Government of the People's Republic of Bangladesh
Department of Disaster Management
Ministry of Disaster Management and Relief

MRVAM

MULTI HAZARD
RISK AND
VULNERABILITY
ASSESSMENT,
MODELING AND MAPPING

FINAL REPORT OF MULTI HAZARD RISK AND VULNERABILITY ASSESSMENT, MODELING AND MAPPINGIN IN BANGLADESH

VOLUME III: ELEMENTS AT RISK

POPULATION, HOUSING, LIVELIHOOD, CRITICAL FACILITIES AND INFRASTRUCTURE

Government of the People's Republic of Bangladesh

Report on Multi-Hazard, Risk and Vulnerability Assessment, Modelling and Mapping in Bangladesh

Volume – III: Elements at Risk

(Population, Housing, Livelihood, Critical Facilities and Infrastructure)

Department of Disaster Management
Ministry of Disaster Management and Relief

Message from Secretary, MoDMR

Government of the Peoples' Republic of Bangladesh had initiated the 'Emergency 2007 Cyclone Recovery and Restoration Project (ECRRP)' under DDM, LGED & BWDB with the assistance of the World Bank for Disaster Risk Mitigation and Reduction. Multi-hazard Risk and Vulnerability Assessment, Modeling and Mapping (MRVAM) is one of the initiatives under ECRRP, D1(DDM component) to assess risk and vulnerability of 8(eight) major hazards like Flood, Cyclone induced Storm Surge, Landslide, Drought, Earthquake, Tsunami, Technological & Health hazards. Component D1 is designed to contribute towards 'building long-term preparedness by strengthening disaster risk management' through strengthening and enhancement of long-term disaster risk mitigation and reduction ability of the DDM. This study is very important, due to the geographical location and topographical features of Bangladesh, exposed the country to almost all kinds of natural disasters and a large-scale disasters in Bangladesh has been observed at a frequency of 5-6 years.

I am very happy to know that ECRRP-D1 project is going to publish comprehensive Report on MRVAM with the help of ADPC, Thailand and IWM, Bangladesh. This study will supplement the efforts of the government to incorporate disaster risk reduction issues in all development programmes to build a safe and disaster resilience nation, referring to the SOD-2010, Disaster Management Act-2012, Disaster Management Policy-2015, and National Disaster Management Plan 2010-15. Alongside by the government, all including non- governmental organizations (NGOs) and civil society should come forward to build an effective disaster management infrastructure to reduce the post-disaster losses. District and local level officials who are frequently involved with the disaster damage assessment, management, preparedness and risk & vulnerability reduction activities will be benefitted by using these national level risk assessment map and database from this project.

Md. Shah Kamal
Secretary
Ministry of Disaster Management and Relief

Message from DG, DDM

Bangladesh has made a strong commitment to implement Hyogo Framework for Action (HFA) during 2005-2015 for critical guidance in efforts to reduce disaster risk and the Multi-Hazard Risk and Vulnerability Assessment, Modeling and Mapping (MRVAM) project initiated under 'Emergency 2007 Cyclone Recovery and Restoration Project (ECRRP)' as D1 component has advanced Bangladesh's progress in Priority Action 2: Identify, assess and monitor disaster risks and enhance early warning. In continuation of this, outcome of this project "Multi-Hazard Risk Assessment at national level" is in line with Priority 1: 'Understanding disaster risk' of Sendai Framework for Disaster Risk Reduction 2015-2030, adopted in the 3rd World Conference on Disaster Risk Reduction, held from 14 to 18 March 2015 in Sendai, Miyagi, Japan.

The findings of MRVAM project has create the basis for "building long term preparedness through strengthening disaster risk management capacity in the country as well as for enhancement of long term disaster risk mitigation and reduction ability of the Department of Disaster Management (DDM)". On the other hand, MRVAM project outcome has created awareness among the district and upazila level officials and will help in contributing towards incorporating appropriate risk-reduction strategies and prioritizing them into the country's development planning process.

In addition to this, the findings of this study 'risk information of population, housing and livelihood at upazila level' will allow decision makers to prioritize risk mitigation investments and measures to strengthen the emergency preparedness and response mechanisms for reducing the losses and damages due to future disaster events.

(Md. Reaz Ahmed)
Director General (Additional Secretary)
Department of Disaster Management

Message from PD, ECRRP-D1, DDM

Multi-Hazard Risk and Vulnerability Assessment, Modeling and Mapping (MRVAM) project implemented as a part of sub-component D1.2 'Emergency 2007 Cyclone Recovery and Restoration Project (ECRRP)', by Department of Disaster Management (DDM) is an efforts towards 'building long-term preparedness through strengthened disaster risk management', through the strengthening and enhancement of the long-term disaster risk mitigation and reduction ability of the DDM.

This project has developed enormous quantity of database representing multi-hazards of Flood, Cyclone induced Storm Surge, Landslides, Drought, Earthquake, Tsunami, Technological and Health along with national level database representing population, housing, livelihood, critical facilities, infrastructure which can be used at Union / Upazila level for development planning process.

DDM has established Multi-Hazard Risk and Vulnerability Assessment (MRVA) Cell, in which geo-database of hazard, exposure and risk assessment at upazila level developed in this project and hosted in the state of the hardware & software facilities. I take this opportunity to state that, this will enhance the capacity of the department to monitor the hazard, exposure and risk assessment, in this way, all the government agencies, professionals and researchers will be benefitted in contributing towards disaster risk reduction in Bangladesh.

(M. Khalid Mahmood)
Joint Secretary and Director (Planning & Development)
Project Director, ECRRP-D1
Department of Disaster Management

Preface

A category IV cyclone *SIDR* struck in the south west coast of Bangladesh on November 15, 2007 evening and moved inland, destroying infrastructure, causing numerous deaths, disrupting economic activities, and affecting social conditions. As most all of Bangladesh is considered as a Delta just above sea level, tidal surge of 15-20 feet and gail-force winds of approximately 150 mph creates havoc in most of the area. The aim of the assessment was to identify priority areas to support the Government of Bangladesh in cyclone recovery efforts as well as to recommend priority interventions for a long-term disaster management strategy. The preparation of Multi-Hazard Risk and Vulnerability Assessment, Modelling and Mapping (MRVAM) project has identified the damage needs and quantified financial and technical requirements and established MRVA Cell in DDM, that will facilitate formulating comprehensive early recovery actions, medium-term recovery and reconstruction plans and a long-term disaster risk management and reduction strategy. The main objective to establish MRVA Cell is to strengthen and enhance country capacity in carrying out systematic multi-hazard risk assessments and consolidating and maintaining hazard risk information at central (national) and disaggregated (district) levels. This will contribute towards the realization of the specific priority attached in the country's disaster management strategy of 'defining and redefining the risk environment' of the country. The Asian Disaster Preparedness Center (ADPC), Thailand, in partnership with the Institute of Water Modeling (IWM), the Norwegian Geotechnical Institute (NGI), the Asian Institute of Technology (AIT), and the Faculty of Geo-Information Science and Earth Observation of the University of Twente (ITC), the Netherlands have been worked together to deliver consulting services on the Multi-Hazard Risk and Vulnerability Assessment, Modeling and Mapping in Bangladesh and finally have prepared the Volume I: Hydro-meteorological Hazard Assessment (Flood, Storm Surge, Landslide, Drought), Volume II: Geological and Environmental Hazard Assessment (Earthquake, Tsunami, Technological, Health), Volume III: Elements at risk, Volume IV: Vulnerability and Risk Assessment (Flood, Storm Surge, Landslide, Drought), Volume V: Vulnerability and Risk Assessment (Earthquake, Tsunami, Technological, Health), Volume VI: Summary and Recommendations.

For flood hazard and vulnerability assessment, Flood Modeling used in this study is MIKE11 Hydrodynamic Model developed by DHI, coupled with Geographic Information System (GIS) to capture the hydraulic response of Bangladesh Rivers, in-depth Flood analysis and its floodplains in extreme flooding conditions. Then a frequency analysis was carried out in the river network at 7617 grid points in order to obtain return period-wise flood levels for 25 year, 50 year, 100 year and 150 years. The model used in MRVAM project for Cyclone induced Storm Surge is called Bay of Bengal Model (BoBM). The model is developed using a MIKE21 FM modelling system, which is a numerical modelling system for the simulation of water levels and flows in estuaries, bays and coastal areas. Storm Surge hazard depth was divided into seven different depth categories in order to find the extent of surge inundation and prepare inundation maps for all return periods: 25, 50 and 100 years for the entire coastal region. The depth categories are <1 m, 1-1.5 m, 1.5-2 m, 2-3 m, 3-4 m, 4-5 m, >5 m. Earthquake hazard maps were developed using the historical data and existing geological setting for 50 year, 100 year, 200 year, 500 year and 1000 years return periods at the sites of investigation derived and interpolated to develop earthquake hazard maps representing spatial variation of Peak Ground Acceleration (PGA) Map in Bangladesh.

Simultaneously, to model the tsunamigenic conditions and the possible hazard maps due to Tsunami, have been generated for 50, 100, 200, 500 and 1000 years return period and the SPI (Standardized Precipitation Index)-Return period plots used to calculate the severity of Drought with different return periods such as the SPI values for 10, 50 and 100 years return period.

The purpose of this Multi-Hazard Risk and Vulnerability Assessment (MRVA) Modelling and Mapping study is to develop a hazard and vulnerability framework using the progression of vulnerability model to identify the root causes (problems) and the underlying pressures within coastal belt as well as whole Bangladesh. The information provided in this study was intended to assist in identifying hazards and vulnerabilities thereby building a disaster resilient Districts and Upazilas by sharing local hazards and also establishing community structures. Combining the results of the theoretical framework and research findings with the argument constructed in these Volumes I-VI about the disaster risk reduction and mitigation; it was found that it is possible to reduce hazard risks, and vulnerability to disasters, through the application of the latest GIS & RS tools and Hydrodynamic modeling and the participation of the grass-root level community in disaster risk management activities.

It is a great pleasure to successfully launch this Scientific MRVA National Document, signifying the needs and opportunities for the protection of the coastal environment as well as overall most vulnerable districts of Bangladesh and associated lives and livelihoods. The Department of Disaster Management (DDM), Ministry of Disaster Management and Relief would like to thank all those involved in the preparation and finalization of this document and would like to believe that materialization of these policies and programmes will improve overall catastrophic environment of the country as a whole and coastal environment in particular.

We would like to express our in-depth gratitude to the prominent experts of Technical Advisory Committee (TAC), the well-known and reverend group of professionals of the Country, specially, Dr. A. S. M. Maksud Kamal, Convener-TAC and Dean, Faculty of Earth and Environmental Sciences, Dhaka University; Dr. Umme Kulsum Navera, Professor, Department of Water Resources Engineering, BUET; Dr. Md. Atiqur Rahman, Joint Secretary (Admin.), Ministry of Disaster Management and Relief (MoDMR), Mr. M. A. Rouf Hawlader, Director, Survey of Bangladesh; Mr. Shamsuddin Ahmed, Director in Charge, Bangladesh Meteorological Department (BMD), Mr. Md. Shahidul Islam, GIS Analyst, CDMP-II; Mr. Mir Ahmed, Member Secretary-TAC & Director-MIM, DDM; Mr. M. Khalid Mahmood, Director (Planning & Development) & PD-ECRRP-D1, DDM; and Mr. Reaz Ahmed, Director General and MRVAM Advisor, DDM & last of all, those associated with MRVA Cell; under whose overall guidance and supervision, these MRVA Volumes were duly checked and scientifically verified, who had worked relentlessly for years to generate scientific information required for these risk and vulnerability assessments. A special appreciation to the World Bank, ERD and PCMU – Planning Commission Team, whose financial and project extension support from the beginning helped us to reach its ultimate destination.

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List of Abbreviations

ADPC	Asian Disaster Preparedness Center
AIT	Asian Institute of Technology
ARCGIS	ARC Geographic Information System
BBS	Bangladesh Bureau of Statistics
CDMP	Comprehensive Disaster Management Programme
DAE	Department of Agricultural Extension
DGHS	Directorate General of Health Services
FSCD	Fire Service and Civil Defense
LGED	Local Government Engineering Department
MRVAM	Multi-hazard Risk and Vulnerability Assessment Modeling and Mapping
RHD	Roads and Highways Department
UGC	University Grants Commission of Bangladesh
WFP	World Food Program

Multi-Hazard Risk and Vulnerability Assessment (MRVA) Report

Volume III: Elements at Risk

Chapter 1: Elements at Risk

The Multi-hazard Risk and Vulnerability Assessment Modeling and Mapping (MRVA) project will help as the catalyst for DRR practice in Bangladesh at both macro and micro level. At macro level, Government's ambitious goal is bringing its policies, institutions, and capabilities for disaster preparation, mitigation, and response up to world-class standards. At the same time, on a more micro level, the outputs of the project will help individual citizens, including the most vulnerable individuals and groups among them, to deal with all aspects of emergencies—and *helping* to save lives and property and increasing the sense of security for people throughout the country at District, City Corporation, Municipality, Upazila level.

To achieve this, a national level database of population, housing, livelihoods, critical facilities and infrastructure is developed as elements at risk database. In volume III of this report, details of these elements at risk and their exposure to flood, cyclone, storm surge, landslide, drought, earthquake, tsunami, techniological and health hazards is presented. More details of database collected for each category is given in table 1.1.

Table 0.1: Details of Elements at Risk considered in this study

S.No.	Elements at Risk category	Details of elements considered in this study
1	Population	Gender, Age, Ethnicity, Employment, Education, Disability and Poverty
2	Housing	Types of Houses (Pucka, Semi-Pucka, Kutcha, Jhupri)
3	Livelihoods	Agriculture (Transplanted Aman), industries
4	Critical facilities	Hospitals, Education, First Responders (Fire and Police stations), Cyclone Shelters
5	Infrastructure	Roads (5 types of roads), Bridge, Railways (broad gauge and narrow gauge), Power sector (Stations, Sub-stations and Transmission), Airports, Sea & River Ports

The above data is collected from different sources as mentioned in table 2.2 of volume I of this report. More details of the data collected and brief analysis is presented here.

1.1 Population

Population data is collected from Bangladesh Census 2011 developed by Bangladesh Bureau of Statistics (BBS, 2012). Salient features are,

- Total Population - 14,40,43,697
- Density (Per Sq. km) - 1015
- Sex ratio (male / female) - 100.3 / 100
- Growth Rate - 1.37 %

It is observed that Bandarban district has lowest total population (0.27%) and Dhaka district is having highest total population (8.36%). Population data at district level is analyzed based on Gender, Age, Income, Ethnicity, Employment, Education and Disability. Mode details are given in the following sections. The population density map at district level is shown in figure 1.1. The highest density of population is in Dhaka district.

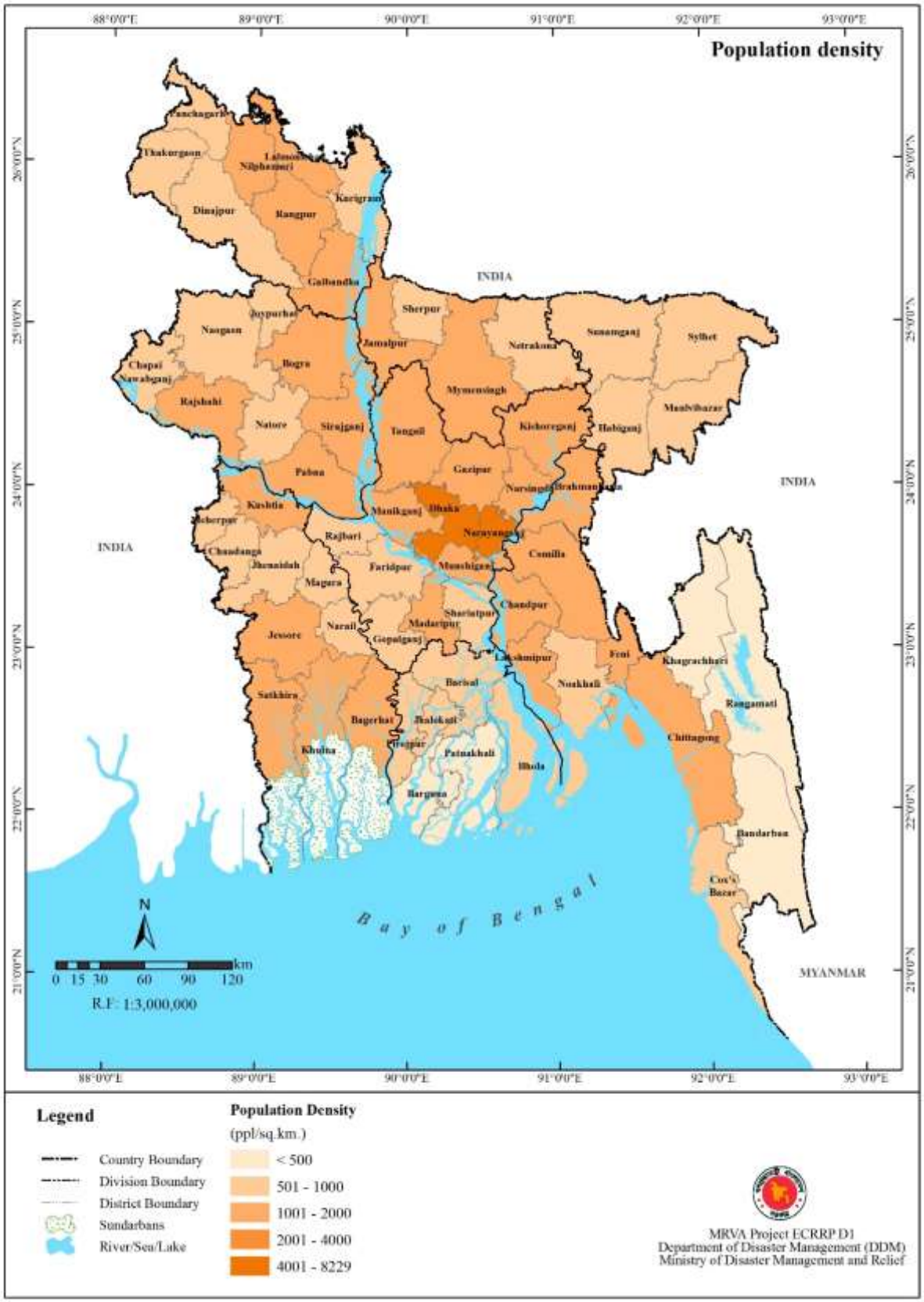

Figure 0.1: Population density at district level in Bangladesh

Source: BBS, 2012

1.1.1. Gender

Distribution of population by gender is given below. Male population represent 50.06 % and female represent 49.94 % with a gender ratio of 100.3 male per 100 female population.

- Total male population - 7,93,21,260 (50.06 %)
- Total female population - 7,93,19,967 (49.94 %)
- Sex Ratio (Number of males per 100 females) - 100.3

Sex ratio is important parameter to understand gender imbalance, if any exist in any area. This has a lot social significance because female population is considered to be more vulnerable than male. Total number of population based on gender in each division is given in table 1.2. Distribution of Population based on gender in each division is shown in figure 1.2. The sex ratio at district level is shown in figure 1.3.

Table 0.2: Number of Total, Male and Female population in different divisions

Division	Total population	Male	Female
Barisal	8,325,666	4,089,508	4,236,158
Chittagong	28,423.019	13,933,314	14,489,705
Dhaka	36433505	18,716,775	17,716,730
Khulna	15,687,759	7842533	7,845,226
Mymenshingh	10,990,913	5,455,542	5,535,371
Rajshahi	18,484,858	9,256,910	9,227,984
Rangpur	15,787,758	7,881,824	7,905,934
Sylhet	9,910,219	4,933,390	4,976,829
Country total	144,043,697	72,109,796	71,933,937

Source: BBS, 2012

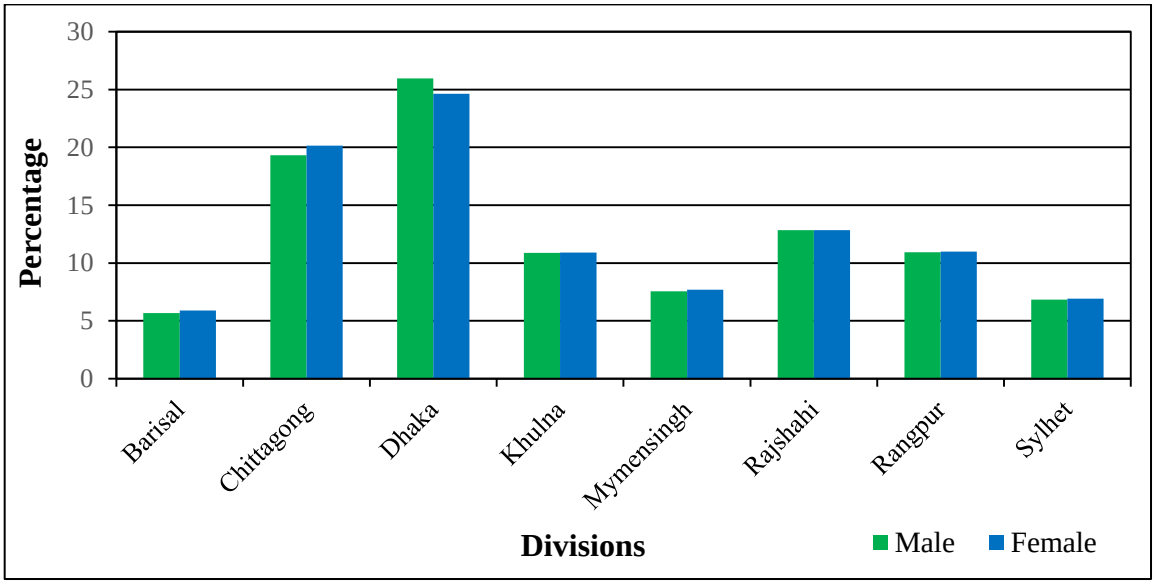

Figure 0.2: Population by gender in each division

Source: BBS, 2012

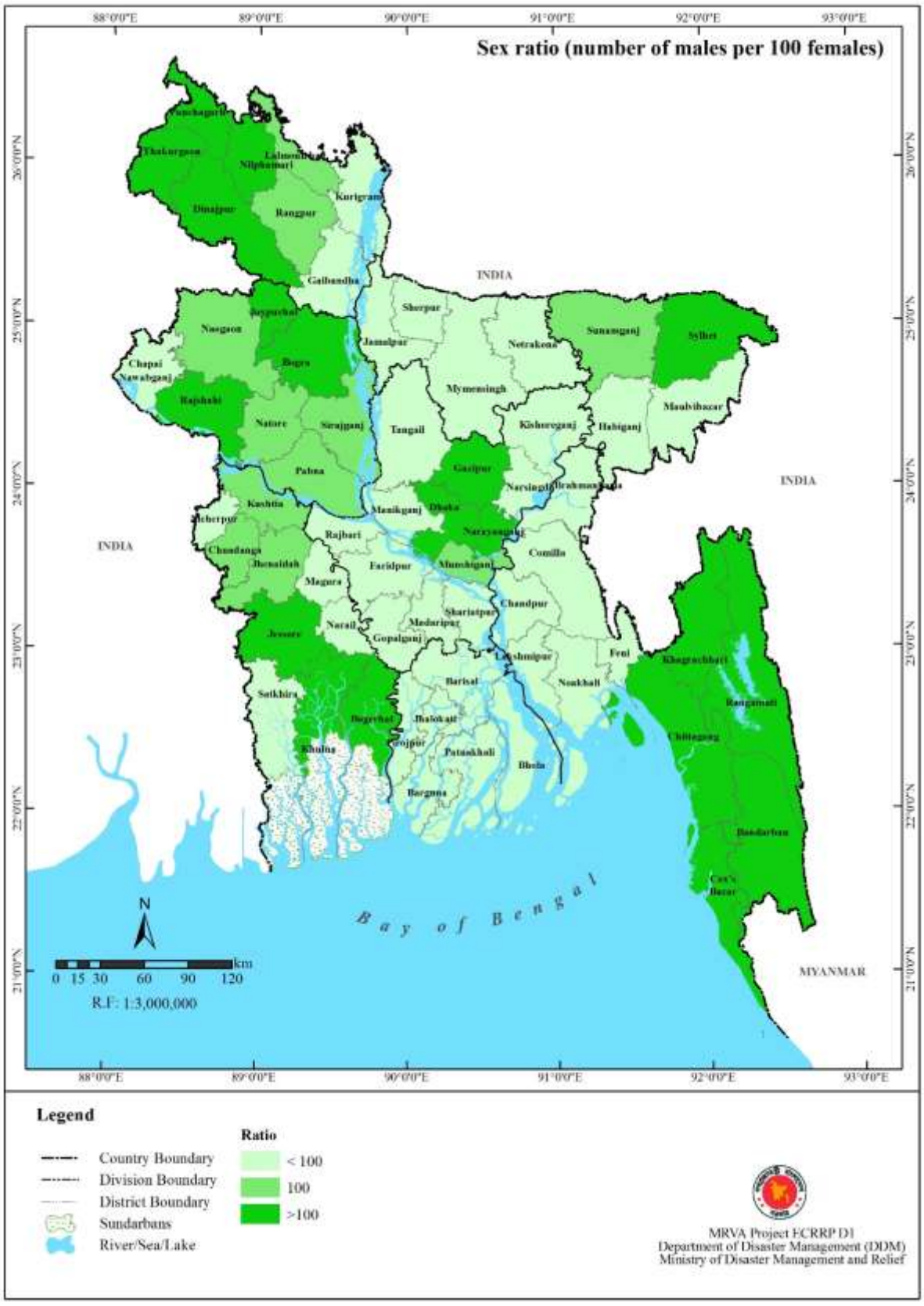

Figure 0.3: Sex Ratio at district level in Bangaldesh

Source: BBS, 2012

1.1.2. Age

Population data based on age is categorized into 10 groups in the range of 0-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-49, 50-59, 60-64 and > 65 years. Percentage of population in each age group in each division is calculated based on the number of population in a age group by the total number of population and is shown in figure 1.4.

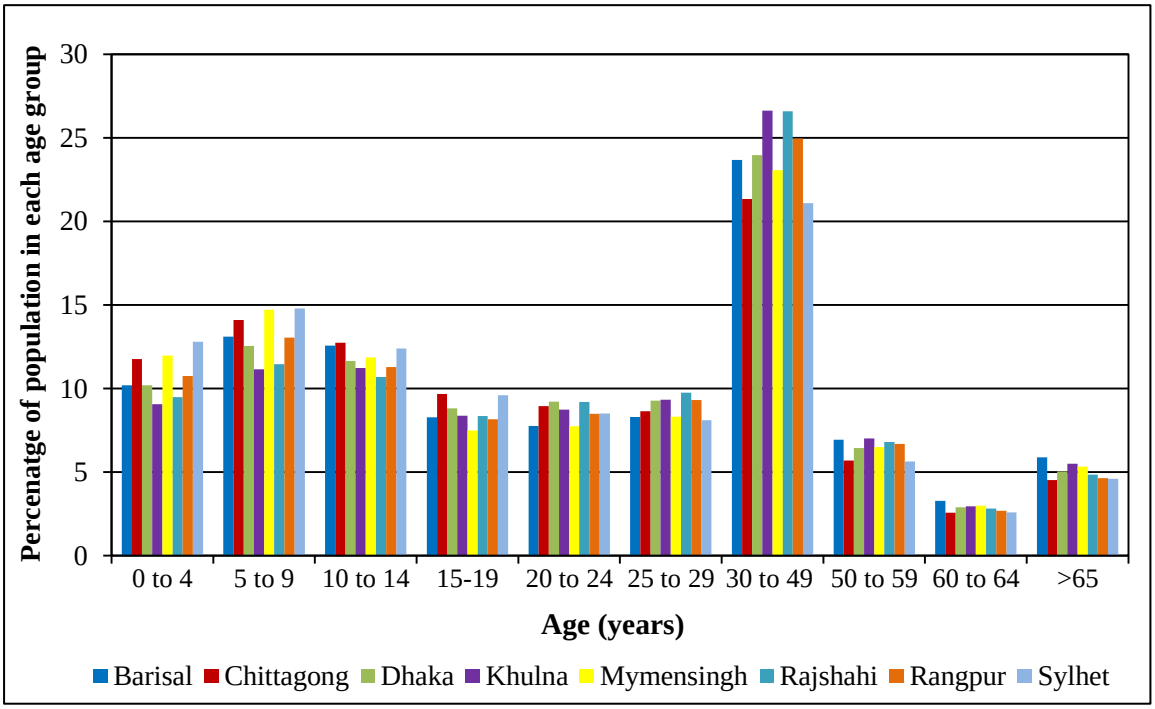

Figure 0.4: Population based on age groups in each division

Source: BBS, 2012

It is observed from figure 1.3 that population in the age group of 30- 49 years is very high at an average of 22 % compared with all other age groups. These age group categories are regrouped into 0 – 14, 15 – 59 and more than 60 years and the population in each division is given in table 1.3.

Table 0.3: Population in age groups in different divisions

Division	Age: 0 - 14	Age: 15 - 59	Age > 60
Barisal	3.027.086	4.551.592	746.986
Chittagong	10.813.662	15.562.098	2.047.259
Dhaka	11.584.497	22.385.719	2.463.286
Khulna	4.877.707	9.494.346	1.315.706
Mymensingh	4.238.096	5.840.571	912.246
Rajshahi	5.896.413	11.178.758	1.409.687
Rangpur	5.488.035	9.121.986	1.177.740
Sylhet	3.963.993	5.245.526	700.699
Country total	49.889.489	83.380.596	10.773.609

Source: BBS, 2012

The district wise lowest population and highest population among these age groups are given in table 1.4.

Table 0.4: Highest and Lowest Population based on Age group

S.No.	Age Group (range in years)	Lowest Population District and Percentage#	Highest Population District and Percentage
1	0 - 4	Dhaka (8.3%)	Sunamganj (14.4%)
2	5 - 9	Dhaka (9.2%)	Brahmanbaria (16%)
3	10 - 14	Gazipur (9.2%)	Cox's Bazar (13.9%)
4	15 - 19	Jamalpur (7.1%) & Barguna (7.1%)	Feni (11.1%)
5	20 - 24	Jhalokati (7.3%)	Gazipur (13.4%)
6	25 - 29	Jhalokati (7.5%)	Gazipur (13.1%)
7	30 - 49	Cox's Bazar (19%)	Joypurhat (29%)
8	50 - 59	Cox's Bazar (4.6%)	Manikganj (7.7%)
9	60 - 64	Cox's Bazar (2.0%) & Dhaka (2.0%)	Jhalokati (3.5%) & Manikganj (3.5%)
10	> 65	Dhaka (2.7%)	Jhalokati (6.6%)

 # - Percentage is percentage of district population only.

Source: BBS, 2012

1.1.3. Ethnicity

About 23 categories of Ethnic Population are living in Bangladesh. They are, *Barmon, Chakma, Coach, Cool, Dalu, Garo, Hajong, Khasia, Khiyang, Khumi, Lusai, Malpahari, Marma, Monda, Monipuri, Mro, Orao, Pahari, Rakhain, Sawntal, Tanchaynga, Tripura* and Others. Percentage of ethnic population is 1.1 %, who are living in about 1.11 % of households. Number of ethnic population in each division is given in table 1.5.

Table 0.5: Number of ethnic population in different divisions

Division Name	Ethnic Male	Ethnic Female
Barisal	1470	1442
Chittagong	453879	441273
Dhaka	35943	34126
Khulna	20231	20299
Mymensingh	38505	40449
Rajshahi	121395	123969
Rangpur	50514	51501
Sylhet	74500	74560
Country total	796437	787619

Source: BBS, 2012

Among them 50.28 % are male and 49.72 % are female. Among these ethnic 4 groups which constitute about 70% of the population are *Chakma's* (29.4 %), *Others* (20.8%), *Marma* (12.75%) and *Tripura* (7.56%).

In total 64 districts, Chakma population are distributed in about 35 districts, Marma are in about 13 districts and Tripura about 16 districts, where as Other category exists in almost all the districts.

1.1.4. Employment

The employment status of population is categorized into *Employed, Looking for work, House hold work* and *Don't work* categories. In these categories, population (male and female) who are *employed, looking for work* and *house hold work* (female) and *Don't work* (male) is lowest in Jhalokati. Male who are involved in *house hold work* is lowest in Meherpur and *Don't work* (female) is lowest in Bandarban. Most population (male and female) employed are in Dhaka district. Female looking for work and Male who don't work are also highest in Dhaka district. Most of the population (male and female) who are more than 7 years of age and not attending school but are employed are lowest in Jhalokatii and highest in Dhaka district.

Categories of employment types are *Agriculture, Industry* and *Services*. Number of population employed in agriculture and industry sectors based on gender is given in table 1.6.

Table 0.6: Number of population based on employment type

Division	Employment by Agriculture		Employment by Industry	
	Male	Female	Male	Female
Barisal	442,015	16,019	30,233	3,202
Chittagong	1,391,953	99,704	175,963	48,539
Dhaka	1,742,615	51,031	493,971	238,051
Khulna	1,213,116	35,835	85,587	16,701
Mymensingh	1,254,023	41,387	65,573	14,552
Rajshahi	1,812,839	50,447	175,691	21,445
Rangpur	1,570,934	75,025	70,278	10,265
Sylhet	726,189	53,451	66,983	19,929
Country total	10,153,684	422,899	1,164,279	372,684

Source: BBS, 2012

Population (male and female) employed in *Agriculture* activity is lowest in Jhalokati and highest men are in Mymensingh and highest female are in Bandarban. In case of *Industry*, lowest Population (male and female) in Meherpur and highest in Dhaka. In *service sector*, lowest male is in Bandarban, lowest female is in Jhalokati, whereas highest male and female are in Dhaka. Distribution of population (male) in different activities at district level is given in figure 1.5. Distribution of population (female) in different activities at district level is given in figure 1.6.

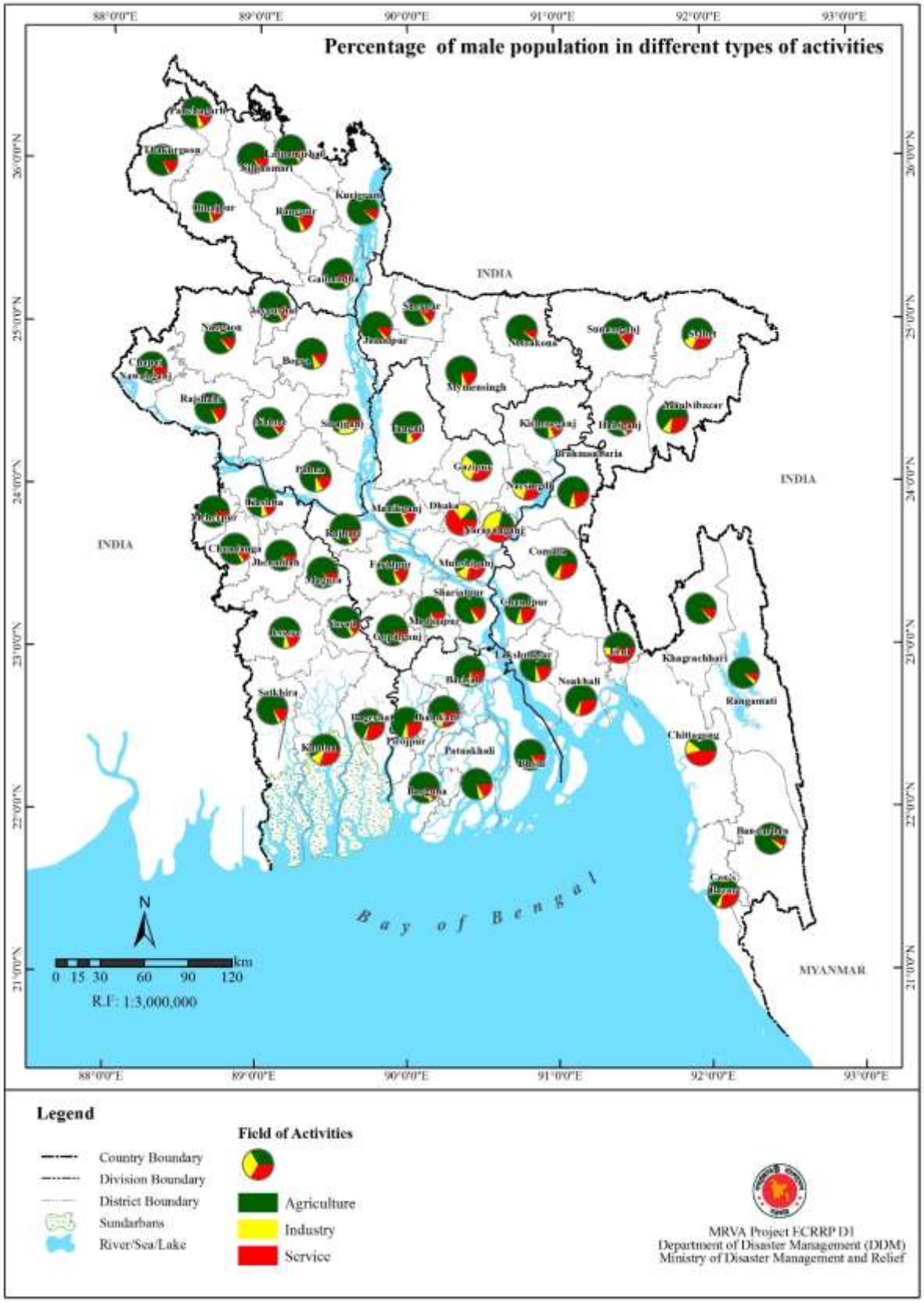

Figure 0.5: Distribution of population (male) in field activities

Source: BBS, 2012

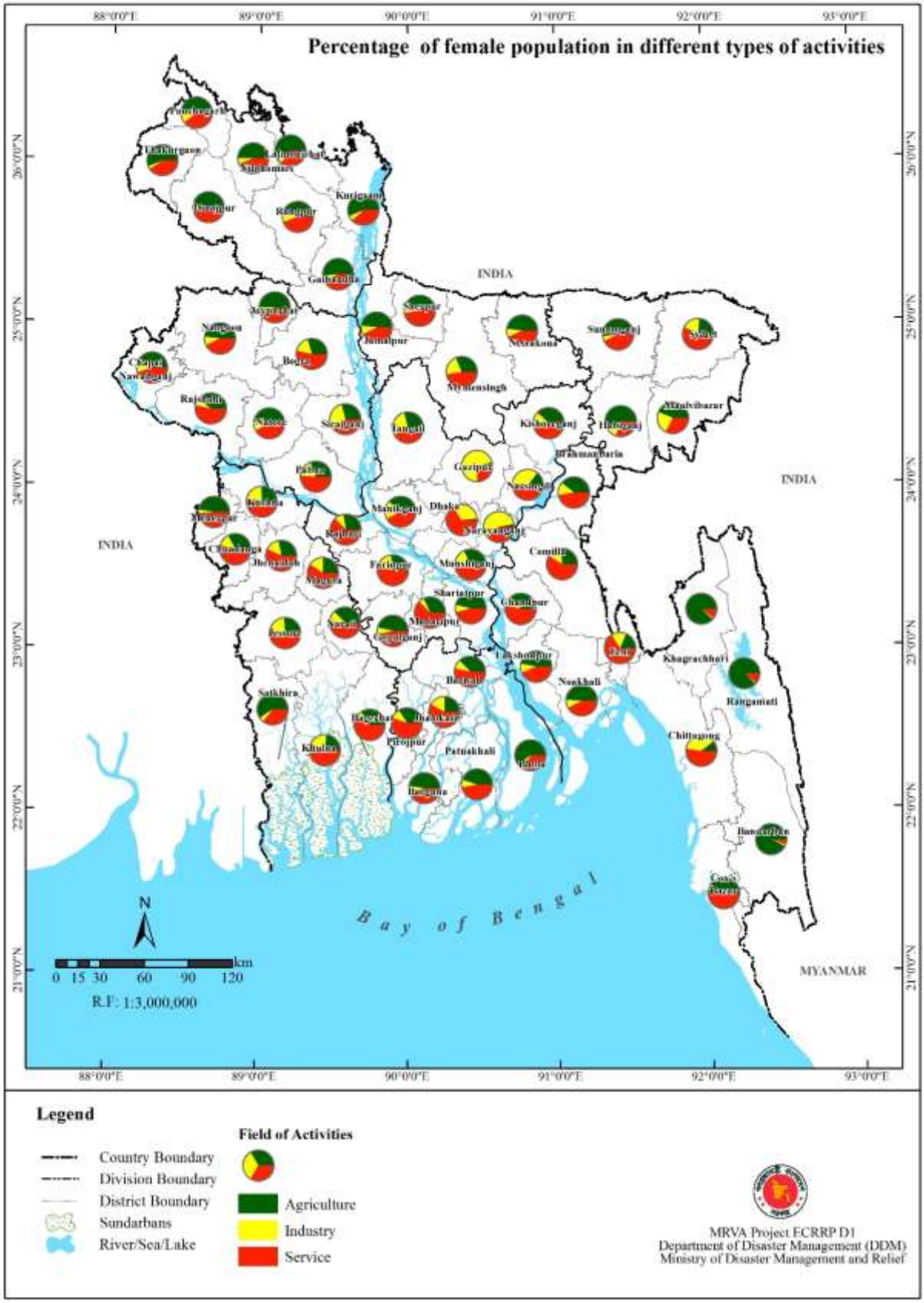

Figure 0.6: Distribution of population (female) in field activities

Source: BBS, 2012

1.1.5. Education

Education level data is collected in categories of literate and illiterate along with population based on gender. Number of literate population based on gender is given in table 1.7.

Table 0.7: Number of literate population based on gender

Division	Literate Male	Literate Female
Barisal	2,350,620	2,362,869
Chittagong	7,491,030	7,448,951
Dhaka	11,777,950	10,082,616
Khulna	4,370,286	3,982,786
Mymensingh	1,907,777	1,797,062
Rajshahi	4,667,614	4,203,127
Rangpur	3,985,925	3,462,497
Sylhet	2,310,720	2,138,539
Country total	38,861,922	35,478,447

Source: BBS, 2012

In addition, based on range of age 3-5, 6-10, 11-14, 15-19, 20-24, 25-29 years, population (gender) attending school and not attending school is also collected. Additional data available is population (gender) with age of 7+ and not attending school.

At country level, Bandarban district is with least and Dhaka district is with highest literate population. At country level, Jhalokati district is with least illiterate and Dhaka district with highest illiterate population. Similar trend is observed in these same districts for Male population for both literate and illiterate, female literate. However female illiterate is lowest in Bandarban and highest in Dhaka.

Attending School: It is noticed that population of all age groups who are attending school is highest in Dhaka and whereas for lowest in varies.

Population (male and female) attending school in the age group of 3 - 5 is lowest in Meherpur district. Population (male and female) attending school in the age group of 6 - 10, 11 – 14, 15-19, 20-24, 25-29 are lowest in Bandarban district.

Not-Attending School: It is noticed that population of all age groups who are not-attending school is highest in Dhaka and whereas for lowest it varies.

Population (male and female) not-attending school in the age group of 3 - 5 is lowest in Bandarban district and in the age group of 6 -10 in Jhalokati. In age group of 11 – 14 male not-attending school is Jhalokati and female is Meherpur. In the age group 15-19, 20-24, 25-29 years, population (male and female) no-attending school is lowest in Bandarban district.

Overall Population (male and female) who are 7+ age, who are not attending school is lowest in Jhalokati and highest in Dhaka.

Percenatage of literacity rate at district level is shown in figure 1.7.

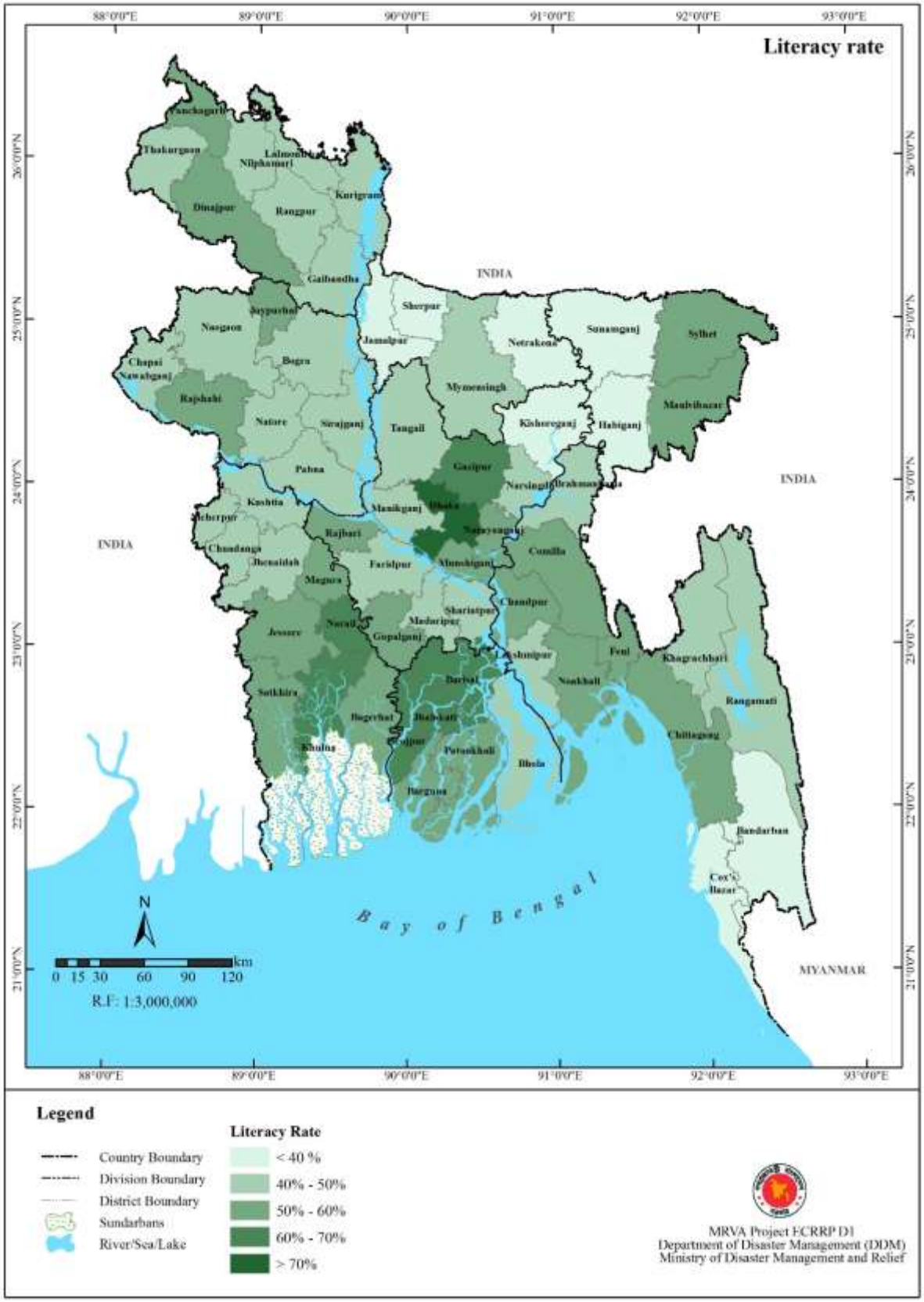

Figure 0.7: Percentage of literacy rate at district level in Bangladesh

Source: BBS, 2012

1.1.6. Disability

Population with is categorized with Speech, Vision, Hearing, Physical, Mental, Autism disabilities. Population with category of disability in each division is given in table 1.8.

Table 0.8: Population with disability in different divisions

Division	Type of Disability			
	Vision	Physical	Mental	Autism
Barisal	25,342	56,549	14,876	8,326
Chittagong	66,163	154,694	51,494	28,421
Dhaka	52,493	110,856	39,651	28,940
Khulna	43,752	103,922	31,376	15,688
Mymensingh	50,833	97,046	32,349	18,485
Rajshahi	58,630	112,688	36,969	18,485
Rangpur	51,542	99,930	31,575	15,787
Sylhet	28,764	51,470	19,820	9,910
Country total	377,519	787,155	258,110	144,042

Source: BBS, 2012

On an average about 1.5 % of population in the country are disabled. Highest disabled population is reported in Barguna (2.1%) and least in Dhaka (0.8%).

Among the physical disability constitutes about 0.6 %, Vision about 0.3 %, Speech and Mental category constitutes 0.2 % each and hearing and Autism constitutes to 0.1 % each.

Highest physical disability is reported in Barguna, Chandpur and Pirojpur, whereas Dhaka and Narayanganj is with least. Vision disability is reported highest in Gaibanda and least is reported in Dhaka. Among highest Speech disability, highest is reported in Barguna, Pirojpur and Rangamati, least is reported in Dhaka and Narayanganj. Highest Mental disability is reported in Rangamati and least in several districts.

Distribution of percentage of population with disability is shown in figure 1.8.

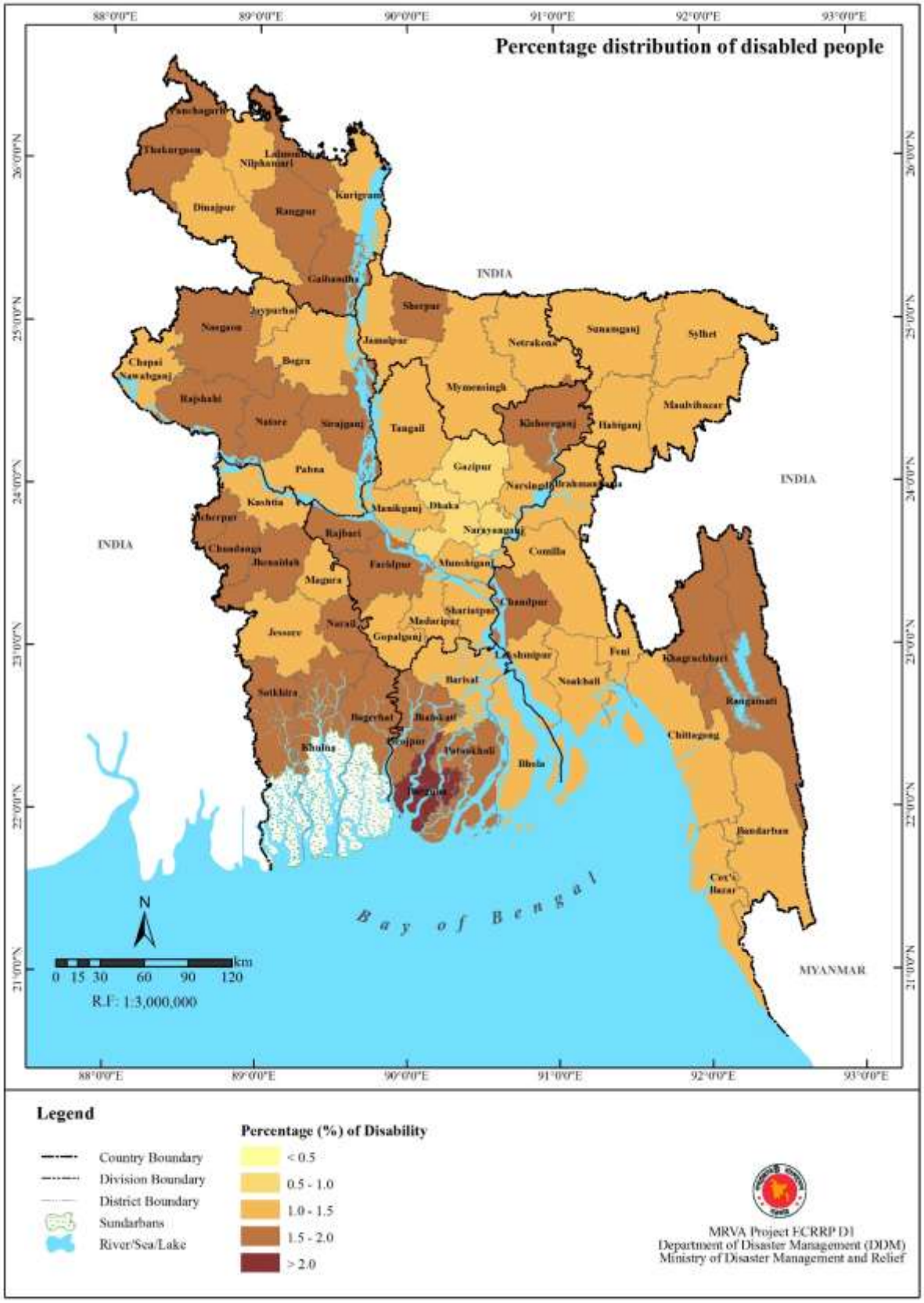

Figure 0.8: Percenatge of disable people at district level in Bangladesh

Source: BBS, 2012

1.1.7. Poverty

This data is collected from BBS, which is based on a joint study by World Bank, World Food Programme. The poverty levels are actegerized into extream poor (lower poverty line) and poor (upper poverty line). The percentage of population in different ranges of poverty levels is shown in Table 1.9. The extream poor (lower poverty line) distribution at district level is shown in figure 1.9, distribution of poor (upper poverty line) is in figure 1.10. Districts in which more than 25 % of extream poor are existing is shown in figure 1.11.

Table 0.9: Poverty Rate at District Level

Division	District	% of Extreme Poor (Lower Poverty Line)	% of Poor (Upper Poverty Line)
Barisal	Barguna	9.8	19
	Barisal	39.9	54.8
	Bhola	20.4	33.2
	Jhalokati	26.7	40.5
	Patuakhali	14.7	25.8
	Pirojpur	30.9	44.1
Chittagong	Bandarban	21.6	40.1
	Brahmanbaria	15	30
	Chandpur	30.3	51
	Chittagong	4	11.5
	Comilla	21.1	37.9
	Cox's Bazar	16.2	32.7
	Feni	14.6	25.9
	Khagrachhari	10.1	25.5
	Lakshmipur	18.1	31.2
	Noakhali	3.4	9.6
	Rangamati	6.8	20.3
Dhaka	Dhaka	4.9	15.7
	Faridpur	19.8	36.3
	Gazipur	8.2	19.4
	Gopalganj	26.8	42.7
	Kishoreganj	16.4	30.3
	Madaripur	17.4	34.9
	Manikganj	8	18.5
	Munshiganj	15.6	28.7
	Narayanganj	10.4	26.1
	Narsingdi	12.1	23.7
	Rajbari	25.7	41.9
	Shariatpur	34.4	52.6
	Tangail	18	29.7
Khulna	Bagerhat	24	42.8
	Chuadanga	10.8	27.7
	Jessore	18.4	39
	Jhenaidah	10	24.7

	Khulna	21.2	38.8
	Kushtia	0.8	3.6
	Magura	25.9	45.4
	Meherpur	5.1	15.2
	Narail	7.7	20
	Satkhira	29.7	46.3
Mymensingh	Jamalpur	34.2	51.1
	Mymensingh	32.3	50.5
	Netrakona	19.5	35.3
	Sherpur	29.8	48.4
Rajshahi	Bogra	6.7	16.6
	Joypurhat	12.9	26.7
	Naogaon	7	16.9
	Natore	21.3	35.1
	Chapai Nawabganj	12.1	25.3
	Pabna	16.7	31.5
	Rajshahi	16.5	31.4
	Sirajganj	22.7	38.7
Rangpur	Dinajpur	21.3	37.9
	Gaibandha	30.3	48
	Kurigram	44.3	63.7
	Lalmonirhat	16.7	34.5
	Nilphamari	18.8	34.8
	Panchagarh	12.3	26.7
	Rangpur	30.1	46.2
	Thakurgaon	13.8	27
Sylhet	Habiganj	20.1	25.3
	Maulvibazar	21.1	25.7
	Sunamganj	20.6	26
	Sylhet	19.5	24.1

Source: BBS, World Bank and WFP, 2011

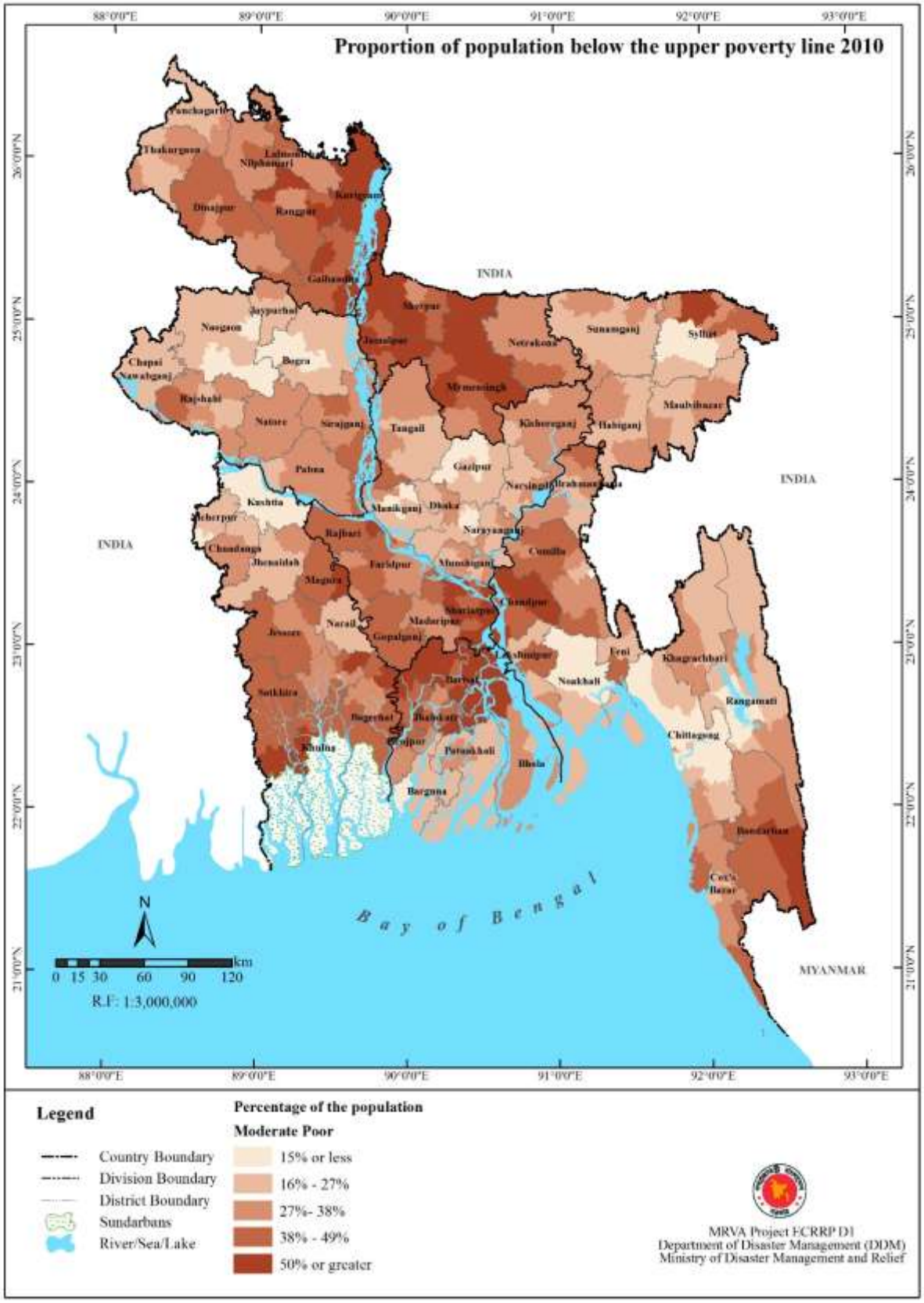

Figure 0.9: Proportion of population below the upper poverty line 2010 in Bangladesh

Source: BBS, World Bank and WFP, 2011

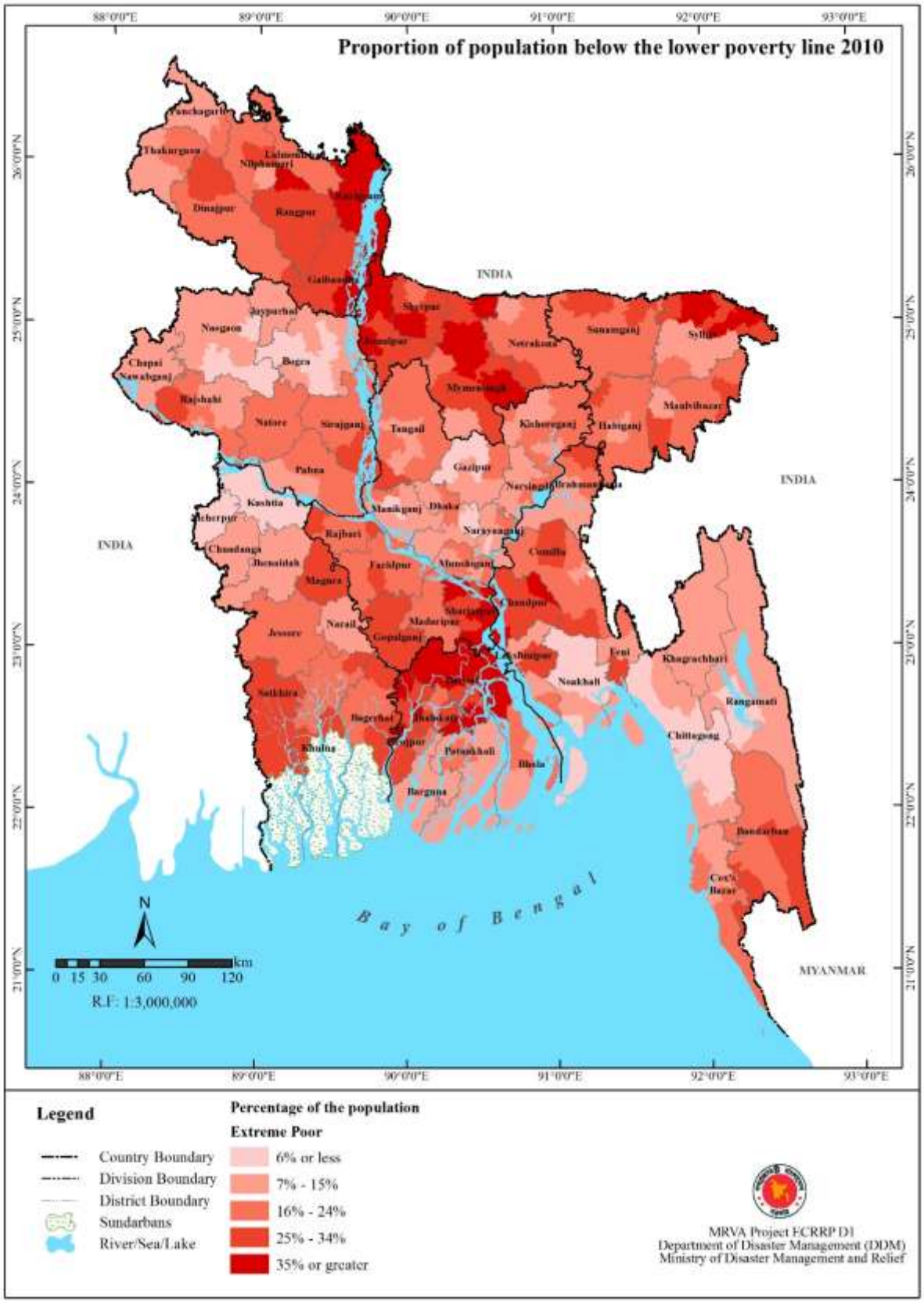

Figure 0.10: Proportion of population below the lower poverty line 2010 in Bangladesh

Source: BBS, World Bank and WFP, 2011

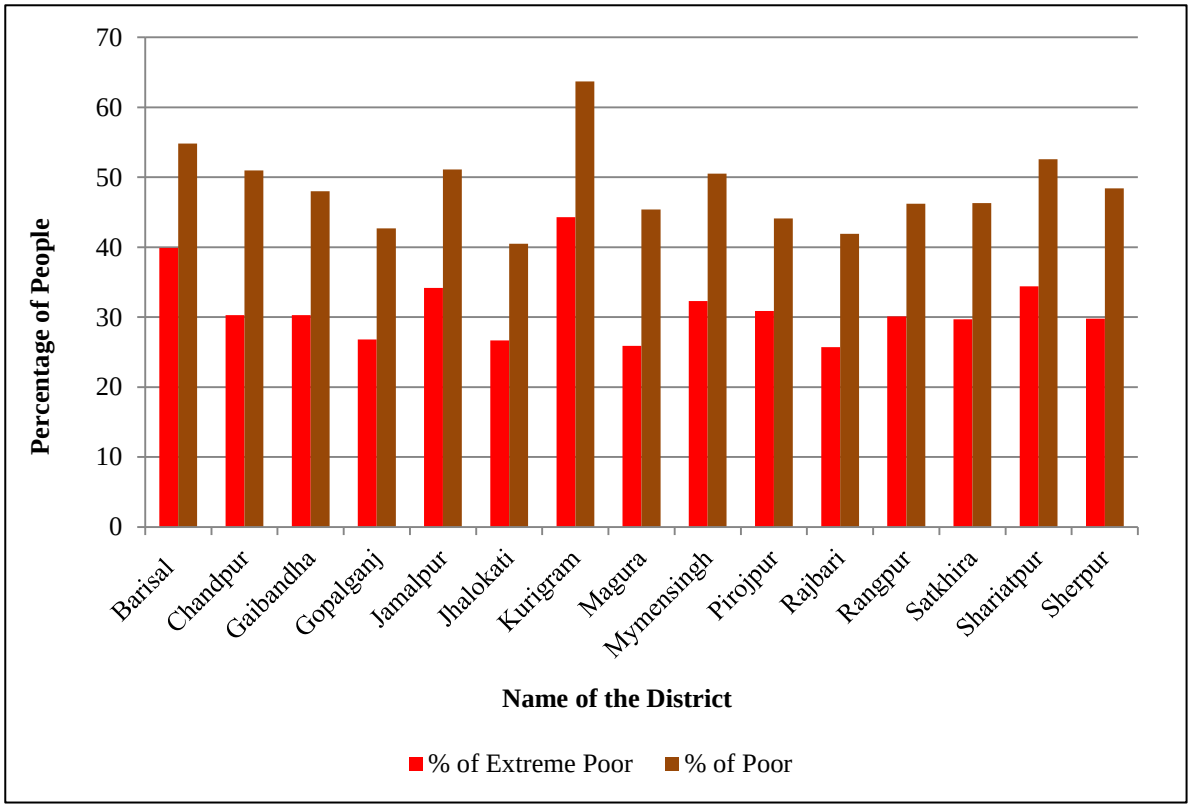

Figure 0.11: Percentage Distribution of Extreme Poor and Poor in Districts having more than 25% Extreme poor

Source: BBS, World Bank and WFP, 2011

1.2 Housing

Housing data is collected from Bangladesh Census data of 2011 from BBS. Summary of total households and general, Institutional and other household data and percentage at county level is given below.

- Total Households - 32,173,630
- Total General Households - 31,863,396 (99.04%)
- Institutional Households - 26,677 (0.08%)
- Others Households - 283,557 (0.88%)

It is observed that total households are lowest (80,102) in Bandarban and highest (2,786,133) in Dhaka. General households are lowest in Bandarban (78,714) and highest in Dhaka (2,639,630) districts. Institutional households are lowest in Meherpur (53) and highest in Dhaka (5,578). Other categories of households are very low in Narail (234) and highest in Dhaka (140,925).

1.2.1. Household Structure Types

General categories of households are divided based on structure type into Pucka, Semi-Pucka, Kutcha, Jhupri categories. Brief description of these categories of household structure types are given in table 1.10.

Table 0.10: Description of general household structure types based on foundation, wall and roof

Household structure Type		Description
Pucka	Foundation	Reinforced concrete (RC)
	Wall	Brick
	Roof	Reinforced concrete (RC)
Semi-Pucka	Foundation	Concrete/Brick
	Wall	Brick
	Roof	CI sheet with timber/iron framing
Kutcha	Foundation	Earthen plinth/Brick perimeter wall with earth infill
	Wall	CI sheet/part or full brick/Earthen walls
	Roof	CI sheet with timber/split bamboo framing
Jhupri	Foundation	Earthen plinth
	Wall	Organic materials – jute stick, catkin grass, straw, bamboo mats, etc/Split bamboo framing/ Earthen walls in some areas
	Roof	Thatch - rice or wheat or maize straw, catkin grass, etc with split bamboo/ single CI sheet without framing

Source: BBS, 2011

Country level distribution of general household structures are

- Average percentage of General – Pucka household structures - 7.9 %
- Average percentage of General – Semi-Pucka household structures - 17.6 %
- Average percentage of General – Kutcha household structures - 71.5 %
- Average percentage of General – Jhupri household structures - 3.0 %

The number of household structure types in in each division is given in table 1.11.

Table 0.11: Number of household structure types in different divisions

Division	Household type				
	Pucka	Semi-Pucka	Kutcha	Jhupri	Total
Barisal	77,994	152,933	1,572,238	59,673	1,862,841
Chittagong	725,257	793,490	3,882,049	225,515	5,626,310
Dhaka	1,684,428	2,186,651	4,311,096	127,115	8,309,288
Khulna	509,340	1,023,972	2,095,162	111,309	3,739,779
Mymensingh	54,597	236,163	2,147,056	102,211	2,540,027
Rajshahi	307,183	965,489	3,085,375	128,780	4,486,829
Rangpur	110,852	564,249	3,024,928	117,636	3,817,664
Sylhet	223,352	414,934	1,099,584	53,020	1,790,892
Country total	3,693,003	6337881	21,217,488	925,259	32,173,630

Source: BBS, 2012

It is observed that Pucka household structure type are very less in Kurigram and highest in Dhaka districts. Semi-Pucka household structure type are very low in Barguna and highest in Gazipur. Kutcha household structure type are very low in Dhaka and highest in Kurigram. Jhupri household structure type are very low in Chandpur and highest in Cox's Bazar districts. Parentage distribution of household structure types is shown in figure 1.12.

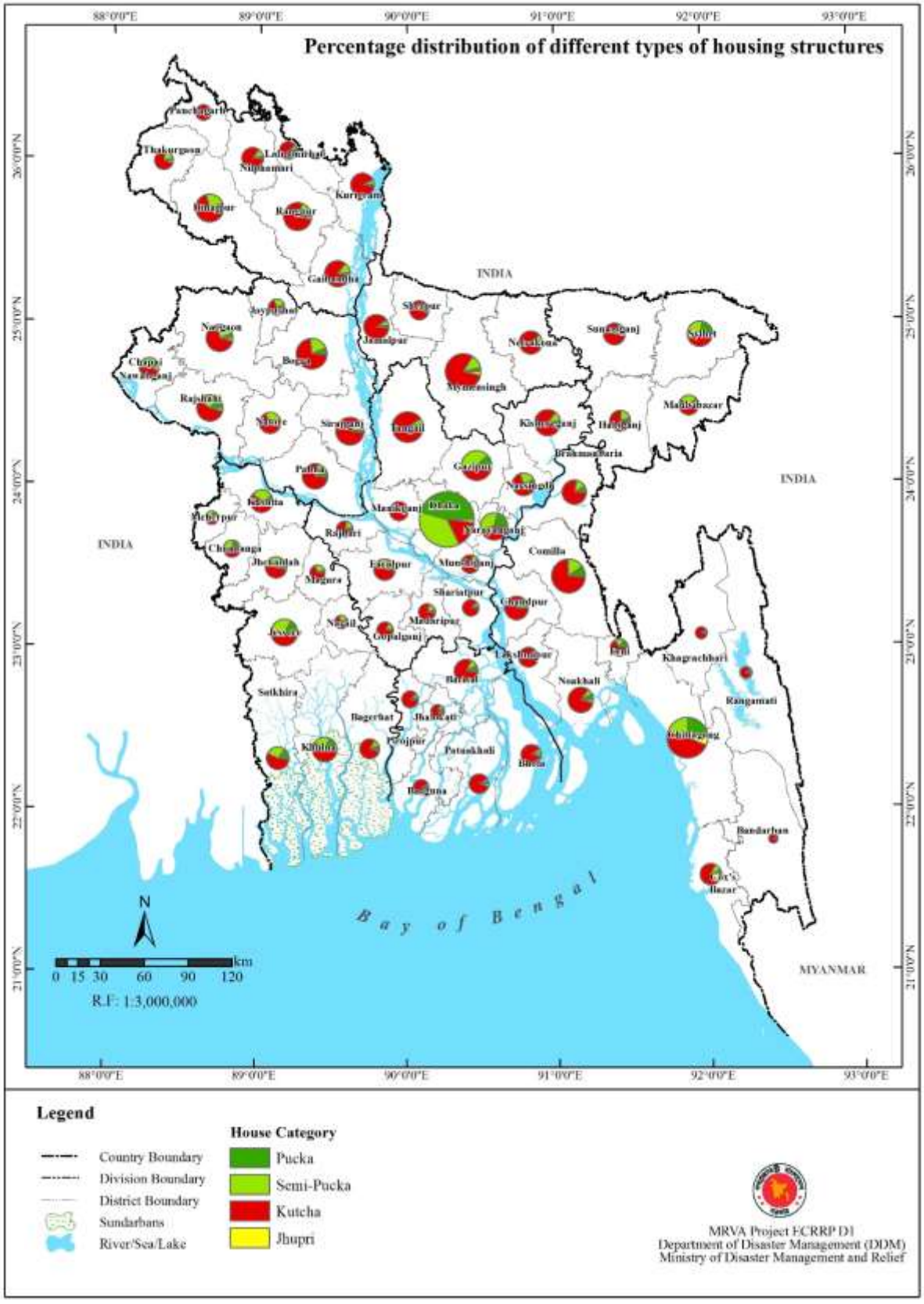

Figure 0.12: Percentage distribution of housing structure types in Bangladesh
Source: BBS, 2012

1.3 Livelihood

According to 2011 census of Bangladesh, categories of livelihood (employment) types are agriculture, industry, services. According to census data 66% percentage of population is involved with agriculture activity, 10% percentage is associated with industry and 24% by service sector.

Quantification of effect of natural hazards in service sector is not possible, in this study agriculture and industries are considered as livelihoods. More details are given here.

1.3.1. Agriculture

The country grows a wide variety of crops which are broadly classified, according to seasons in which they are grown, into two groups:

- Kharif crops
- Rabi crops.

Kharif crops are grown in the spring or summer season and harvested in late summer or in early winter. Rabi crops are sown in winter and harvested in the spring or early summer. Paddy (rice) is grown in 77 % of the agriculture area in the country. Out of which 49 % is grown as Aman (June to December), 41 % as Boro (December to June) and 10 % as Aus (mid-March to August).

Keeping in view of the crop growing seasons and relevance of hazards which are being investigated in this study, it is proposed to consider only Transplanted Aman crop area for livelihood exposure and risk in this study.

Transplanted Aman crop area in Bangladesh according the land use and land cover map provided by WARPOS is 64338.7 km^2. This distributed among various divisions as shown in table 1.12. The distribution of transplanted Aman crop in Bangladesh is shown in figure 1.13.

Table 0.12 : Area and percentage of Transplanted Aman crop in different divisions

Division	Transplanted Aman crop	
	Area (Km^2)	Percentage
Barisal	9,021.7	68
Chittagong	9,217.2	27
Dhaka	3,375.7	17
Khulna	9,865.4	44
Mymensingh	6,169.7	59
Rajshahi	9,829.1	54
Rangpur	12,136.8	75
Sylhet	4,723.1	37
Country total (Km^2)	64,338.7	44

Source: DAE, 2013

Figure 0.13: Spatial distribution of Transplanted Aman crop area in Bangladesh

Source: DAE, 2013

1.3.2. Industries

Bangladesh has several industries which are contributing significantly to the economy of the country. The industrial database provided by LGED consists of categories as Food Godowns, Mill factory, Gas Field, Cold Storage, Cottage Industries, Rice/Oil/Grain mills. Number of each category of industries existing in the database in each division are given in table 1.13.

Table 0.13: Number of Industry categories existing in different divisions

Division	Type of Industry						Grand Total
	Mill/Industry	**Cottage Industry**	**Cold Storage**	**Rice/Oil/Grain Mill**	**Food Godown**	**Gas field**	
Barisal	6				64		70
Chittagong	27	3	2	21	117	7	177
Dhaka	33	49	1	1	154	4	242
Khulna	24	1			72	2	99
Mymensingh	2		1		61		64
Rajshahi	23	3	5		95		126
Rangpur	10			4	114		128
Sylhet	6	1	1	5	58	3	74
Country total	131	57	10	31	735	16	980

Source: LGED, 2013

1.4 Critical Facilities

Critical facilities considered in this study based on existing data collected from different sources are Hospitals, Educational institutions, First Responders (Fire and Police stations) and Cyclone Shelters.

1.4.1. Health care facilities

Health care facilities database consist of two categories. i.e. hospitals and family welfare centers. Hospitals include hospitals, medical college hospitals and upazila medical centres. The number of hospitals and family welfare centers existing are given in table 1.14 and shown in figure 1.14.

Table 0.14: Number of hospitals and family welfare centres in different divisions

Division	Hospital	Family Welfare Centre	Grand Total
Barisal	36	207	243
Chittagong	95	352	447
Dhaka	102	626	728
Khulna	66	342	408
Mymensingh	24	179	203
Rajshahi	53	391	444
Rangpur	38	364	402
Sylhet	34	154	188
Country total	448	2615	3063

Source: LGED, 2013

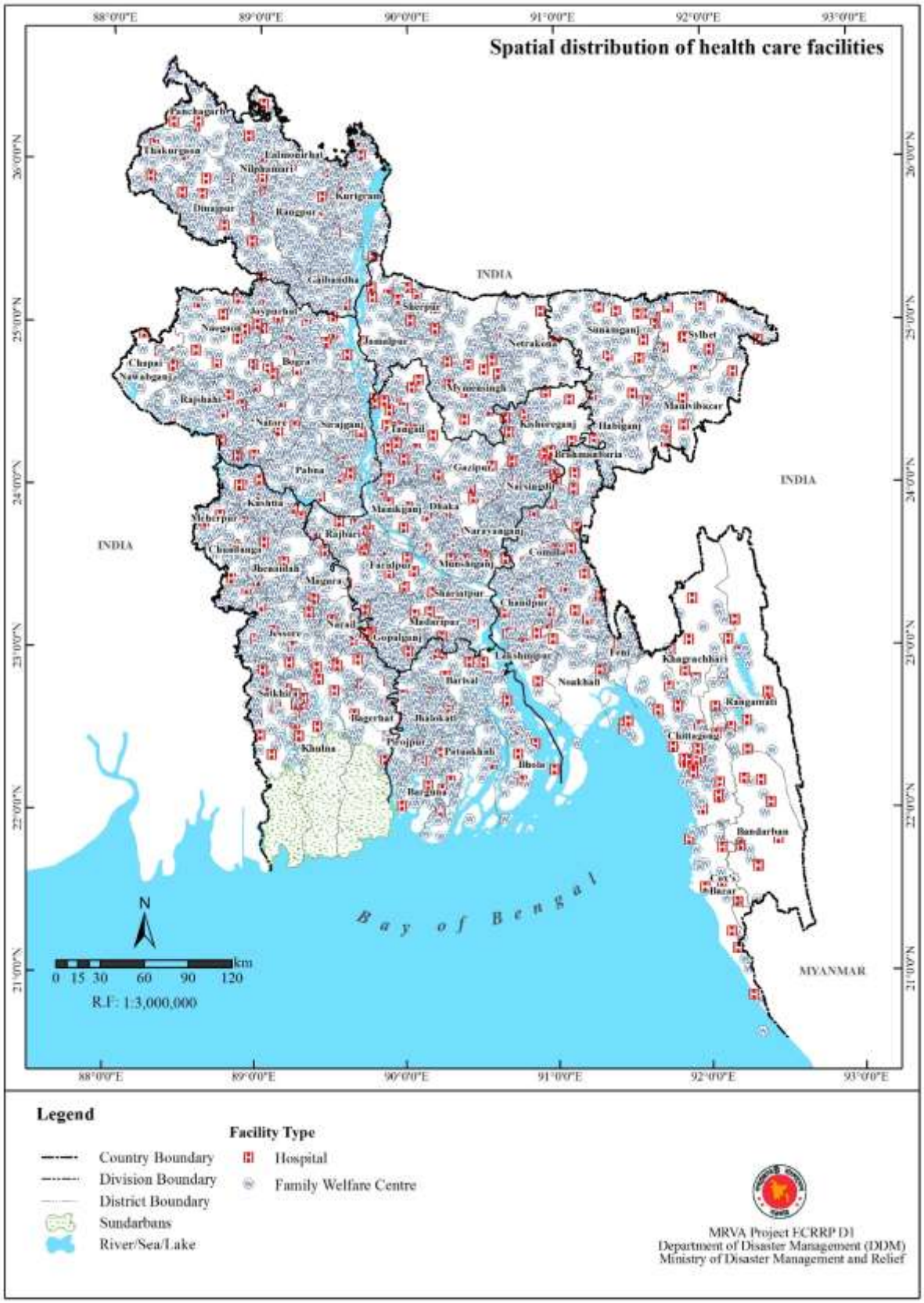

Figure 0.14: Location of health care facilities in Bangladesh

Source: DGHS, 2013

1.4.2. Educational Institutions

Educational institutions database consists of categories of educational institutions as University, College, High School, Madrasa, Primary Schools. The number of educational institutions existing in the database are given in figure 1.15 and table 1.15.

Table 0.15: Number of educational institutions in different divisions

Division	University	College	High School	Madrasa	Primary School
Barisal	2	70	835	315	2,257
Chittagong	7	163	1246	675	6,321
Dhaka	37	173	1,482	876	7,599
Khulna	4	87	1,048	507	4,191
Mymensingh	2	61	523	331	2,655
Rajshahi	2	112	952	663	4,322
Rangpur	2	87	919	530	3,999
Sylhet	2	65	427	419	3,219
Country total	58	818	7432	4316	34,563

Source: LGED, UGC and Primary Education Department, 2013

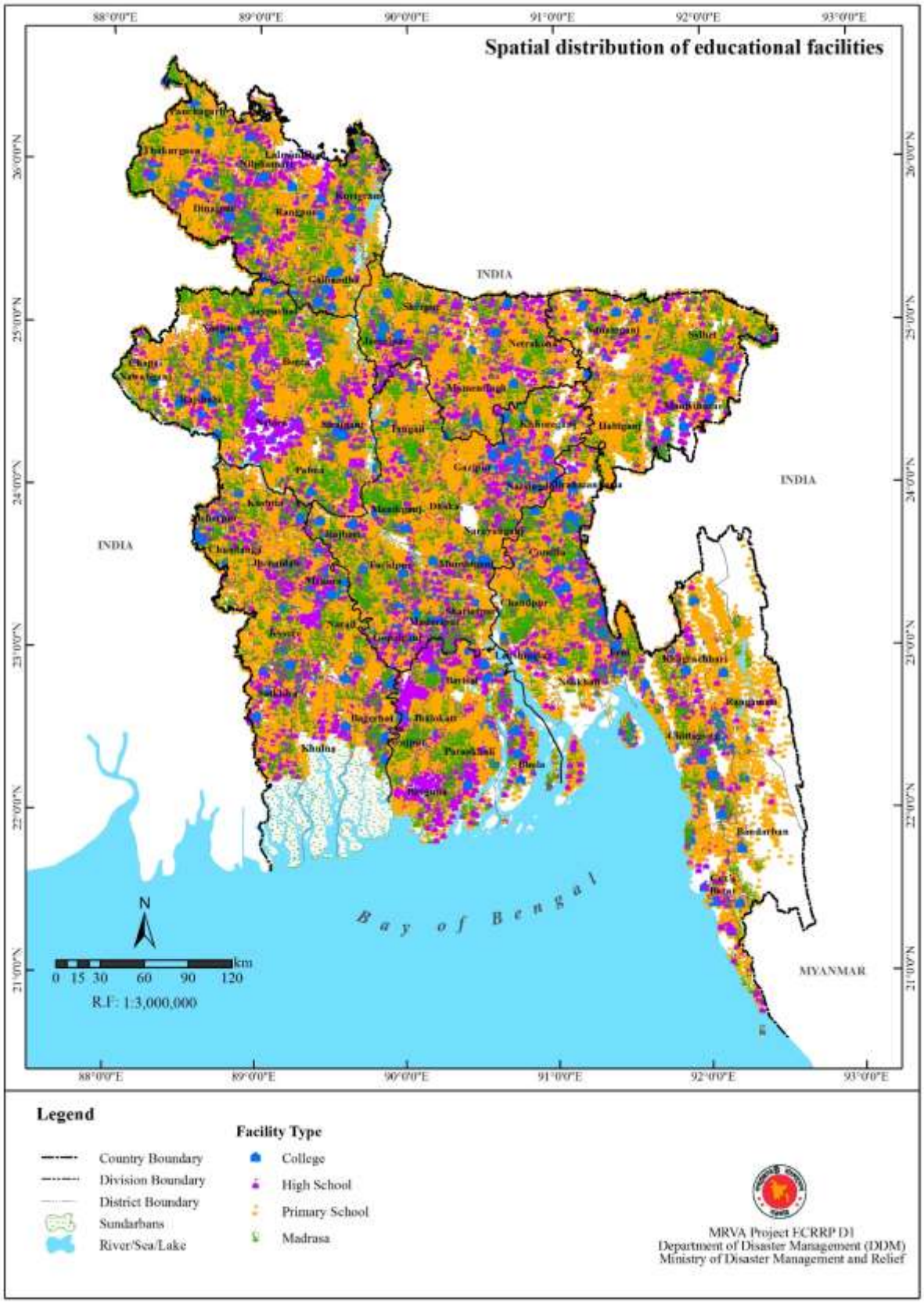

Figure 0.15: Location of education facilities in Bangladesh
Source: LGED, UGC and Primary Education Department, 2013

1.4.3. First Responders

Keeping in view of the database available, the first responders are fire service and civil defense (FSCD) and police. The data available is location of fire stations and police stations, as a point file.

1.4.3.1. Fire stations

The number of fire stations available as per the database provided by Fire Service and civisl Defence (FSCD, 2013) are 121. The location of them is shown in figure 1.16.

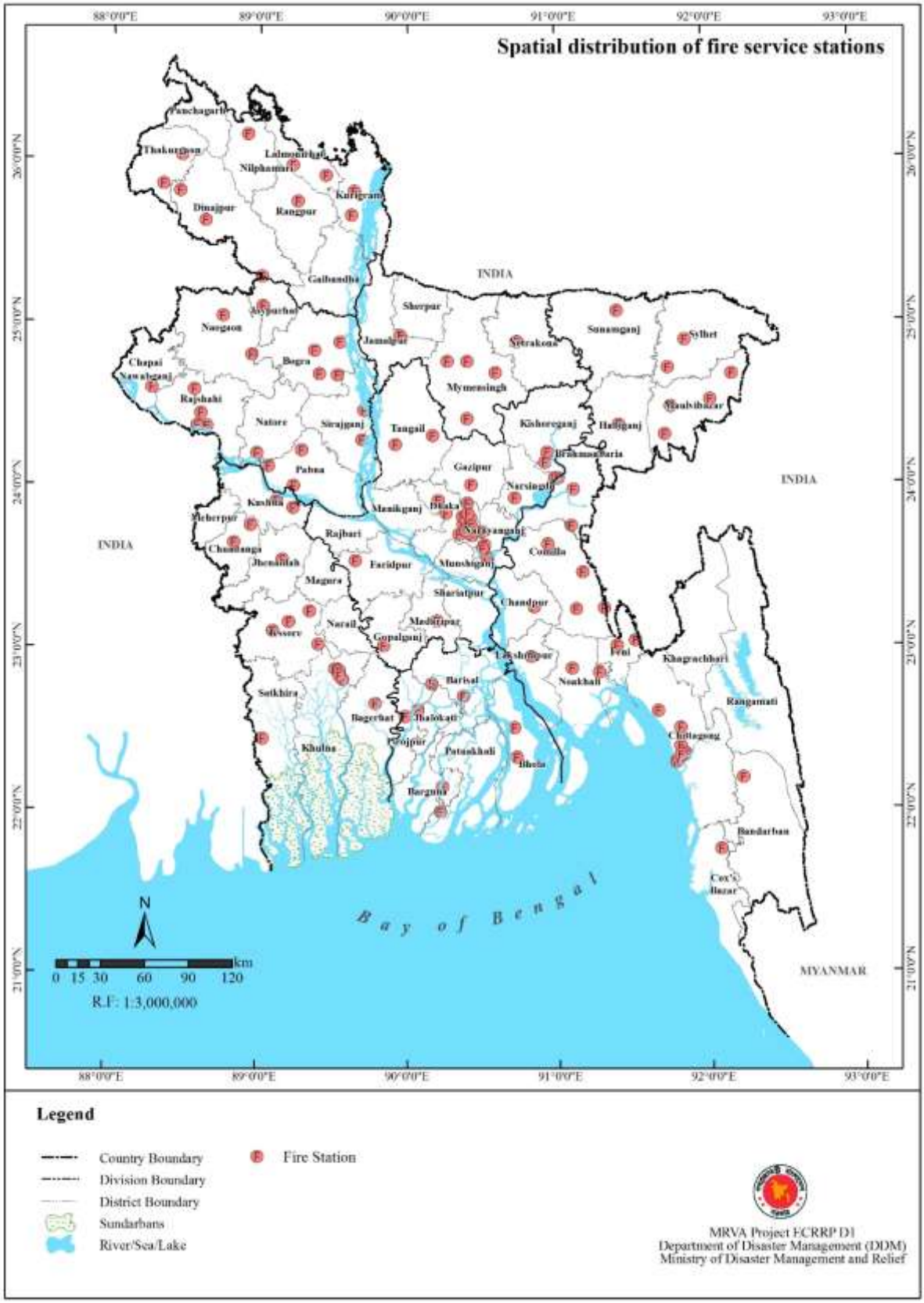

Figure 0.16: Location of fire stations in Bangladesh

Source: FSCD, 2013

1.4.3.2. Police stations

The number of police stations available as per the database are 15477. The number of fire stations and police stations in each division is shown in table 1.16.

Table 0.16: Number of fire and police stations in different divisions

Division	Number of Fire stations	Number of Police stations
Barisal	8	569
Chittagong	24	2,709
Dhaka	29	2,644
Khulna	16	3,063
Mymensingh	6	1,302
Rajshahi	19	2,213
Rangpur	11	1,391
Sylhet	8	1,586
Country total	121	15,477

Source: LGED, 2013

1.4.4. Cyclone Shelters

This database is collected at Upazila level from LGED (2010), existing Cyclone shelters database from CDMP (2010) and additional cyclone shelter database (only tabular data not shape file) provided by Executive Engineer, DDM was shared by MRVA cell. All these database is compiled and summary is given in table 1.17. The location of these shelters is shown in figure 1.17.

Table 0.17: Number of cyclone shelters in different divisions

Division	Number
Barisal	1407*
Chittagong	2030*
Dhaka	41
Khulna	399*
Country Total	3877

Source: LGED and CDMP, 2010, DDM, 2016

* number of cyclone shelters updated using input from DDM. List of Additional Cyclone Shelters in Barisal, Chittagong and Khulna divisions are given in **Annexure – I**.

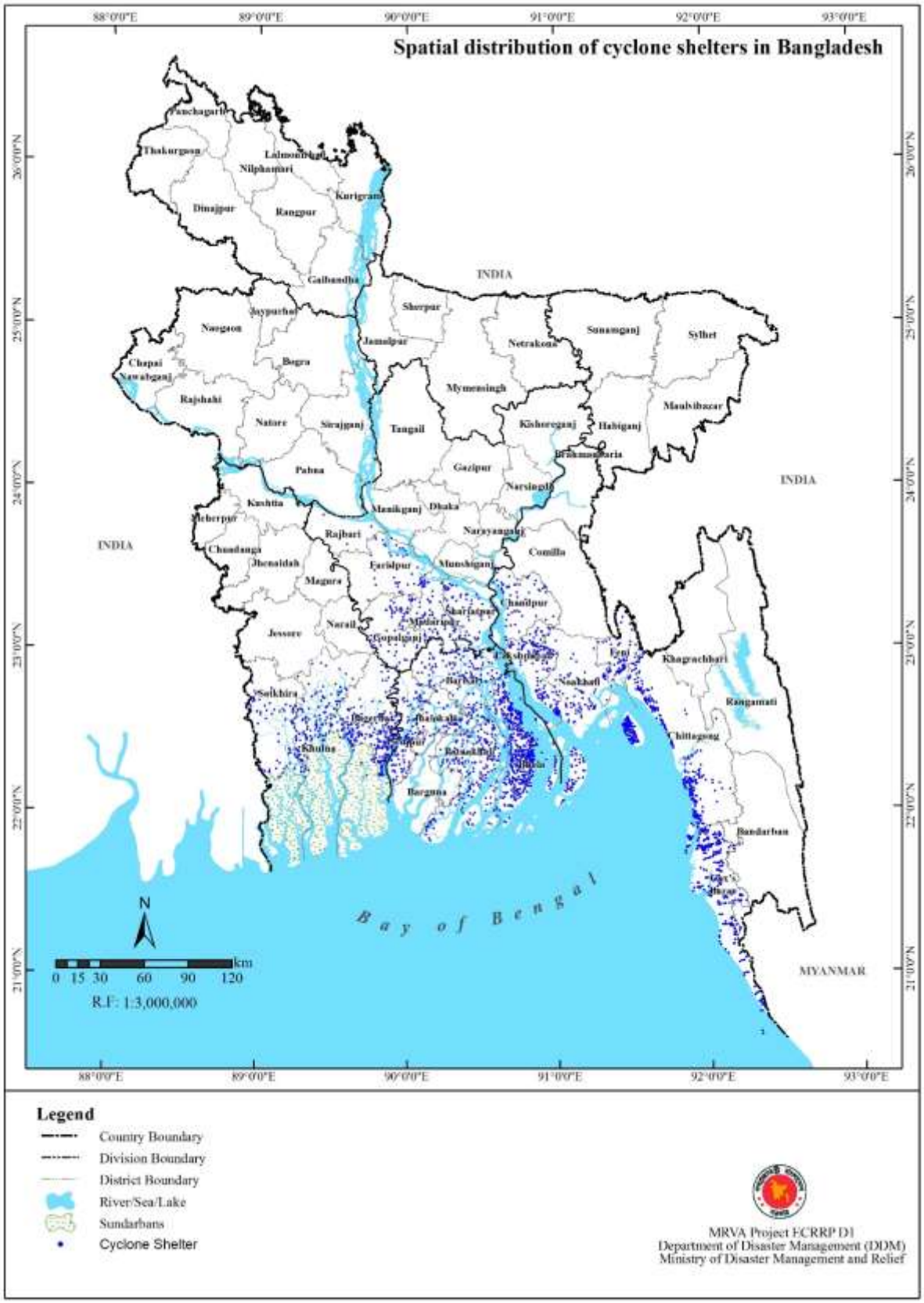

Figure 0.17: Location of cyclone shelters in coastal area of Bangladesh

Source: LGED and CDMP, 2010

1.5 Infrastructure

1.5.1. Road

The type of roads existing in the database are, National Highway, Regional Highway, Municipal road, Upazila road, Union road and Village roads. The length of road as per the database in each division is given in table 1.18.

Table 0.18: Length (Km) of the road types in different divisions

Division	National High Way	Regional High Way	Municipal Road	Union Road	Upazila Road	Village Road	Grand Total
Barisal	159.2	812.8		3,845.4	2,921.4	14,704.2	22,443.1
Chittagong	679.0	2,680.8	10.9	6,528.3	5,192.7	27,540.1	42,631.7
Dhaka	837.6	1,666.9	31.3	6,677.6	5954	22,225.5	37,392.9
Khulna	568.5	1,257.3		4,581.7	5,530.9	20,551.2	32,489.5
Mymensingh	135.1	1,096.8		3382	2,612	10,886.4	18,112.3
Rajshahi	613.1	1,752.5	18.1	5,721.5	5,441.8	15,617.3	29,164.4
Rangpur	403.5	1,393.9		5,758.9	4,501.9	16,889.4	28,947.4
Sylhet	247.6	855.7	41.5	2,407.5	2,356.2	8,833.7	14,742.2
Country Total	3,643.6	11,516.6	101.9	38,902.9	34,510.8	137,247.8	225,923.5

Source: LGED and RHD, 2013

1.5.2. Bridge

The number of bridges in the database are 43,019. The distribution of them in each division is shown in table 1.19.

Table 0.19: Number of bridges in different divisions

Division	Number
Barisal	912
Chittagong	2394
Dhaka	15626
Khulna	3280
Mymensingh	7784
Rajshahi	1367
Rangpur	1217
Sylhet	10417
Country total	43019

Source: LGED and RHD, 2013

1.5.3. Railway

The length of the railway network existing in each division as per the database is given in table 1.20.

Table 0.20: Length of the railway network in different divisions

Division	Broad Gauge (Km)	Narrow Gauge (Km)	Closed Railway (Km)
Chittagong	0.00	309.57	148.28
Dhaka	232.65	286.64	44.88
Khulna	287.90	0.00	36.12
Mymensingh	0.00	308.86	7.44
Rajshahi	356.51	67.40	20.45
Rangpur	118.46	456.97	4.94
Sylhet	0.00	279.89	0.28
Country total	995.5	1709.3	262.4

Source: LGED, 2013

1.5.4. Air, Sea & River Ports

The categories of airports (16) existing are international (3), domestic airports (7), Short takeoff and landing (STOL) airports (6). The number of river ports are 3, seas ports are 2. The air, sea and ports existing in the database are shown in table 1.21.

Table 0.21: Number of Air ports, river ports and sea ports

Division	Air ports	River ports	Sea ports
Barisal	2	2	
Chittagong	3		1
Dhaka	2	1	
Khulna	1		1
Mymensingh			
Rajshahi	5		
Rangpur	2		
Sylhet	1		
Country total	16	3	2

Source: LGED, 2013

All the transport infrastructure is road, bridge, rail, air, sea and river ports are shown in figure 1.18.

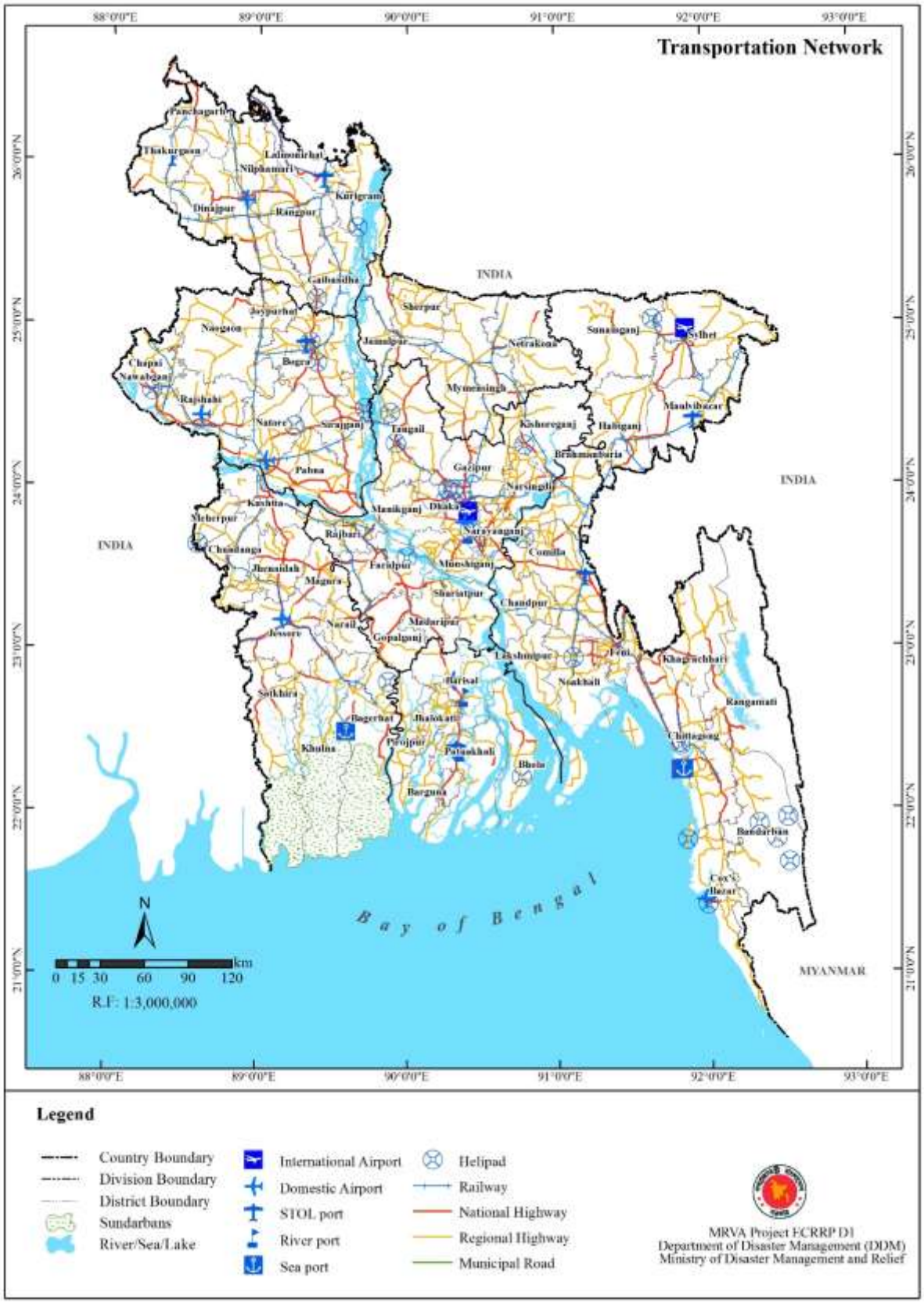

Figure 0.18: Transportation network map of Bangladesh

Source: LGED and RHD, 2013

1.5.5. Power

The Power sector consists of number of Power stations, grid sub-stations and transmission (power) line. The no. of power stations, grid sub-stations in each division is shown in table 1.22 and figure 1.19.

Table 0.22: Number of Power stations, grid sub-stations in different divisions

Division	Power Station	Grid Sub Station
Barisal	1	3
Chittagong	5	13
Dhaka	3	18
Khulna	2	11
Mymensingh	1	3
Rajshahi	1	10
Rangpur	4	4
Sylhet	3	3
Country total	20	65

Source: LGED, 2013

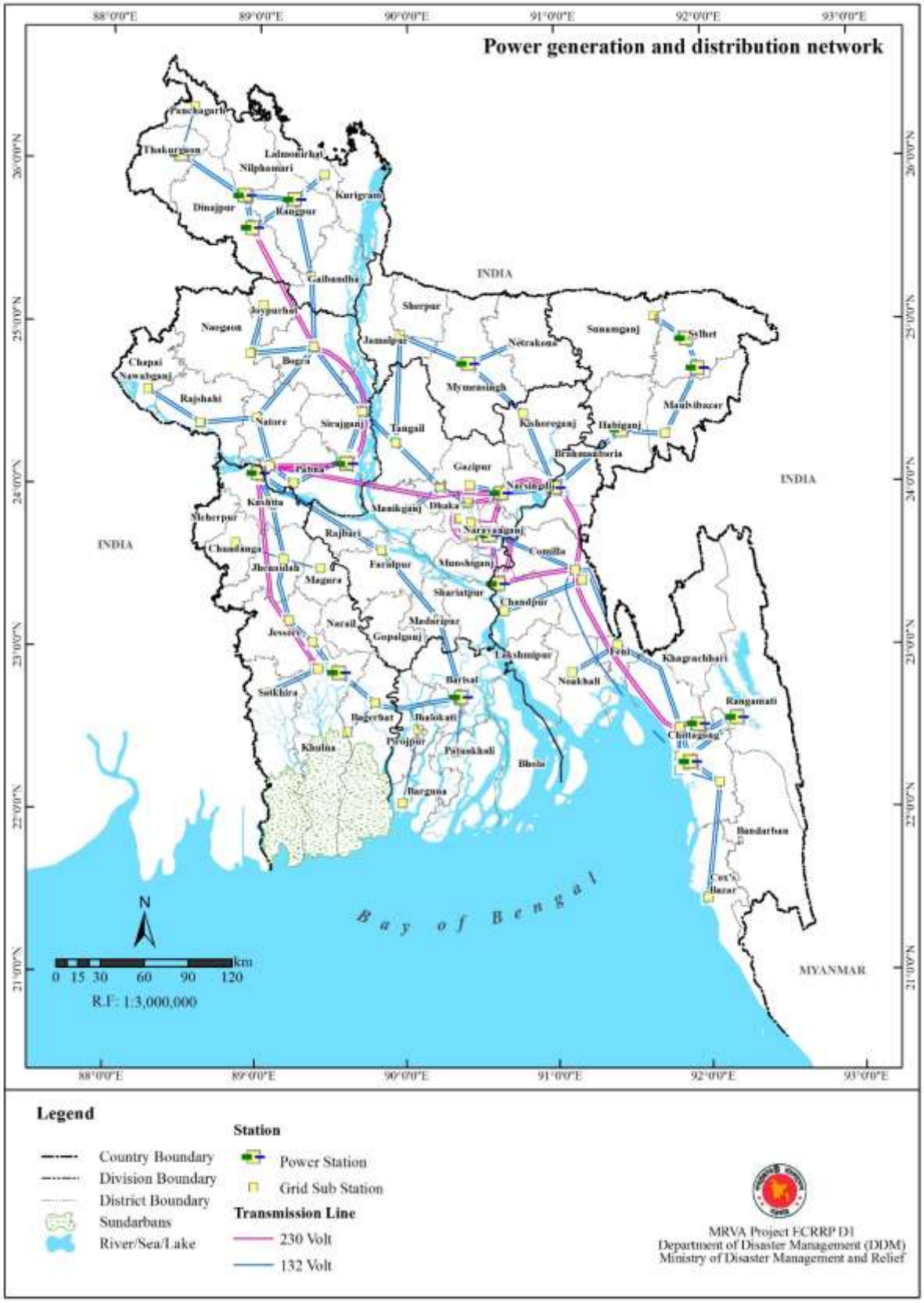

Figure 0.19: Power generation and distribution network

Source: LGED, 2013

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Annexure – I:

Table A.1: List of Additional Cyclone Shelters in Barisal, Chittagong and Khulna divisions at upazila level

Division	District	Upazila	Name of the Cyclone Shelter
Barisal	Barisal	Bakerganj	a. Dudholmo Fayez Hossain Senior Fajil Madrasha Cyclone Shelter
	Jhalokhati	Nolchiti	a. Birobaria Al-Haz Abdul Hamid Molla Dorgah Madrasha and Orphanage cylone shelter b. Dopdopia Union Degree College Cyclone Shelter
		Kathalia	a. Hetalbunia Dakhil Madrasha Cyclone Shelter
	Pirojpur	Vandaria	a. Horinpala Siddiquea Necharia Dakhil Madrasha Cyclone Shelter
		Zia Nagar	a. S. Endurkani S. S. Ideal Girl's High School Cyclone Shelter
		Mothbaria	a. Haziganj High School Cyclone Shelter
	Borguna	Bamna	a. Bamna Sher-E-Bangla Cooperative High School Cyclone Shelter b. Cholavanga Darussalam Roshidia Dakhil Madrasha Cyclone Shelter
		Pathorghata	a. Saiyed Fajlul Haq Degree College Cyclone Shelter b. Kakcharia High School Cyclone Shelter
		Betagi	a. Koruna Mokamia Kamil Madrasha Cyclone Shelter
		Amtali	a. Locha High School Cyclone Shelter
			a. Agapara High School Cyclone Shelter
		Borguna Sadra	a. Burir Khal Mohsin Uddin High School Cyclone Shelter b. Baoalkor D.K. High School Cyclone Shelter
	Patuakhali	Patuakhali Sadar	a. Dakkhin Birajla Nurjahan Dakhil Madrasha Cyclone Shelter
		Mirjagonj	a. West Subidhakhali Salehia Alim Madrasha Cyclone Shelter
		Kolapara	a. Boro Baliatoli Islamia Dakhil Madrasha Cyclone Shelter b. Kuakata Bangabandhu High School Cyclone Shelter
		Golachipa	a. Chotosiba Salehia Dakhil Madrasha Cyclone Shelter
		Rangabali	a. Halima Khatun Women College Cyclone Shelter
		Baufol	a. Edris Molla Degree College Cyclone Shelter b. Kalaiya High School Cyclone Shelter
		Doshmina	a. Hazirhat High School Cyclone Shelter

Division	District	Upazila	Name of the Cyclone Shelter
Chittagong	Bhola	Sadar	a. Taiyeba Khatun Model Academy Cyclone Shelter b. Poet Mojammmel Haq Khorki Islam High School Cyclone Shelter
		Borhan Uddin	a. Joya Girl's Alim Madrasha Cyclone Shelter b. Joya Hazi Tofalia Dakhil Madrasha Cyclone Shelter
		Charfashion	a. Nilkomol Girl's High School Cyclone Shelter b. Udoyon Girl's High School Cyclone Shelter
		Lalmohon	a. Nurunobi Chowdhury College Cyclone Shelter
		Daulotkhan	a. Hazipur Cyclone Shelter b. Modonpur Cyclone Shelter
		Monpura	a. South Sakuchia Karatia Islamia Dakhil Madrasha Cyclone Shelter
			b. Sakuchia Badiujjaman Dakhil Madrasha Cyclone Shelter
		Tazumuddin	a. North Chacra Mohammadia Fazil Madrasha Cyclone Shelter
			b. Char Jahir Uddin High School Cyclone Shelter
	Lakshmipur	Raypur	a. Darul Islamia Dakhil Madrasa Bohumukhi Cyclone Shelter
		Kamalnagar	a. Torabganj High School Bohumukhi Cyclone Shelter b. Shahidnagar Adorsho Girls' High School Bohumukhi Cyclone Shelter
		Ramgoti	a. Char Afjal Ajad Memorial High School Bohumukhi Cyclone Shelter b. Malek Molla High School (Azadnagar) Bohumukhi Cyclone Shelter
	Noakhali	Hatia	a. Center Bazar High School Bohumukhi Cyclone Shelter b. Sukhochor Union Bangabondhu High School Bohumukhi Cyclone Shelter c. Nijhum Dip Junior High School Bohumukhi Cyclone Shelter
		Subornochar	a. Ekram Chowdhury Bazar High School Bohumukhi Cyclone Shelter
		Companyganj	a. Gangchil Kobi Nazrul Junior High School Bohumukhi Cyclone Shelter b. Charparboti S C High School Bohumukhi Cyclone Shelter
	Chittagong	Potia	a. Juldha Shahmir High School Bohumukhi Cyclone Shelter
		Boalkhali	a. Chorondip Rojovia Islamic Fazil Madrasa High School Bohumukhi Cyclone Shelter
		Anowara	a. Khaskhama Amirul Aulia Sunnia Madrasa High School Bohumukhi Cyclone Shelter

Division	District	Upazila	Name of the Cyclone Shelter
		Sondip	a. Mogdhora High School Bohumukhi Cyclone Shelter b. Urirchar Bangabondhu Bohumukhi Cyclone Shelter
		Mirsshorai	a. Kherarhat Nuria Siddiquia Dakhil Madrasa Bohumukhi Cyclone Shelter
		Bashkhali	a. Rejvia Siddiquia Sunnia Dakhil Madrasa Bohumukhi Cyclone Shelter b. Bashkhali Upokulio Degree College Bohumukhi Cyclone Shelter
		Satkania	a. Choroti Durduri High School Bohumukhi Cyclone Shelter
	Cox's Bazar	Moheshkhali	a. Mojidia Sunnia Senior (Alim) Madrasa Bohumukhi Cyclone Shelter b. Dakhshin MuhuriKhola Burir Para Nurani and Forkania Bohumukhi Cyclone Shelter
		Pekua	a. Rajakhali Esar Ali khan Adorsho High School Bohumukhi Cyclone Shelter
		Chokoria	a. Kisholoy Adorsho Girls' High School Bohumukhi Cyclone Shelter b. Hazrat Fatima (Ra:) Girls' Madrasa Bohumukhi Cyclone Shelter
		Sadar	a. Gomtoli High School Bohumukhi Cyclone Shelter b. Khankhona Bohumukhi Cyclone Shelter
		Teknaf	a. Molkanu High School Bohumukhi Cyclone Shelter b. Baitush Shorof Mohammodia riadul Jannah Dakhil Madrasa Bohumukhi Cyclone Shelter
		Kutubdia	a. Kutubdia College Bohumukhi Cyclone Shelter b. Darul Hikmah Almalekia Madrasa Bohumukhi Cyclone Shelter
		Ukhia	a. Nurul Chowdhury Technical B. M School and College Cyclone Shelter
Khulna	Satkhira	Shamnagor	a. Shundorban Secondary Girls Bahumukhi Cyclone Shelter b. b.Gazi Abdul Hamid Model Academy Dakhil Madrasa Cyclone Shelter
		Devhata	a. Chalte Tola Aminia Dakhil Madrasa Cyclone Shelter b. Baburabad Tepukhali Secondary School Cyclone Shelter
		Kaliganj	a. Shimu Reza M.P. College Bahumukhi Cyclone Shelter b. Milni Secondary School Bahumukhi Cyclone Shelter
		Ashushuni	a. Kollanpur MH. Secondary School Bahumukhi Cyclone Shelter

Division	District	Upazila	Name of the Cyclone Shelter
			b. Mariala Secondary School Bahumukhi Cyclone Shelter
		Tala	a. Batua Danga Bahumukhi Cyclone Shelter
	Bagerhat	Morelganj	a. Dr. Mozammel Hossain Agriculter Technology Institute b. Chingrakhali Secondary School Bahumukhi Cyclone Shelter
		Shoronkhola	a. Tafalbari School and College Bahumukhi Cyclone Shelter b. Khontakata Secondary School Bahumukhi Cyclone Shelter
		Bagerhat Sadar	a. Chirulia Secondary School Bahumukhi Cyclone Shelter
		Chitolmari	a. Kochuria Adorsho Secondary School Bahumukhi Cyclone Shelter b. Khoria Arulia Secondary School Bahumukhi Cyclone Shelter
		Mongla	a. Shekh Fazilatunnesa Mohila Dakhil Madrasa Bahumukhi Cyclone Shelter b. Madurpalta Niaz Makhdum Alim Madrasa Bahumukhi Cyclone Shelter
		Rampal	a. Madardia Primary School Bahumukhi Cyclone Shelter b. Rajnagar Primary School Bahumukhi Cyclone Shelter
		Mollerhat	a. KAASA Hamid Higher Secondary Aduradihi Bahumukhi Cyclone Shelter b. Chaderhat Secondary Girls School Cyclone Shelter
	Khulna	Dakop	a. Joynagar Dakhil Madrasa Bahumukhi Cyclone Shelter b. Gunarishitol Chondro Secondary School Bahumukhi Cyclone Shelter
		Baliaghata	a. Halia Binodbihari Secondary School Bahumukhi Cyclone Shelter b. Jomia Islamia Arabia Shundormahal Dakhil Madrasa Bahumukhi Cyclone Shelter
		Koira	a. Kopotakkho Secondary School Bahumukhi Cyclone Shelter b. Kopotakkho College Bahumukhi Cyclone Shelter
		Paikgacha	a. BGP Shamukpota Secondary School Bahumukhi Cyclone Shelter b. Kumkhali Secondary School Bahumukhi Cyclone Shelter

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