারাশ, ১টি পংখীরাজ)	২২/০৬/২০২১	৪ টি	কক্সবাজার রেঞ্চ এর আওতাধীন কলাতলী বিটের সাত্তারঘোনা নামক এলাকায়		কলাতল বিটের সংরক্ষিত বনে অবমুক্ত করা হয়।
১৭	বানর (জীবিত)	০৮/০৭/২০২১	১ টি	কক্সবাজার রেঞ্জের আওতাধীন কক্সবাজার শহরের বৈদ্যঘোনা এলাকায়		প্রাথমি সেবাযত্নের পর কলাতল বিটের দরিয়ানগর এলাকায় সংরক্ষিত বনে অবমুক্ত করা হয়।
১৮	গুইসাপ (জীবিত)	০৯/০৭/২০২১	১ টি	কক্সবাজার রেঞ্জের আওতাধীন দক্ষিণ ডিককুল এলাকার লোকালয়		কলাতলী বিটের দরিয়ানগর এলাকায় সংরক্ষিত বনে অবমুক্ত করা হয়।
১৯	অজগর সাপ (জীবিত)	০৮/০৭/২০২১	১ টি	ইনানী রেঞ্জের আওতাধীন ইনানী বিটের বড় ইনানী এলাকায় লোকালয়		ইনানী বিটের সংরক্ষিত বনে অবমুক্ত করা হয়।
২০	বার্মিজ পাইথন (জীবিত)	২৮/০৭/২০২১	১ টি	কক্সবাজার রেঞ্জের কলাকতী বিটের দরিয়ানগর বড়ছড়ার পাশে অবস্থিত পুলিশ ফাঁড়ির ভিতর থেকে জীবিত অবস্থায় উদ্ধার করা হয়।		দরিয়ানগর পিকনিক স্পটের ভিতরে পাহাড়ী গভীর জঙ্গলে অবমুক্ত করা হয়।
২১	গন্ধগকুল (জীবিত)	২৯/০৮/২০২১	১ টি	কক্সবাজার রেঞ্জের ঝিলংজা বিটের অধীন ঘোনার পাড়া নামক এলাকা।		কলাতলী বিটের দরিয়ানগর পিকনিক স্পটের দক্ষিণে গভীর জঙ্গলে অবমুক্ত করা হয়।

২২	০৭ টি ঘুঘু, ০৮ টি চড়ুই, ১ টি বাবুই, ০১ টি ঈগল পাখি (জীবিত)	২৯/০৯/২০২১	১৭ টি	উখিয়া বিটের হাঙরঘোনা এলাকা হতে উদ্ধার করা হয়।		উপজেলা নির্বাহী অফিসার, উখিয়া মহোদয়ের উপস্থিতিতে তাহার অফিস প্রাঙ্গনে অবমুক্ত করা হয়।
২৩	অজগর সাপ (জীবিত)	২৭/১১/২০২১	১ টি	টেকনাফ রেঞ্জের মোচনী বিটের আলীখালী এলাকায় তুলাবাগান নামক স্থান হতে উদ্ধার করা হয়।		টেকনাফ সদ বিটের বেত বাগানের অভ্যন্তরে অবমুক্ত করা হয়।
২৪	বার্মিজ অজগর সাপ (জীবিত)	২৮/১১/২০২১	১ টি	হোয়াইক্যং রেঞ্জাধীন হোয়াইক্যং বিটের মনিরঘোনা এলাকায় সৈয়দ আহম্মদ শিকদার এর বাড়ীর পাশ হতে উদ্ধার করা হয়।		রইক্ষ্যং বিটের কুদুম গুহার গভীর বনে অবমুক্ত করা হয়।
২৫	অজগর সাপ (জীবিত)	০৮/১২/২০২১	১ টি	উখিয়া রেঞ্জের থাইংখালী বিটের পালংখালী ইউনিয়নের রহমতের বিল এলাকা হতে উদ্ধার করা হয়।		দোছড়ি বিটের গভীর অরণ্যে অবমুক্ত করা হয়।

Annex 9: Some pictorial presentation of released wildlife in the wild habitat after treatment from 22.04.2021 to 18.10.2022 at Cox's South Forest Division

	
An elongated tortoise was released at the Teknaf Sadar Beat area on 22.04.2021	A leopard was cat rescued and released in the Cox's Bazar Sadar Range on 21.09.2021
	
BFD staff with the help of ERT members, 17 white storks rescued and released in the wild at Ukhiya Beat, Ukhiya Range on 10.10.2021	Two softshell turtles were rescued and released at the Ukhiya Range area on 12.11.2021

	
A python was rescued and released at Monirghona area of Whykeong Range by BFD, CPG and Nature and Life Project Staff on 28.11.2021	A Burmese python rescued and released at Mochoni area, Mochoni Beat, Teknaf Range on 15.12.2021
	
A white-rumped vulture was rescued Teknaf Sadar Beat area and released at the Mochoni Beat area on 17.12.2021	A red jungle fowl was rescued and released at the Whykong area on 22.12.2021

	
A Civet Cat rescued from Rajarkul Beat, Rajarkul Range and after treatment send to Dulahajra S. Mujib Sarfi Park on 17.02.2022	A leopard cat was released at Mochoni Beat area on 30.03.2022
	
A clouded leopard was rescued from the BGC Camp area under the Teknaf Sadar Beat area and handover to Bangabandhu Sheikh Mujib Safari Park, Dulahazara, Cox's Bazar on 12.10.2022	A ring / water lizard was released at the Teknaf Sadar Beat area on 18.10.2022

Annex 10: A news of Barking deer's meet seized and destroyed by FD and law enforcement personnel.

যায়যায়দিন

শুক্রবার, ১৮ নভেম্বর ২০২২, ৩ অগ্রহায়ণ ১৪২৯

জাতীয় | সারাদেশ | রাজনীতি | আন্তর্জাতিক | খেলাধুলা | অর্থনীতি | বিনোদন | তথ্য প্রযুক্তি | ইসলাম ও ধর্ম

ব্রেকিং নিউজ

সারাদেশ

টেকনাফে হরিণের মাংস উদ্ধার

টেকনাফ (কক্সবাজার) প্রতিনিধি

২৬ জানুয়ারি ২০২২, ২০:০৭

কক্সবাজারের সীমান্ত উপজেলা টেকনাফে সাড়ে ২৫ কেজি হরিণের মাংস উদ্ধার করেছে বন বিভাগ। মঙ্গলবার বিকালে উপজেলার হোয়াইক্যং ইউনিয়নের মিনা বাজারের ঝিমংখালীতে এ অভিযান পরিচালিত করা হয়। এসময় কাউকে আটক করা সম্ভব হয়নি।

টেকনাফ রেঞ্জ কর্মকর্তা মনিরুজ্জামান যায়যাযদিন কে এসব তথ্য নিশ্চিত করে জানান, একটি চক্র হোয়াইক্যংয়ের ঝিমংখালী এলাকায় কিশোরের বিপুল পরিমাণ হরিণের মাংস পাচার করছে- এমন সংবাদ পাওয়া যায়। এমন সংবাদের ভিত্তিতে বন বিভাগের একটি দল ওই এলাকায় অভিযানে যায়। এ সময় বন বিভাগের উপস্থিতি টের পেয়ে সংঘবদ্ধ শিকারির দল দ্রুত পালিয়ে যায়। পরে প্লাস্টিক মুড়ানো সাড়ে ২৫ কেজি মাংস উদ্ধার করা হয়। উদ্ধার করা হরিণের মাংস গুলো কেরোসিন দিয়ে মাটিতে পুঁতে ফেলা হয়েছে।

তিনি আরও জানান, এ ঘটনার সাথে জড়িত কাউকে আটক করা সম্ভব হয়নি। শিকারিরা হরিণের মাংস ফেলে বনের ভিতর পালিয়ে যায়। এ ঘটনার সাথে জড়িত ব্যক্তিদের শনাক্ত করে আইন আওতায় আনার চেষ্টা চলছে।

এ সময় আরো উপস্থিত ছিলেন, উপজেলা সহকারী কমিশনার ভূমি এরফানুল হক চৌধুরী ও বন বিট কর্মকর্তা মো. আবুল কালাম সরকার।

Annex 11: List of dead elephants at Cox's South Forest Division from January 2005 to August 2022

"শেখ হাসিনার নির্দেশ
জলবায়ু সহিষ্ণু বাংলাদেশ।"

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
বিভাগীয় বন কর্মকর্তার কার্যালয়
কক্সবাজার দক্ষিণ বন বিভাগ।

বিষয়ঃ বন্যহাতি মারা যাওয়া সংক্রান্ত তথ্যাদি
হালনাগাদের তারিখ: ১ লা ডিসেম্বর, ২০২২

ক্রঃ নং	হাতির মৃত্যুর তারিখ	হাতি মৃত্যুর স্থান	আনুমানিক বয়স	পুরুষ হাতি	মাদি হাতি	বাচ্চা হাতি	সর্বমোট	হাতি মারা যাওয়ার কারণ	গৃহীত ব্যবস্থা	পোস্ট মর্টেম রিপোর্ট এবং থানায় এজাহারের কপি
১	২	৩	৪	৫	৬	৭	৮	৯	১০	১১
১.	০১/০২/২০০৫	মোচনী বিট টেকনাফ রেঞ্জ	২৫ বছর	০	০১	০	০১	প্রসব জনিত কারণে মৃত্যু	জিডি নং- ২১, তারিখঃ ০১/০২/২০০৫ খ্রিঃ	-
২.	০৩/০৩/২০০৫	টেকনাফ বিট টেকনাফ রেঞ্জ	৭০ বছর	০	০১	০	০১	ফুসফুস ও প্রজননতন্ত্রে সংক্রমণ জনিত কারণে মৃত্যু	জিডি নং- ৮৭, তারিখঃ ০৩/০৩/২০০৫ খ্রিঃ	-
৩.	০৫/১১/২০০৫	উখিয়া বিট উখিয়া রেঞ্জ	৫ বছর	০১	০	০	০১	ধান ক্ষেত নষ্ট করায় গুলি করে হত্যা	জিডি নং- ২৭৮, তারিখঃ ০৮/১২/২০০৫ খ্রিঃ	-
৪.	১৫/০১/২০০৬	দোছড়ি বিট উখিয়া রেঞ্জ	-	০১	০	০	০১	-	জিডি নং- ৫৪১, তারিখঃ ১৬/০১/২০০৬ খ্রিঃ	-
৫.	১৬/১২/২০০৬	মধ্যহ্লীলা বিট টেকনাফ রেঞ্জ	২৫ বছর	০	০১	০	০১	পাহাড়ের চূঁড়া হতে পড়ে মৃত্যু	জিডি নং- ৫৯৬, তারিখঃ ১৭/১২/২০০৬ খ্রিঃ	-
৬.	১৮/০৩/২০০৭	চাইন্দা বিট কক্সবাজার রেঞ্জ	-	০১	০	০	০১	দুই পুরুষ হাতি লড়াই করে মৃত্যু	জিডি নং- ৯৮২, তারিখঃ ২০/০৩/২০০৭ খ্রিঃ	-
৭.	১৯/০৭/২০০৭	টেকনাফ বিট টেকনাফ রেঞ্জ	১০ বছর	০১	০	০	০১	উঁচু পাহাড় হতে পড়ে মৃত্যু	জিডি নং- ৭১৮, তারিখঃ ২০/০৭/২০০৭ খ্রিঃ	-
৮.	১০/০৩/২০০৮	টেকনাফ বিট টেকনাফ রেঞ্জ	১ বছর	০	০	০১	০১	উঁচু পাহাড় হতে পড়ে মৃত্যু	-	-
৯.	০৯/১২/২০১১	রইক্ষ্যং বিট হোয়াইক্যং রেঞ্জ	৮ বছর	০	০১	০	০১	দেহের পশ্চাৎ ভাগে টিউমার আক্রান্ত হয়ে মৃত্যু		-
১০.	২৬/১১/২০১২	খুনিয়াপালং বিট ধোয়াপালং রেঞ্জ	৭ বছর (আনুঃ)	০	০১	০	০১	২৯/১২/১২ খ্রিঃ তারিখ দেহের বিভিন্ন অংশ পঁচা গলা ও আলাদা আলাদা অবস্থায় পাওয়ায় মৃত্যুর কারণ নির্ধারণ করা যায় নি।	জিডি নং- ১৩, তারিখঃ ২৯/১১/২০১২ খ্রিঃ	-
১১.	২৭/০১/২০১৩	চাইন্দা বিট কক্সবাজার রেঞ্জ	৩৫-৪০ বছর	০	০১	০	০১	প্রাকৃতিক কারণে মৃত্যু	জিডি নং- ১০৪৩, তারিখঃ ২৭/০১/২০১৩	-
১২.	১৭/১০/২০১৩	মধ্যহ্লীলা বিট টেকনাফ রেঞ্জ	৭৫ বছর	০	০১	০	০১	বার্ধক্যজনিত কারণে মৃত্যু	-	-

১৩.	১৯/১১/২০১৩	ইনানী বিট ইনানী রেঞ্জ	-	০	০১	০	০১	গর্ভবতী অবস্থায় উঁচু পাহাড় হতে পড়ে মৃত্যু।	-	-
১৪.	১৮/০৩/২০১৪	রাজারকুল বিট, রাজারকুল রেঞ্জ	২৫ বছর	০	০১	০	০১	উঁচু পাহাড় হতে পড়ে মৃত্যু।	জিডি নং- ৮৪৫/১৪, তারিখঃ ১৮/০৩/২০১৪ খ্রিঃ	-
১৫.	১০/০৬/২০১৪	রইক্ষ্যং বিট হোয়াইক্যং রেঞ্জ	৪০ বছর	০১	০	০	০১	প্রাকৃতিক কারণে মৃত্যু	জিডি নং- ৩৯, তারিখঃ ১০/০৬/২০১৪ খ্রিঃ	-
১৬.	২৮/১১/২০১৪	মোছারখোলা টহল ফাঁড়ি উখিয়া রেঞ্জ	৫০ বছর	০	০১	০	০১	দুষ্কৃতকারীদের গুলিতে	জিডি নং- ১৯, তারিখঃ ০৯/১২/২০১৪ খ্রিঃ	-
১৭.	২৭/০৩/২০১৭	শিলখালী বিট শিলখালী রেঞ্জ	-	০	০১	০	০১	বার্ধক্যজনিত কারণে	জিডি নং- ১৩৫২, তারিখঃ ২৮/০৩/২০১৭ খ্রিঃ	-
১৮.	০৩/০৫/২০১৭	মধ্যহ্লীলা বিট টেকনাফ রেঞ্জ	-	০	০১	০	০১	হার্ট অ্যার্টাকে মৃত্যু	জিডি নং- ১১৭, তারিখঃ ০৩/০৫/২০১৭ খ্রিঃ	পোস্ট মর্টেম রিপোর্ট ০৫ পাতা
১৯.	১৮/০৬/২০১৭	কলাতলী বিট কক্সবাজার রেঞ্জ	১০-১২ বছর	০১	০	০	০১	পাহাড় হতে পড়ে মারা যায়।	জিডি নং- ১২৬১, তারিখঃ ১৯/০৬/২০১৭ খ্রিঃ	পোস্ট মর্টেম রিপোর্ট ০১ পাতা
২০.	২৪/০৭/২০১৭	টেকনাফ বিট টেকনাফ রেঞ্জ	৫ বছর	০	০	০১	০১	পানিতে ডুবে শ্বাসরুদ্ধ হয়ে মৃত্যু		পোস্ট মর্টেম রিপোর্ট ০১ পাতা
২১.	২৭/১২/২০১৮	মোচনী বিট টেকনাফ রেঞ্জ	৯৭-১০০ বছর	০	০১	০	০১	বার্ধক্যজনিত কারণে মৃত্যু	জিডি নং- ১১২২, তারিখঃ ২৮/১২/২০১৮ খ্রিঃ	পোস্ট মর্টেম রিপোর্ট ০১ পাতা
২২.	২৩/০২/২০১৯	ইনানী বিট ইনানী	৪-৫ বছর	০	০	০১	০১	উঁচু পাহাড় হতে পড়ে অভ্যন্তরীন রক্ত ক্ষরণ ও শ্বাসতন্ত্র বিকল হয়ে মৃত্যু	-	পোস্ট মর্টেম রিপোর্ট ০২ পাতা
২৩.	২১/০৩/২০২০	ধোয়াপালং বিট ধোয়াপালং রেঞ্জ	২৫ বছর	০১	০	০	০১	ফুসফুস ও ক্ষুদ্রান্তে সংক্রমন জনিত কারণে	জিডি নং- ১১৩২, তারিখঃ ২২/০৩/২০২০ খ্রিঃ	পোস্ট মর্টেম রিপোর্ট ০২ পাতা
২৪.	০৪/০৪/২০২০	রইক্ষ্যং বিট হোয়াইক্যং রেঞ্জ	২৫ বছর	০	০১	০	০১	পেছনের ডান পা ভেঙ্গে সংক্রমনে মৃত্যু	--	পোস্ট মর্টেম রিপোর্ট ০১ পাতা
২৫.	১২/০৬/২০২০	হ্লীলা বিটের টেকনাফ রেঞ্জ	৩৫ বছর	০১	০	০	০১	বিদ্যুতের তারে স্পর্শ জনিত কারণে বিদ্যুতায়িত হয়ে মৃত্যু হয়।	পিওআর নং- ১৪/টেক অব ২০১৯-২০, তারিখঃ ১৬/০৬/২০২০ খ্রিঃ।	পোস্ট মর্টেম রিপোর্ট ০১ পাতা ও পিওআর মামলার কপি ০৩ পাতা
২৬.	২৫/১০/২০২০	পানেরছড়া বিট, পানেরছড়া রেঞ্জ	০১ দিন			০১	০১	প্রসবকালীন সময়ে মৃত্যু	রামু থানার জিডি নং-১০৪৭, তারিখ ২৬/১০/২০২০	
২৭.	১৫/১১/২০২০	তুলাবাগান বিটের, পানেরছড়া রেঞ্জ	৩০ বছর	০১			০১	সংরক্ষিত বনের পাশ্ববর্তী লোকালয়ে প্রবেশ করলে দুষ্কৃতশারী কর্তৃক বিদ্যুতের তারের পাতা ফাঁদে বিদ্যুতায়িত হয়ে পুরাতন আঘাতজনিত কারণে মৃত্যু	৩ জন জ্ঞাত ও ৪/৫ জন অজ্ঞাত আসামীর বিরুদ্ধে রামু থানায় মামলা নং-৪৭/১৭-১১-২০২০ এবং বিজ্ঞ আদালতে পিওআর মামলা নং-০২/পিসি ২০২০-২১, তারিখঃ	পোস্টমর্টেম রিপোর্ট ০২ পাতা ও পিওআর মামলার কপি ০৭ পাতা

									১৭/১১/২০২০ খ্রিঃ দায়ের করা হয়েছে।	
২৮.	০২/০৩/২০২১	শাপলাপুর বিট, হোয়াইক্যং রেঞ্জ	৬০ বছর		০১		০১	বার্ধক্যজনিত কারণে মৃত্যু	টেশনাফ মডেল থানা, কক্সবাজারে সাধারণ ডায়েরী করা হয়েছে। যা নম্বর ৬৫৭, তারিখ-১৪/০৩/২০২১ খ্রিঃ।	পোস্ট মর্টেম রিপোর্ট ০৩ পাতা ও সাধারণ ডায়েরী ০১ পাতা
২৯.	৩১/০৮/২০২১	খুনিয়াপালং বিট, ধোয়াপালং রেঞ্জ	২০-২৫ বছর		০১		০১	দুষ্কৃতিকারী কর্তৃক বিদ্যুতের তারের পাতা ফাঁদে বিদ্যুতায়িত হয়ে মৃত্যু।	পিওআর মামলা নং-০১/ধোয়া অব ২০২১-২২, তারিখঃ ৩১/০৮/২০২১ খ্রিঃ এবং রামু থানার সাধারণ ডায়েরী নং-১২১৩, তারিখঃ ৩১/০৮/২০২১ খ্রিঃ।	পোস্ট মর্টেম রিপোর্ট ০২ পাতা, সাধারণ ডায়েরী ০১ পাতা ও পিওআর মামলার কপি ০৩ পাতা।
৩০.	২০/০৯/২০২১	মোচনী বিট, টেকনাফ রেঞ্জ	১৫-১৬ বছর	১ টি			০১	পাহাড়ের উঁচু চূড়া হতে পড়ে মৃত্যু	------	পোষ্ট মর্টেম রিপোর্ট
৩১.	২৫/০৯/২০২১	মোচনী বিট, টেশনাফ রেঞ্জ	৭-৮ বছর		১ টি		০১	পাহাড়ের উঁচু চূড়া হতে পড়ে মৃত্যু	-----	পোষ্ট মর্টেম রিপোর্ট
৩২.	৩১/১২/২০২১	রইক্ষ্যং বিট, হোয়াইক্যং রেঞ্জ				০১	০১	প্রসবকালীন সময়ে মৃত্যু	টেকনাফ থানার জিডি নং-২৫ তারিখ-০১/০১/২০২২ নোট বহি পাতা নং ৫৫/৫৭	পোষ্ট মর্টেম রিপোর্ট
৩৩.	২৩/১০/২০২২	রাজাপালং বিট, ইনানী রেঞ্জ	২৫ বছর	১ টি			০১	দুষ্কৃতিকারী কর্তৃক বিদ্যুতের তারের ফাঁদ দ্বারা মৃত্যু।	বন আদালত, কক্সবাজার পিওআর মোকদ্দমা নং - ০৫/রাজা/১৮/ইনা অব ২০২২-২৩, তারিখ ২৩/১০/২০২২	পোষ্ট মর্টেম রিপোর্ট

সারসংক্ষেপ

ক্রমিক নং	হাতি মৃত্যুর কারণ	সংখ্যা
১।	প্রসবকালীন/জন্মকালীন সময়ে মৃত্যু	০২ টি
২।	প্রাকৃতিক / অসুস্থতাজনিত কারণে মৃত্যু	১৮ টি
৩।	বার্ধক্যজনিত কারণে মৃত্যু	০৫ টি
৪।	দুষ্কৃতিকারী কর্তৃক পাতা ফাঁদে/ বিদ্যুতায়িত হয়ে / গুলিতে মৃত্যু	০৬ টি
৫।	অজ্ঞাত কারণে মৃত্যু	০২ টি

মোট = ৩৩ টি

Annex 12: List of death and injured persons by animal attack at Cox's Bazar South Forest area

"শেখ হাসিনার নির্দেশ
জলবায়ু সহিষ্ণু বাংলাদেশ।"

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
বিভাগীয় বন কর্মকর্তার কার্যালয়
কক্সবাজার দক্ষিণ বন বিভাগ।

বিষয়ঃ বন্যহাতি দ্বারা আক্রান্ত জানমালের ক্ষয়ক্ষতি সংক্রান্ত তথ্যাদি
তারিখঃ ৩১ ডিসেম্বর ২০২২ ইং

ক্রমিক নং	নাম ও ঠিকানা	হাতি দ্বারা আক্রান্ত হওয়ার ঘটনাস্থল	আহত/ নিহত	ক্ষতিপূরণ প্রাপ্তির পরিমাণ	আক্রান্ত হওয়ার তারিখ
১.	শাহিদুল ইসলাম বাপ্পী ঠিকানা- হাবিবুল্লাহর বাড়ী, ঘোনারপাড়া, ঝিলংজা, রামু, কক্সবাজার।	পানেরছড়া রেঞ্জ, পানেরছড়া বিট এর বনতলার ছেংছড়ি নামক এলাকা	নিহত	তিন লক্ষ টাকা প্রদানের জন্য সুপারিশপ্রাপ্ত	০৬/১১/২০২১
২.	সাহিদুল ইসলাম (বাগানমালী, আউটসোর্সিং) ঠিকানা- ফাজেল হাজীর বাড়ী, হারামিয়া,বকতার হাট-৪৩০০, সন্দীপ, চট্টগ্রাম।	পানেরছড়া রেঞ্জ, পানেরছড়া বিট এর বনতলার ছেংছড়ি নামক এলাকা	আহত	এক লক্ষ টাকা প্রদানের জন্য সুপারিশপ্রাপ্ত	০৬/১১/২০২১
৩.	মোঃ সোহেল রানা (বিট কর্মকর্তা) ঠিকানা- মহানন্দপুর, এবাদত নগর, সখিপুর, টাংগাইল।	পানেরছড়া রেঞ্জ, পানেরছড়া বিট এর বনতলার ছেংছড়ি নামক এলাকা	আহত	চিকিৎষা সনদ প্রাপ্তি সাপেক্ষে ক্ষতিপূরণ প্রদানের জন্য সুপারিশপ্রাপ্ত	০৬/১১/২০২১
৪.	মোঃ আনোয়ার ,ঠিকানা- তুলাবাগান, রাবেতা, রামু, কক্সবাজার।	পানেরছড়া রেঞ্জ, পানেরছড়া বিট এর বনতলার ছেংছড়ি নামক এলাকা	আহত	চিকিৎষা সনদ প্রাপ্তি সাপেক্ষে ক্ষতিপূরণ প্রদানের জন্য সুপারিশপ্রাপ্ত	০৬/১১/২০২১
৫.	মোঃ নজরুল (ইআরটি সদস্য)	পানেরছড়া রেঞ্জ, পানেরছড়া বিট এর বনতলার ছেংছড়ি নামক এলাকা	আহত	------	০৬/১১/২০২১
৬.	এস. এম শুকুকুর মাহমুদ সাং- ডেন্ডাবর, নতুন পাড়া, ডাকঘর- সাভার - ১৩৪৪, ঢাকা।	রাজারকুল রেঞ্জ এর রামু উপজেলাধীন রামু সেনানিবাস এলাকায় ডিউটিরত অবস্থায় হাতির আক্রমনে আহত	আহত	পঞ্চাশ হাজার টাকা	১৫/০৪/২০১৮
৭.	নুর আহামদ ,ঠিকানা- সাং- দেয়াংপাড়া, রাজারকুল, রামু, কক্সবাজার।	রাজারকুল রেঞ্জ এর রামু উপজেলাধীন হুগলিয়াকাটা এলাকায় নিজ বসতবাড়ীতে প্রবেশ করার সময় হাতি দ্বারা আক্রান্ত	নিহত	জবরদখলকারী হওয়ায় ক্ষতিপূরণ দেয়া হয়নি।	১৯/০৪/২০১৮
৮.	জহুরলাল পাল, ঠিকানা- রামকুট, রাজারকুল , রামু কক্সবাজার।	রাজারকুল রেঞ্জ এর রামু উপজেলাধীন সোনইছড়ি যাওয়ার সময় পাঞ্জেরখানার পূর্ব পার্শ্বে	নিহত	জবরদখলকারী হওয়ায় ক্ষতিপূরণ দেয়া হয়নি।	২৯/০৪/২০১৮
৯.	নুর বেগম, ঠিকানা- শামলাপুর, নয়াপাড়া, বাহারছড়া ইউপি, থানা- টেকনাফ, কক্সবাজার।	হোয়াইক্যং রেঞ্জের আওতাধীন মরহুমের নিজ বসতবাড়ীর আঙ্গিনায়	নিহত	তিন লক্ষ টাকা প্রদানের জন্য সুপারিশপ্রাপ্ত	০৫/০৭/২০২২
১০.	শিফা আক্তার, পিতা-মৃত নুর মোহাম্মদ,	শিলখালী রেঞ্জের শিলখালী বিটের শিলছড়ি পাড়া নামক এলাকায়	নিহত	জবরদখলকারী হওয়ায় ক্ষতিপুরন দেয়া হয়নি	১১/১১/২০২১

Annex 13: Camp-based Information on Flood

Sl. No.	Camp No.	Flood occurs (+ mark means flood occurs)	Level of flood (1 = Low, 2 = Medium, 3 = High)	People died from 2017 to till date
1	KTRC	+	1	No
2	1E	+	2	No
3	1W	+	2	No
4	2E	+	2	No
5	2W	+	2	No
6	3	+	2	Yes
7	4	+	3	No
8	4 Ext			
9	5			
10	6	+	2	No
11	7	+	1	No
12	8E	+	1	No
13	8W			
14	9	+	2	No
15	10	+	2	No
16	11	+	1	No
17	12	+	1	No
18	13	+	1	No
19	14	+	2	Yes
20	15	+	1	No
21	16			
22	17	+	2	No
23	18			
24	19	+	2	No
25	20	+	1	No
26	20 Ext	+	2	No
27	21	+	3	No
28	22			
29	NRC	+	2	1
30	24	+	2	No
31	25			
32	26	+	2	2
33	27	+	1	1
Total people died				4

N.B.: This is the average flood situation of the camps. The table was prepared based on visits to the camps and information collected from the CiC Offices during 2018-2022. The situation is improving day by day by taking different initiatives such as the construction of drains, the creation of water parsing pathways, etc.

Annex 14: Questionnaire for Brickfield Survey

Date: **Related to Camp No.**

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1. Name of Brickfield: 2. Year of Establishment: 3. Address:

4. Owner of Brickfield:

5. GPS Coordi.-Lat.: GPS Coordi.-Long:

6. Education (Brickfield owner): Illiterate/Below SSC/SSC/HSC/Graduate

7. Other Occupation: 8. Age: 9. Sex: M / F 10. Living Duration:

11. Monthly income (Average):

12. Mobile: 13. ID:

14. Distance of the brickfield from the forest (km)……

15. Soil collection for brick production from… . . . . . .

16. Labourers are local/Rohingya/Mixing (local: Rohingya:)

17. Raw materials for Brick kiln (kg) (Wood fuel_____/coal_____/Other_____):

18. If wood fuel is used, what is the source of wood fuel?

19.

Brick production in the Year 2016	Price per thousand bricks:
Brick production in the Year 2017	Price per thousand bricks:
Brick production in the Year 2018	Price per thousand bricks:
Brick production in the Year 2019	Price per thousand bricks:
Brick production in the Year 2020	Price per thousand bricks:
Brick production in the Year 2021	Price per thousand bricks:
Brick production in the Year 2022	Price per thousand bricks:

20. Is there any elephant corridor/route adjacent to/through the brickfield? Y/N

21. Any record of human-wildlife conflict in the brick-field in the last 10 years (Number):. . . .

22. Other comments: