



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

Multi Hazard

Risk and

Vulnerability

Assessment,

Modeling and Mapping

RISK ATLAS

VOLUME III

Multi Hazard Exposure and Risk Assessment
(Flood, Storm Surge, Drought, Landslide, Earthquake and Tsunami)

The background of the slide features a series of fluid, wavy lines in various shades of blue and cyan, creating a sense of movement and depth. The colors transition from a deep blue at the bottom to a lighter cyan towards the top.

MULTI-HAZARD RISK ATLAS



Government of the People's Republic of Bangladesh

Risk Atlas

Multi-Hazards Risk and Vulnerability Assessment, Modeling and Mapping

Volume III: Hazard Exposure and Risk Assessment (Flood, Storm Surge, Drought, Landslide, Earthquake and Tsunami)

**Department of Disaster Management
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Risk Atlas

Multi-Hazards Risk and Vulnerability Assessment, Modeling and Mapping

Volume III: Hazard Exposure and Risk Assessment (Flood, Storm Surge, Drought, Landslide, Earthquake and Tsunami)

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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 disaster 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 Risk Atlas 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 Risk Atlas as well as MRVAM Reports.



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 Risk Atlas of MRVAM project has created 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 Atlas '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.

Last of all, I hope that this Atlas will be actively and frequently consulted by decision-makers, becoming a resource not only to disaster risk reduction professionals, but also to local government officials, development professionals, planners, and researchers across the board.



(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 effort 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 Risk Atlas and Report/s produced under the MRVAM project 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.

Finally, It is important to note that, this Risk Atlas is a living document, and therefore, there is an expectation of further improvement in the Disaster Risk Reduction and Mitigation Strategy based on continuous research in many relevant disciplines.


(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), Thailand, and the Faculty of Geo-Information Science and Earth Observation of the University of Twente (ITC), the Netherlands had worked together to deliver consulting services on the Multi-Hazard Risk and Vulnerability Assessment, Modeling and Mapping in Bangladesh and finally 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. Based on the MRVA six volumes, the Risk Atlas produced and organized in 4 volumes representing:

- Volume I [PART-I]: Hydro-meteorological Hazard, Exposure / Risk Assessment (Flood and Storm Surge)
- Volume I [PART-II]: Hydro-meteorological Hazard, Exposure / Risk Assessment (Drought and Landslide)
- Volume II: Geological and Environmental Hazard, Exposure / Risk Assessment (Earthquake, Tsunami, Technological and Health)
- Volume III: Multi Hazard Exposure and Risk Assessment (Flood, Storm Surge, Drought, Landslide, Earthquake and Tsunami)

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 MRVA Volumes I-VI and Risk Atlas 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 MRVAM National Risk Atlas, 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 (SOB); 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, this MRVAM Risk Atlas was 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.

Last of all, the main objective of the Risk Atlas is to provide decision makers, city planners, engineers, academics and managers with a compiled and handy set of information on the current situation of the respective hazards/ sectors in the districts and upazilas in terms of vulnerability and risk to facilitate more informed and effective development decision making. The Risk Atlas is to form a basis for decision making and mainstreaming disaster risk reduction in the government's sectoral planning process. It provides recommendations to different institutions on revision or formulation of national policies, laws and regulations for disaster risk reduction and management. Maps presented in this Atlas can be used as reference and further research only, for more details, it is however, recommended to consult main MRVA reports.

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About The Project

The project “Multi-Hazard Risk and Vulnerability Assessment, Modeling and Mapping (MRVAM) was initiated by the Department of Disaster Management (DDM) under the Ministry of Disaster Management and Relief (MoDMR) as a part of sub-component D1.2 ‘Emergency 2007 Cyclone Recovery and Restoration Project (ECRRP)’ with funding support from the World Bank. ECRRP aims to contribute towards ‘building long-term preparedness through strengthened disaster risk management’, through the strengthening and enhancement of long-term disaster risk mitigation and reduction ability of the DDM. The main purpose of MRVAM is to develop a hazard and vulnerability framework using the progression of vulnerability model to identify the root causes and the underlying pressures within coastal belt as well as whole Bangladesh. The specific objectives of this study are as follows:

- Identify all hazard prone areas of Bangladesh specifically District, City Corporation, Municipality, Upazila and Unions covering geological, hydro-meteorological and technological hazards;
- Assess the exposure of people, property, infrastructure and economic activities to the above mentioned hazards;
- Assess the full range of vulnerabilities of the exposed elements experienced throughout the country with reference to the above hazards; and
- Influence sectoral development strategies towards recognizing the highly dynamic form of vulnerabilities and factoring an understanding into institutional, legislative and organizational systems for preparedness, planning and mitigation.

Project Partners

The MRVAM project was implemented by the Asian Disaster Preparedness Center (ADPC), Thailand, in partnership with the Institute of Water Modeling (IWM), Bangladesh, the Norwegian Geotechnical Institute (NGI), the Asian Institute of Technology (AIT), Thailand, and the Faculty of Geo-Information Science and Earth Observation of the University of Twente (ITC), the Netherlands. The project was also supported by many other departments and institutions, such as Bangladesh Bureau of Statistics (BBS), Directorate General Health Services (DGHS), Geological Survey of Bangladesh (GSB), Local Government Engineering Department (LGED), Water Resources Planning Organization (WARPO), and Deputy Commissioner (DC) Offices.



About the Atlas

The Risk Atlas contains the basic information on the 8 (eight) major hazards, such as Flood, Cyclone induced Storm Surge, Landslide, Drought, Earthquake, Tsunami, Technological & Health hazards in context of the country, and the exposure, vulnerability and risk with regard to population (Gender, Age, Ethnicity, Employment, Education, Disability, Poverty), housing (Housing Types- Pucka, Semi-Pucka, Kutcha, Jhupri), livelihoods (Agriculture, Industries), critical facilities (Healthcare, Educational Institutions, First Responders- Fire and Police stations, Cyclone Shelters), and infrastructure (Road, Bridge, Railway, Air, Sea and River Ports, Power Stations).

The Atlas is presented in 3 Volumes, such as Volume I (Part I): Hydro-meteorological Hazard, Exposure/Risk Assessment (Flood and Storm Surge); Volume I (Part II): Hydro-meteorological Hazard, Exposure/Risk Assessment (Drought and Landslide); Volume II: Geological and Environmental Hazard, Exposure/Risk Assessment (Earthquake, Tsunami, Technological and Health), Volume III: Multi-Hazard Exposure and Risk Assessment (Flood, Storm Surge, Landslide, Drought, Earthquake and Tsunami).

It is now very interesting that the decision makers are aware of National Risk Atlas as a tool that must be applied during planning and programming for preparedness and response to disasters. Given that the disaster management is a cross cutting issue, the Atlas will serve to identify and prioritize hazard prone areas during planning and programming for development activities in various sectors, such as transport, health and education, other critical facilities, essential service, as well as in urban and rural land use planning and in the development of infrastructures.

For flood hazard and vulnerability assessment, MIKE11 Hydrodynamic Model developed by DHI used to obtain return period-wise flood levels for 25 year, 50 year, 100 year and 150 years. For Cyclone, induced Storm Surge, the Bay of Bengal Model (BoBM) was used for the return periods: 25, 50 and 100 years for the entire coastal region. 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. Simultaneously, Tsunami hazards maps were generated for 50, 100, 200, 500 and 1000 years return period and the Drought hazard maps were generated with different return periods such as the SPI (Standardized Precipitation Index) values for 10, 50 and 100 years return period.

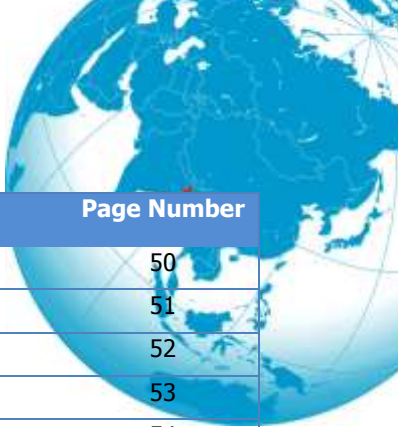
The objective of the Atlas is to facilitate the decision makers with the information on the existing situation of respective sectors in terms multi-hazard risk and vulnerability. It will assist the decision makers and respective government departments to prioritize risk mitigation investments and measures for strengthening the emergency preparedness and response mechanisms to different hazards identified in the study.



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List of Abbreviations	
AFCL	Ashuganj Fertilizer & Chemical Company Factory Limited
ARCGIS	Aeronautical Reconnaissance Coverage Geographic Information System
BBS	Bangladesh Bureau of Statistics
BoBM	Bay of Bengal Model
CRI	Multi-Hazard Risk Indices
CUFL	Chittagong Urea Fertilizer Limited
DAPFCL	DAP Fertilizer Company Ltd.
DEM	Digital Elevation Model
DHI	Danish Hydraulic Institute
DRR	Disaster Risk Reduction
EM-DAT	Emergency Event Database
GIS	Geographic Information System
HFA	Hyogo Framework for Action
JFCL	Jamuna Fertilizer Company
MPO	Master Plan Organization
MRVAM	Multi-Hazard Risk and Vulnerability Assessment Modeling and Mapping
NGFFL	Natural Gas Fertilizer Factory Ltd.
PFFL	Polash Fertilizer Factory Limited
PGA	Peak Ground Acceleration
ToR	Terms of Reference
UNISDR	United Nations International Strategy for Disaster Reduction

1. Multi-Hazard Risk and Vulnerability Assessment Modeling and Mapping (MRVAM)

Bangladesh has made a strong commitment to implementing the Hyogo Framework for Action (HFA) and, in that context, the Project on “Multi-hazard Risk and Vulnerability Assessment Modeling and Mapping for Bangladesh” has advance Bangladesh’s progress in Priority Action Area 2: “Identify, assess and monitor disaster risks and enhance early warning”. This includes ensuring that “national and local risk assessments based on hazards data and vulnerability information are available and include risk assessments for key sectors. “Bangladesh is considered to be a disaster “hot-spot”, facing multiple hazards that threaten lives, property and economic development (UNISDR, 2008).

The project on Multi-hazard Risk and Vulnerability Assessment Modeling and Mapping will have an impact far beyond what its detailed scope might suggest. On a macro level, this project aims to be the catalyst for DRR practice in Bangladesh, helping to achieve the Government’s ambitious goal of bringing its policies, institutions, and capabilities for disaster preparation, mitigation, and response up to world-class standards. In a very real sense, it is a pilot effort for activities to be financed by various donor agencies in order to expand efforts further at all levels. Therefore, it absolutely must establish a solid base and ensure that Bangladesh will have the expertise to take maximum advantage of the present and future interventions. At the same time, on a more micro level, outputs of the project are aimed to increase the capacity of Districts, City Corporations, Paurashava, Upazila etc., and individual citizens, including the most vulnerable individuals and groups among them, to deal with all aspects of emergencies. It further aims to help save lives and property, and increase the sense of security for people throughout the country.

1.1 Project Objectives

The main objectives of this study are as follows:

- Identify all hazard prone areas of Bangladesh specifically district, City Corporation, municipality, upazila and unions covering geological, hydro-meteorological and technological hazards;
- Assess the exposure of people, property, infrastructure and economic activities to the above mentioned hazards;
- Assess the full range of vulnerabilities of the exposed elements experienced throughout the country with reference to the above hazards; and
- Influence sectoral development strategies towards recognizing the highly dynamic form of vulnerabilities and factoring an understanding into institutional, legislative and organizational systems for preparedness, planning and mitigation.

1.2 Multi-Hazard, Vulnerability and Risk Assessment

The methodology adopted in this project is summarized in Figure 1.1. The hazards identified for assessment as per the Terms of Reference (ToR) are as follows:

- Flood, Storm surge, Earthquake, Tsunami, Landslide, Drought, Technological, Health

The elements at risk considered in this project for exposure, vulnerability and risk assessment are as follows:

- Population – Gender, Age, Ethnicity, Employment, Education, Disability, Poverty
- Housing – Housing Types (Pucka, Semi-Pucka, Kutcha, Jhupri)
- Livelihoods - Agriculture, Industries
- Critical Facilities – Healthcare, Educational Institutions, First Responders (Fire and Police stations), Cyclone Shelters
- Infrastructure – Road, Bridge, Railway, Air, Sea and River Ports, Power Stations.

Using the individual hazard assessment maps developed for the eight hazards in GIS environment and GIS database developed at the country level, the above elements at risk are combined to assess the exposure. Using the exposure data, vulnerability assessment is carried out by the damage curves developed exclusively for Bangladesh for the first time at the national level. Using the hazard and vulnerability assessment, individual risk of the elements at risk is assessed. The hazard specific risk is combined into a multi-hazard risk assessment to identify the most hazardous prone district/upazila/union in the country.

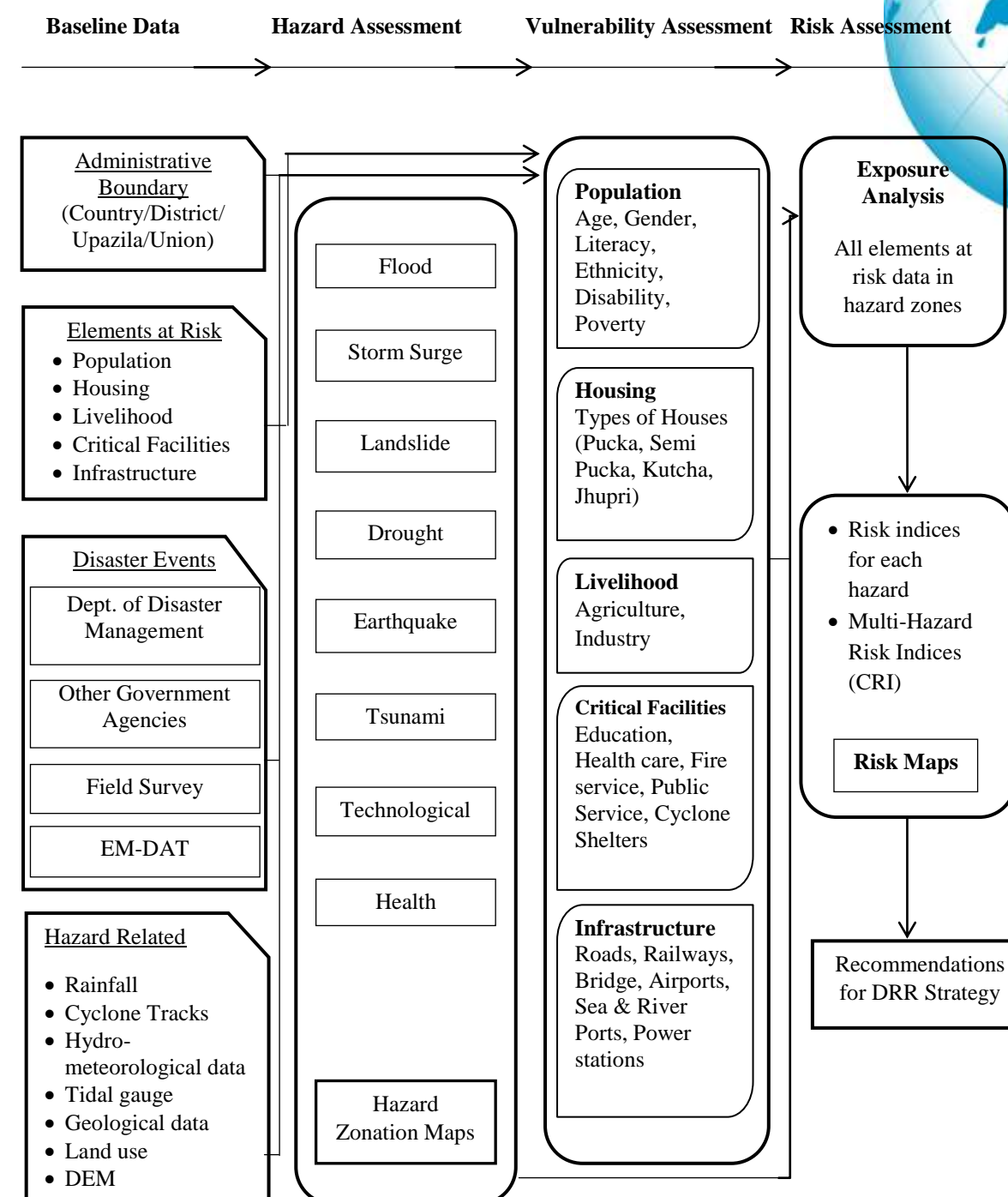


Figure 1.1: Overall Methodology of the MHVRA Project



1.3 Risk Assessment

Components of risk assessment are hazard, elements at risk, exposure, vulnerability. The hazard, exposure, vulnerability and risk Assessment approach adopted in this study is based on definitions from United Nations International Strategy for Disaster Reduction (UNISDR, 2009), given in table 1.1.

Table 1.1: Definition of Hazard, Exposure, Vulnerability and Risk

Hazard	A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.
Exposure	The degree to which the elements at risk are exposed to a particular hazard.
Vulnerability	The conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards. Can be subdivided into physical, social, economic and environmental vulnerability.
Risk	The probability of harmful consequences, or expected losses (deaths, injuries, property loss, livelihoods loss, economic activity disruption or environmental damaged) resulting from interactions between (natural and/ or human-induced) hazards and vulnerable conditions in a given area and time period.

Risk can be presented conceptually with the following basic equation:

Risk = Hazard x Vulnerability x Element at risk

1.3.1 Hazard Assessment

Hazard assessment presented in this risk atlas are Flood, Storm Surge, Earthquake, Tsunami, Landslide, Drought, Technological and Health. These hazard maps are prepared for different return periods, as shown in table 1.2.

Table 1.2: Summary of Hazard maps developed in this study

Hazards	Return Period							
	10	25	50	100	150	200	500	1000
Flood		√	√	√	√			
Storm Surge		√	√	√				
Earthquake			√	√		√	√	√
Landslide			Not Applicable as there is no return period					
Tsunami			√	√		√	√	√
Drought	√		√	√				
Technological			Not Applicable as there is no return period					
Health			Not Applicable as there is no return period					

1.3.2 Exposure Assessment

Exposure is assessed for elements at risk of Population, Housing, Livelihoods, Critical Facilities and Infrastructure using the most frequent and damaging hazard maps with relevant return periods (table 1.3) based on indicators of hazard levels for each hazard (table 1.4).

Table 1.3: Summary of exposure assessment and return period of hazards

Hazard	Return Period for Exposure of Elements at Risk				
	Population	Housing	Livelihood	Critical Facilities	Infrastructure
Flood	25	25	25	100	100
Storm Surge	25	25	25	100	100
Landslide	Not Applicable (NA)				
Drought	10	NA	50	NA	NA
Earthquake	50	50	NA	50	50
Tsunami	50	50	50	50	50
Technological	Not Applicable (NA)				
Health	Not Applicable (NA)				

Table 1.4: Hazard level indicators considered for exposure assessment

Indicator of Hazard level considered	
Flood	Inundation area with different flood depths at 25 and 100 year return period
Storm Surge	Inundation area with different depth due to Cyclone induced storm surge at 25 and 100 year return period
Landslide	Landslide susceptibility category
Drought	Drought hazard category representing severity of 10 year return period
Earthquake	Peak Ground Acceleration (PGA) zones at 50 year return period
Tsunami	Inundation area with different depth due to tsunami at 50 year return period
Technological	Area of influence (3 zones) due to chemical release
Health	Area representing number of cases reported for each disease at district level

1.3.3 Vulnerability Assessment

Based on exposure assessment, damage curves are developed for all hazards and elements at risk for vulnerability and risk assessment, where ever possible. Damage curves represent the relationship between hazard level and % of physical damage.

Vulnerability of Population: Based on the area of exposure of the settlements in each union, the vulnerability of population is calculated as number of population affected due to a hazard.

Vulnerability of Household structures: Factors affecting vulnerability of household structures are different in each hazard, damage curves are developed accordingly, as indicated in table 1.5.



Table 1.5: Factors affecting used for vulnerability of household structures

Hazard	Factor considered for damage curves	Vulnerability of Household structures
Flood	Inundation depth due to Flood	Damage curves
Cyclone induced Storm surge	Inundation depth due to induced storm surge	Damage curves
Landslide	Landslide susceptible category	Risk matrix
Earthquake	Peak Ground Acceleration (PGA)	Damage curves
Tsunami	Inundation depth due to Tsunami	Damage curves

Vulnerability of Livelihood: Livelihood considered is transplanted Aman crop. Vulnerability of crop is developed using damage curves using the factors affecting a hazard as given in table 1.6.

Table 1.6: Factors considered for vulnerability for crops

Hazard	Factor considered for damage curves	Vulnerability
Flood	Inundation depth due to Flood	Risk matrix
Storm surge	Inundation depth due to Storm surge	Risk matrix
Drought	Drought hazard category	Risk matrix
Tsunami	Inundation depth due to Tsunami	Risk matrix

Exposure of Population, Risk of Housing and Livelihood as explained in section 1.3 is assessed at upazila / thana level in Bangladesh and the results are presented in this risk atlas based on the administrative division as given in section 1.4.

1.4 Administrative Division of Bangladesh

Bangladesh is divided into eight administrative divisions, each named after respective divisional headquarters: Barisal, Chittagong, Dhaka, Khulna, Mymensingh, Rajshahi, Rangpur and Sylhet. Divisions are subdivided into 64 districts (zila), which are further subdivided into 544 upazila or thana, and their distribution is given in table 1.7.

Table 1.7: Administrative Division of Bangladesh

Division	Districts	Upazilas / Thanass	City Corporations
Barisal	6	40	1
Chittagong	11	111	1
Dhaka	13	129	4
Khulna	10	64	1
Mymensingh	4	34	
Rajshahi	8	70	1
Rangpur	8	58	1
Sylhet	4	38	1
Country Total	64	544	11

Source: BBS, 2012

1.5 How to use this Risk Atlas?

The main components in this study are Hazard Assessment, Elements at Risk, Exposure / Risk Assessment, Multi-Hazard Risk Assessment. This Atlas is organized in 4 volumes representing,

- Volume I [PART-I]: Hydro-meteorological Hazard, Exposure / Risk Assessment (Flood and Storm Surge)
- Volume I [PART-II]: Hydro-meteorological Hazard, Exposure / Risk Assessment (Drought and Landslide)
- Volume II: Geological and Environmental Hazard, Exposure / Risk Assessment (Earthquake, Tsunami, Technological and Health)
- Volume III: Multi Hazard Exposure and Risk Assessment (Flood, Storm Surge, Drought, Landslide, Earthquake and Tsunami)

In each volume, the relevant text, info graphics and maps representing Hazard, Exposure / Risk are arranged for each division and all districts in the division. However, at upazila / thana level very high and high exposure / risk are only presented.

Volume I [PART-1]: Hydro-meteorological Hazards (Flood and Storm Surge)

Flood

- Flood hazard maps are available for four return periods i.e. 25, 50, 100 and 150 years for all the eight divisions.
- Exposure of Population and Risk levels of Housing and Livelihood to flood hazard are provided at district and upazila / thana level as given in table 1.8

Table 1.8: Population Exposure, Housing and Livelihood at Risk to Flood

Flood	Population Exposure		Housing at Risk (Packa and Semi-Packa)		Housing at Risk (Kutcha and Jhupri)		Livelihood	
Division	Districts	Upazilas /Thanas	Districts	Upazilas /Thanas	Districts	Upazilas /Thanas	Districts	Upazilas /Thanas
Barisal	3	6	3	8	3	8	4	11
Chittagong	5	29	5	30	5	30	5	27
Dhaka	12	67	10	71	10	71	7	31
Khulna	1	2	1	2	1	2	1	1
Mymensingh	4	16	4	19	4	20	4	27
Rajshahi	4	9	3	11	3	12	3	20
Rangpur	2	2	3	3	3	3	3	6
Sylhet	4	31	4	31	4	31	4	29
Total	35	162	33	175	33	177	31	152



Storm Surge

- Storm Surge hazard maps are available for three return periods i.e. 25, 50 and 100 years for Barisal, Chittagong, Dhaka and Khulna divisions.
- Exposure of Population and Risk levels of Housing and Livelihood to storm surge hazard are provided at district and upazila / thana level as given in table 1.9

Table 1.9: Population Exposure, Housing and Livelihood at Risk to Storm Surge

Storm Surge	Population Exposure		Housing at Risk (Packa and Semi-Packa)		Housing at Risk (Kutcha and Jhupri)		Livelihood	
Division	Districts	Upazilas /Thanas	Districts	Upazilas /Thanas	Districts	Upazilas /Thanas	Districts	Upazilas /Thanas
Barisal	2	3	1	2	2	3	6	16
Chittagong	2	2	2	4	2	2	5	13
Khulna	0	0	0	0	0	0	1	1
Total	4	5	3	6	4	5	12	30

Volume I [PART-II]: Hydro-meteorological Hazards (Drought and Landslide)

Drought:

- Drought hazard maps are available for 10, 50 and 100 year return period for all the eight divisions.
- Exposure of Population and Risk levels of Housing and Livelihood to drought hazard are provided at district and upazila / thana level as given in table 1.10

Table 1.10: Population Exposure and Livelihood at Risk to Drought

Drought	Population Exposure		Livelihood	
Division	Districts	Upazilas /Thanas	Districts	Upazilas /Thanas
Barisal	0	0	6	40
Chittagong	0	0	9	73
Dhaka	0	0	11	47
Khulna	0	0	4	33
Mymensingh	0	0	10	56
Rajshahi	5	34	8	61
Rangpur	7	35	8	57
Sylhet	0	0	4	31
Total	12	69	60	398

Landslide:

- Landslide hazard does not have any return period and is presented for Chittagong and Sylhet divisions.
- Exposure of Population and Risk levels of Housing to landslide hazard are provided at district and upazila level as given in table 1.11.

Table 1.11: Population Exposure and Housing at Risk to Landslide

Landslide	Population Exposure		Housing at Risk (Packa and Semi-Packa)		Housing at Risk (Kutcha and Jhupri)	
Division	Districts	Upazilas /Thanas	Districts	Upazilas /Thanas	Districts	Upazilas /Thanas
Chittagong	5	29	5	31	5	34
Sylhet	2	5	2	11	3	14
Total	7	34	7	42	8	48

Volume II: Geological and Environmental Hazards (Earthquake, Tsunami, Technological and Health)

Earthquake:

- Earthquake hazard maps are available for five return periods i.e. 50, 100, 200, 500 and 1000 years for all the eight divisions.
- Exposure of Population and Risk levels of Housing to earthquake hazard (moderate) at district and upazila / thana level as given in table 1.12

Table 1.12: Population Exposure and Housing at risk to Earthquake Hazard

Earthquake	Population Exposure		Housing Exposure (Packa and Semi-Packa)		Housing Exposure (Kutcha and Jhupri)	
Division	Districts	Upazilas /Thanas	Districts	Upazilas /Thanas	Districts	Upazilas /Thanas
Chittagong	10	96	10	62	10	62
Dhaka	4	28	4	28	4	28
Mymensingh	4	34	4	34	4	34
Rajshahi	5	70	5	30	5	30
Rangpur	7	49	7	48	7	48
Sylhet	4	38	4	38	4	38
Total	34	315	34	240	34	240

Tsunami:

- Tsunami hazard maps are available for five return periods i.e. 50, 100, 200, 500 and 1000 years for Barisal, Chittagong and Khulna divisions.
- Exposure of Population and Risk levels of Housing to tsunami hazard are provided at district and upazila level as given in table 1.13.



Table 1.13: Population Exposure, Housing and Livelihood at Risk to Tsunami

Tsunami	Population Exposure		Housing Exposure (Packa and Semi-Packa)		Housing Exposure (Kutcha and Jhupri)		Livelihood	
Division	Districts	Upazilas /Thanas	Districts	Upazilas /Thanas	Districts	Upazilas /Thanas	Districts	Upazilas /Thanas
Barisal	2	2	2	4	2	4	1	1
Chittagong	0	0	0	0	0	0	1	1
Total	2	2	2	4	2	4	2	2

Technological:

- Technological hazard maps are available only for six industries in Chittagong and Dhaka divisions.
- Exposure maps of Population to six industries at upazila level as given in table 1.14.

Table 1.14: Population Exposure due to Technological Hazard

Sl. No.	Name of the Industry	Division	District	Number of Upazilas
1	Ashuganj Fertilizer & Chemical Company Factory Limited (AFCCL)	Chittagong	Brahmanbaria	3
			Kishoreganj	1
			Narsingdi	2
2	Chittagong Urea Fertilizer Limited (CUFL)	Chittagong	Chittagong	2
3	DAP Fertilizer Company Ltd. (DAPFCL)	Chittagong	Chittagong	2
4	Jamuna Fertilizer Company (JFCL),	Mymensingh	Jamalpur	1
		Dhaka	Tangail	2
		Rajshahi	Sirajganj	1
5	Natural Gas Fertilizer Factory Ltd. (NGFFL)	Sylhet	Maulvibazar	2
			Sylhet	2
6	Polash Fertilizer Factory Limited (PFFL)	Dhaka	Gazipur	2
			Narsigdi	3

Health:

- Health hazard maps represents number of population affected to 9 diseases (Arsenicosis, Dengue, Diarrhea, Encephalitis, Filariasis, Kalaazar, Leprosy, Malaria, Tuberculosis (Pulmonary)) are shown at national level and division level for 2011, 2012 and 2013, which represents the exposure of Population to Health hazard.

Volume III: Multi-Hazard Exposure and Risk Assessment (Flood, Storm Surge, Drought, Landslide, Earthquake and Tsunami)

- Population exposed to six multi-hazards (Flood, Storm Surge, Landslide, Drought, Earthquake and Tsunami) at country level are presented along with division and district level maps
- Housing types (Pucka, Semi-Pucka, Kutcha, Jhupri) at Risk to five multi-hazards (Flood, Storm Surge, Landslide, Earthquake and Tsunami) at country level are presented along with division and district level maps
- Livelihood (Transplanted Aman crop) at Risk to four multi-hazards (Flood, Storm Surge, Drought and Tsunami) at country level are presented along with division and district level maps

VOLUME - III
(MULTI HAZARD EXPOSURE
&
RISK ASSESSMEN)



2. Multi-Hazard Risk Assessment

The Multi-Hazard Risk and Vulnerability Assessment, Modeling and Mapping (MRVAM) project report provides information on probable frequency and intensity of floods, cyclone and storm surge, landslides and drought, earthquakes, tsunami, technical hazards and health. The report analyzed exposure of population, critical facilities and infrastructure sectors and risk of housing and livelihoods to the above hazards. The exposure / risk maps are developed at union/upazila/district level in Bangladesh.

2.1 Scenarios and Criteria for Multi-Hazard Assessment

The multi-hazard risk assessment is developed based on a criteria selected from possible exposure of Population and risk of Housing and Livelihood (agriculture). Multi-Hazard exposure of Population is assessed with six hazards (flood, storm surge, landslide, drought, earthquake and tsunami), housing is considered with five hazards (flood, storm surge, landslide, earthquake and tsunami) and livelihood (agriculture) with four hazards (flood, storm surge, earthquake and tsunami). The criteria considered are summarized in Table 2.1.

Table 2.1: Criteria Considered for Multi-hazard Assessment

Hazard	Criteria for Exposure / Risk		
	Population (Exposure)	Housing (Risk)	Livelihood –Agriculture (Risk)
Exposure Criteria	Settlement Area (%)	Settlement Area (%)	Transplanted Aman crop area (%)
Flood	Flood depth	Flood depth	Flood depth
Storm Surge	Storm Surge depth	Storm Surge depth	Storm Surge depth
Landslide	Susceptibility category	Susceptibility category	
Drought	Hazard category	Hazard category	Hazard category
Earthquake	Hazard category	Hazard category	
Tsunami	Hazard category	Hazard category	Hazard category

Note: For other elements at risk only exposure was assessed, hence not considered for multi-hazard assessment.

Given the criteria provided in Table 2.1, a multi-hazard scenario maps are generated. Overlaying and weighing was carried out using GIS tools, resulting in a multi-hazard map that defines the number of hazards existing in each upazila.

2.2 Methodology for Population Exposure

Population exposure at upazila level is assessed as weighted aggregate of hazard category scores for six hazards using the hazard category scores (Table 2.2) and percentage of population (based on settlement area in each hazard category). The range of weighted aggregate exposure is divided into six categories i.e. No Hazard, Very Low, Low, Moderate, High and Very High. Number of upazilas in each exposure category is calculated and the results are shown in table 2.2.

Table 2.2: Hazard category scores used for Population Exposure

Flood Depth (m)	Storm Surge Depth (m)	Drought Hazard category	Landslide Hazard Category	Earthquake / Tsunami Hazard category	Hazard category Score
No Flood	No Inundation			No Hazard	0
< 0.3	< 1.0	Near Normal		Very Low	1
0.3 – 0.9	1.0 – 1.5	Moderate	Low	Low	2
0.9 – 1.8	1.5 – 2.0	Severe	Moderate	Moderate	3
1.8 – 3.6	2.0 – 3.0	Extreme	High	High	4
>3.6	3.0 – 4.0		Very High	Very High	5
	4.0 – 5.0				6
	>5.0				7

2.3 Multi-Hazard Analysis: Population Exposure

Multi-Hazard maps representing exposure of population consists of six categories i.e. Not Exposed, Very Low, Low, Moderate, High and Very High and the symbology used and the number of Upazilas / Thanas in which population is exposed to multi-hazards is given in Table 2.3.

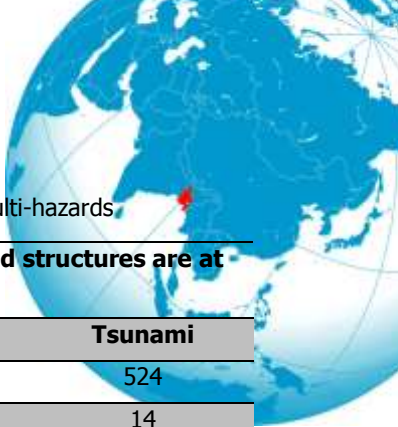
Table 2.3: Number of Upazilas / Thanas in which population exposed to multi-hazards

Exposure Category	Number of Upazilas / Thanas in which population is exposed					
	Flood	Storm Surge	Landslide	Drought	Earthquake	Tsunami
Not Exposed	144	455	401	0	0	524
Very Low	123	39	0	475	261	14
Low	48	29	91	69	9	2
Moderate	67	16	18	0	274	2
High	108	3	14	0	0	0
Very High	54	2	20	0	0	2
Total	544	544	544	544	544	544

Number of maps indicating the exposure of population to multi-hazards is national, divisional and district level is given in table 2.4.

Table 2.4 : Number of maps for exposure of population to multi-hazards

Division	Number of Districts in which population is exposed
Barisal	6
Chittagong	11
Dhaka	13
Khulna	10
Mymensingh	4
Rajshahi	8
Rangpur	8
Sylhet	4
Total	64



2.4 Multi-Hazard Analysis: Housing (Pacca and Semi-Pacca)

Multi-Hazard maps representing risk levels of housing (Pacca and Semi-Pacca) consists of six categories i.e. No Risk, Very Low, Low, Moderate, High and Very High and the symbology used and the number of Upazilas / Thanas in which Housing (Pacca and Semi-Pacca) at risk to multi-hazards is given in Table 2.5.

Table 2.5: Number of Upazilas / Thanas in which Housing (Pacca and Semi-Pacca) at risk to multi-hazards

Risk level	Number of Upazilas / Thanas in which Pacca and Semi-Pacca household structures are at risk				
	Flood	Storm Surge	Landslide	Earthquake	Tsunami
No Risk	130	465	0	0	526
Very Low	137	54	103	257	12
Low	42	17	12	11	1
Moderate	60	5	8	276	3
High	85	1	2	0	0
Very High	90	2	17	0	2
Total	544	544	544	544	544

Number of maps indicating the Housing (Pacca and Semi-Pacca) at risk to multi-hazards is national, divisional and district level is given in table 2.6.

Table 2.6 : Number of maps for Housing (Pacca and Semi-Pacca) at risk to multi-hazards

Division	Number of Districts in which population is exposed
Barisal	6
Chittagong	11
Dhaka	13
Khulna	10
Mymensingh	4
Rajshahi	8
Rangpur	8
Sylhet	4
Total	64

2.5 Multi-Hazard Analysis: Housing (Kutcha and Jhupri)

Multi-Hazard maps representing risk levels of housing (Kutcha and Jhupri) consists of six categories i.e. No Risk, Very Low, Low, Moderate, High and Very High and the symbology used and the number of Upazilas / Thanas in which Housing (Kutcha and Jhupri) at risk to multi-hazards is given in Table 2.7.

Table 2.7: Number of Upazilas / Thanas in which Housing (Kutcha and Jhupri) at risk to multi-hazards

Risk level	Number of Upazilas / Thanas in which Kutcha and Jhupri household structures are at risk				
	Flood	Cyclone	Landslide	Earthquake	Tsunami
No Risk	130	452	402	0	524
Very Low	135	41	76	544	14
Low	42	24	15	0	2
Moderate	60	22	3	0	2
High	75	3	7	0	0
Very High	102	2	41	0	2
Total	544	544	544	544	544

Number of maps indicating the Housing (Kutcha and Jhupri) at risk to multi-hazards is national, divisional and district level is given in table 2.8.

Table 2.8 : Number of maps for Housing (Kutcha and Jhupri) at risk to multi-hazards

Division	Number of Districts in which population is exposed
Barisal	6
Chittagong	11
Dhaka	13
Khulna	10
Mymensingh	4
Rajshahi	8
Rangpur	8
Sylhet	4
Total	64

1.5 Livelihood (Agriculture)

Livelihood (Agriculture) considered in this study is transplanted Aman crop. Risk analysis is carried out based on crop growing periods and stages, possible month of occurrence of hazard. In case of flood, based on the frequency analysis of observed water level data in the rivers in Bangladesh, time of flood occurrence at district level on monthly basis is derived, for storm surge it is assumed to occur in the month of October and drought hazard is assumed to occur in August. In case of tsunami, it is assesmed to occur in September. (Please see Risk Assessment reports for more details).



The number of Upazila / Thana in which livelihood (agriculture) is at risk to multi-hazards is given in Table 2.9.

Table 2.9: Number of Upazila / Thana in which livelihood (agriculture) at risk to multi-hazards

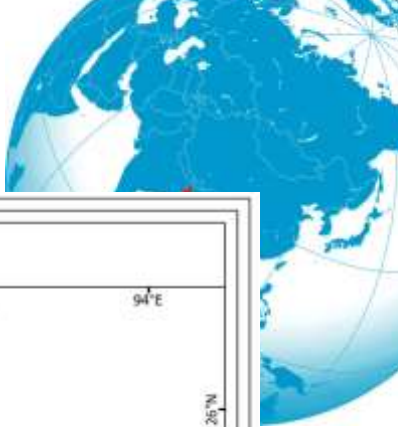
Risk level	Number of Upazilas / Thanas in which Livelihood (Agriculture) at risk			
	Flood	Storm Surge	Drought	Tsunami
No Risk	246	456	143	529
Very Low	91	28	0	10
Low	21	13	0	2
Moderate	36	17	0	1
High	53	23	23	0
Very High	97	7	378	2
Total	544	544	544	544

Note: No Risk Upazilas include No Hazard and No Aman Crop.

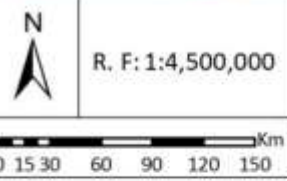
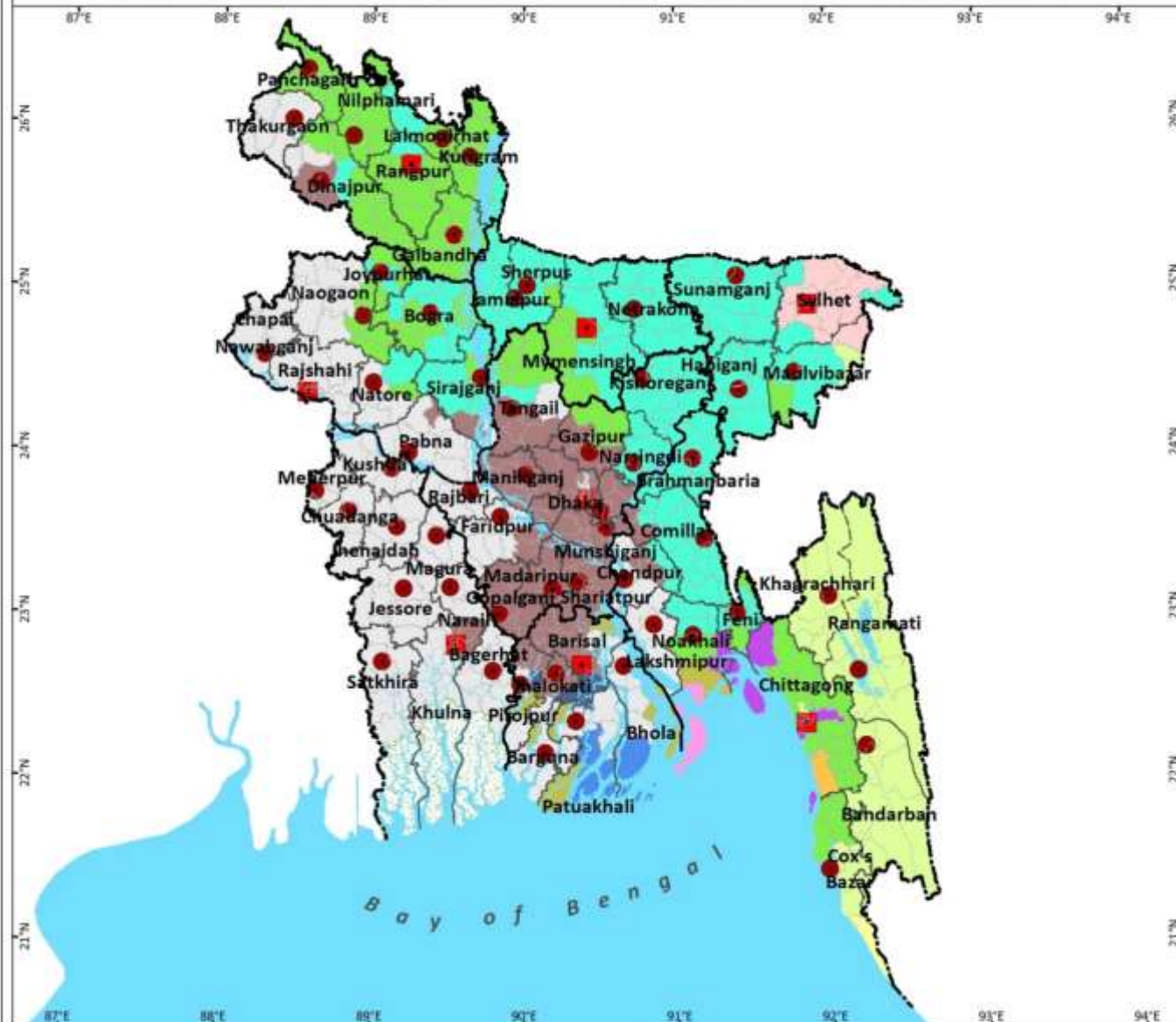
Number of maps indicating the livelihood (agriculture) at risk to multi-hazards is national, divisional and district level is given in table 2.10.

Table 2.10 : Number of maps for Housing (Pacca and Semi-Pacca) at risk to multi-hazards

Division	Number of Districts in which population is exposed
Barisal	6
Chittagong	11
Dhaka	13
Khulna	10
Mymensingh	4
Rajshahi	8
Rangpur	8
Sylhet	4
Total	64



National level Population Exposure to Multi-Hazards



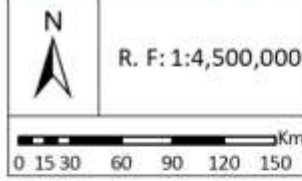
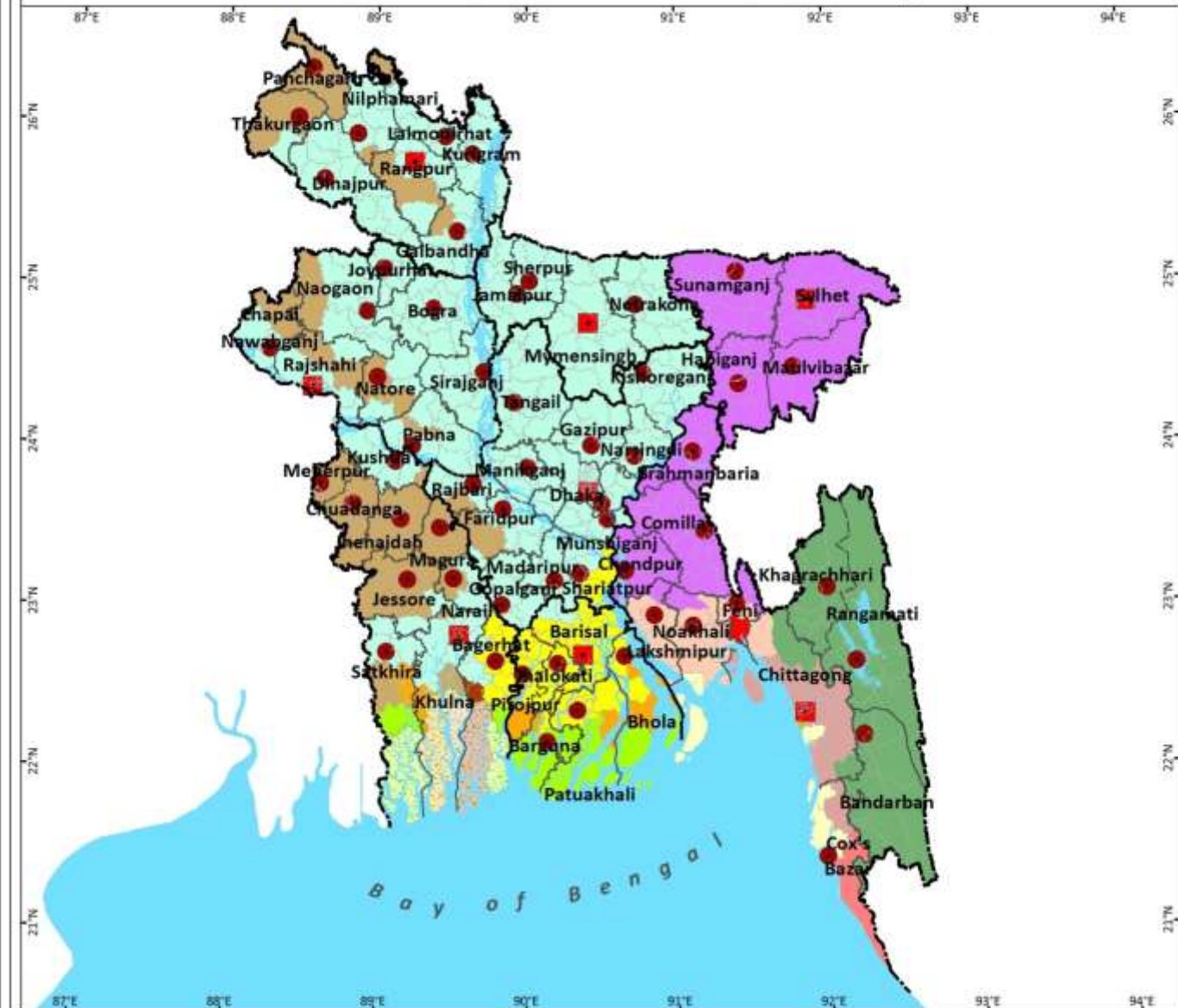
Note: Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated at national level.
Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.
Coordinate System: BTM, Datum: Gulshan 303

- Legend**
- Country Boundary
 - Division Boundary
 - District Boundary
 - Upazila Boundary
 - Division Head Quarter
 - District Head Quarter
 - River/Sea/Lake
 - Sundarbans
- Combination of hazards**
- Flood, Landslide, Earthquake
 - Storm Surge, Landslide, Earthquake
 - Landslide, Earthquake, Tsunami
 - Landslide, Earthquake
 - Flood, Earthquake
 - Flood, Storm Surge
 - Storm Surge, Earthquake
 - Storm Surge, Tsunami
 - Flood
 - Storm Surge
 - Earthquake
 - Tsunami
 - Exposure below moderate

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

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National level Multi-Hazard Map



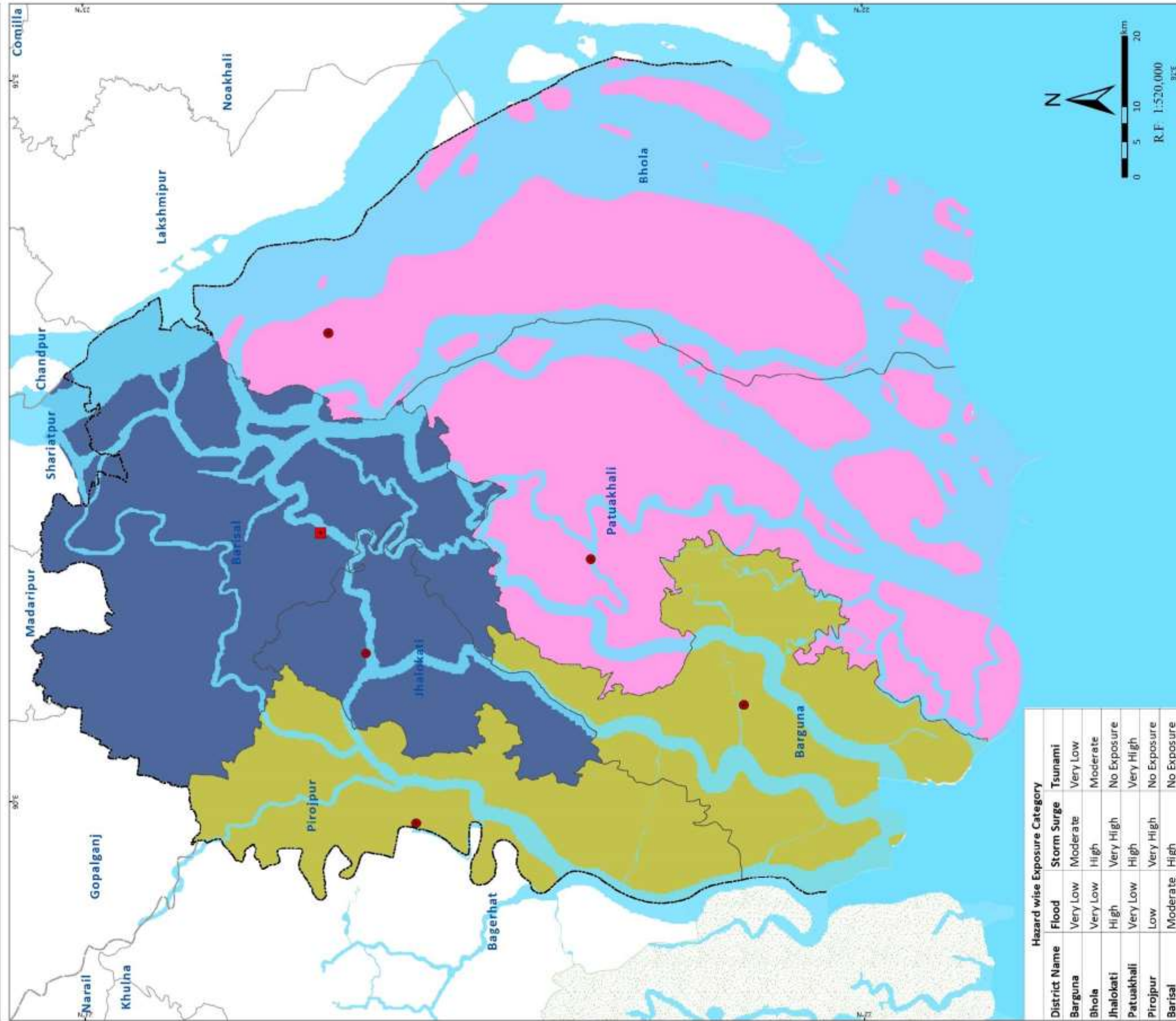
Note: Hazard intensity of moderate and above category for flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated in the map.
Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.
Coordinate System: BTM, Datum: Gulshan 303

- Legend**
- Country Boundary
 - Division Boundary
 - District Boundary
 - Upazila Boundary
 - Division Head Quarter
 - District Head Quarter
 - River/Sea/Lake
 - Sundarbans
- Combination of hazards**
- Fld,SS,LS,DRT,EQ,TS
 - Fld,SS,DRT, EQ,TS
 - Fld,SS,LS,DRT, EQ
 - SS,LS,DRT, EQ, TS
 - Fld,LS,DRT,EQ
 - Fld,SS,DRT,EQ
 - LS,DRT,EQ,TS
 - SS,DRT, EQ,TS
 - SS,LS,DRT, EQ
 - Fld,DRT,EQ
 - LS,DRT,EQ
 - SS,DRT,EQ
 - DRT,EQ

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Department of Disaster Management (DDM)
Ministry of Disaster Management and Relief

Population Exposure to Multi-Hazard (Barisal Division)



District Name	Hazard wise Exposure Category		
	Flood	Storm Surge	Tsunami
Barguna	Very Low	Moderate	Very Low
Bhoila	Very Low	High	Moderate
Jhalokati	High	Very High	No Exposure
Patuakhali	Very Low	High	Very High
Pirojpur	Low	Very High	No Exposure
Barisal	Moderate	High	No Exposure

- Country Boundary
- Division Boundary
- Division Head Quarter
- District Head Quarter
- River/Sea/Lake
- Sundarbans

Note:
Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

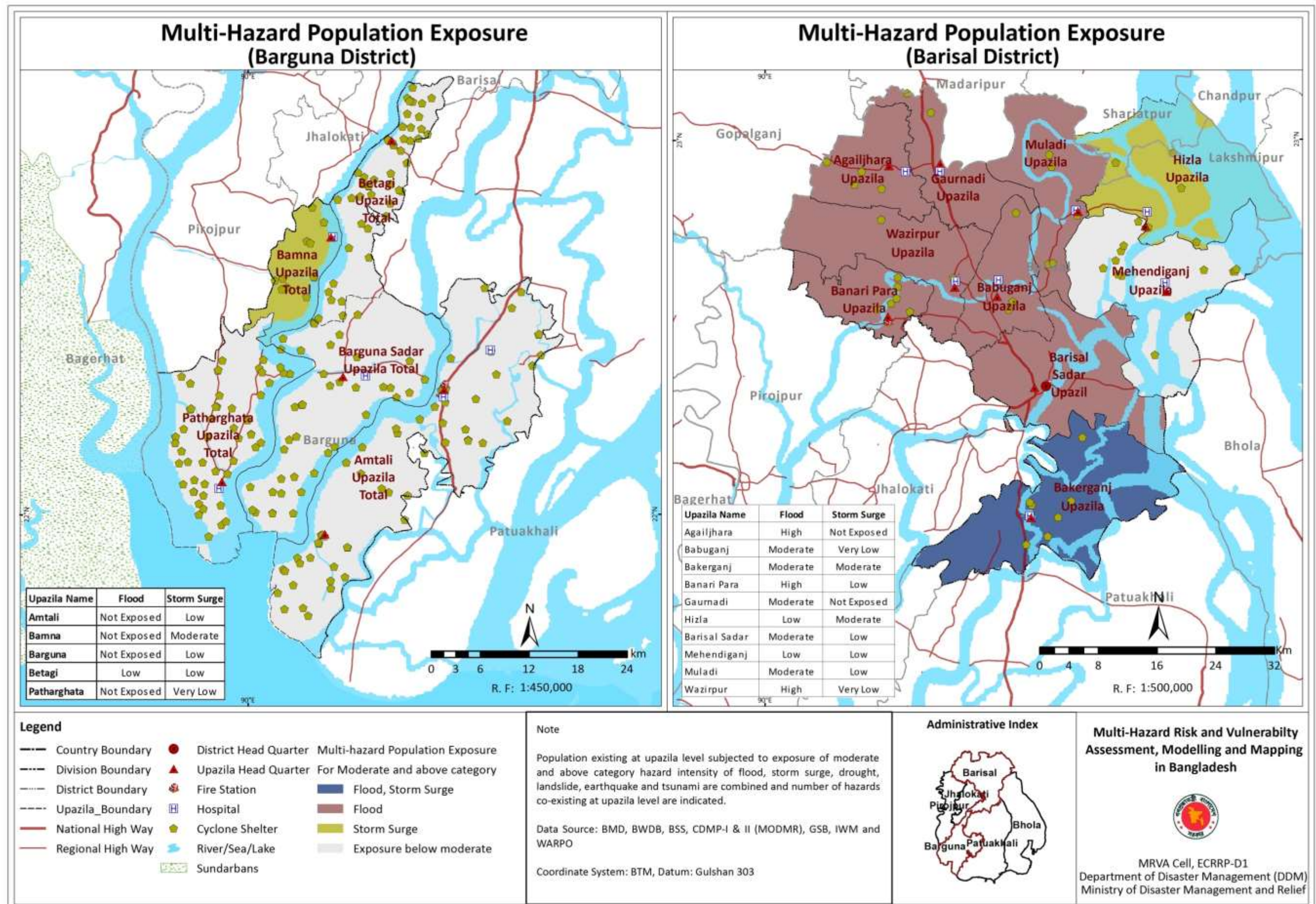
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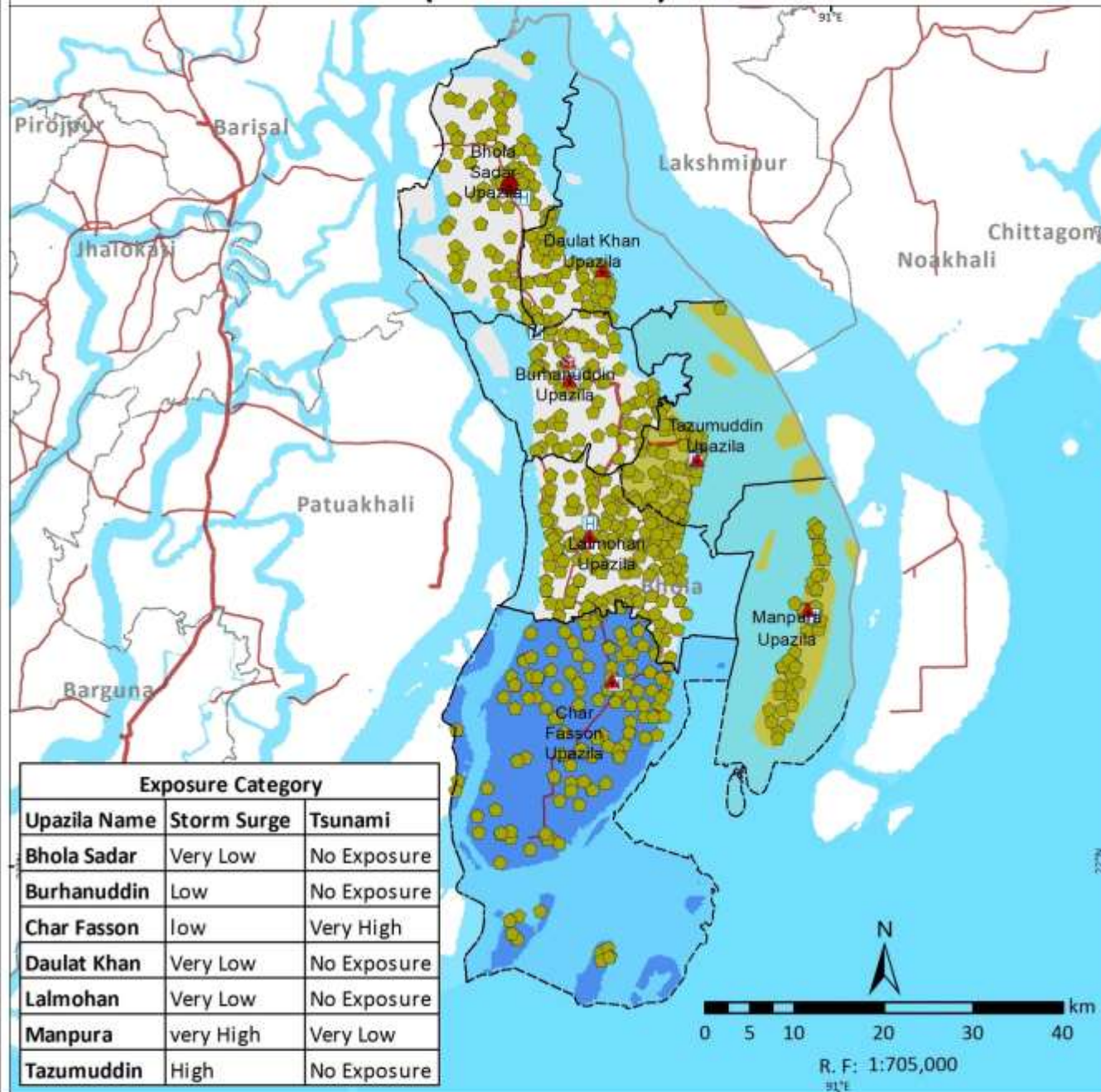


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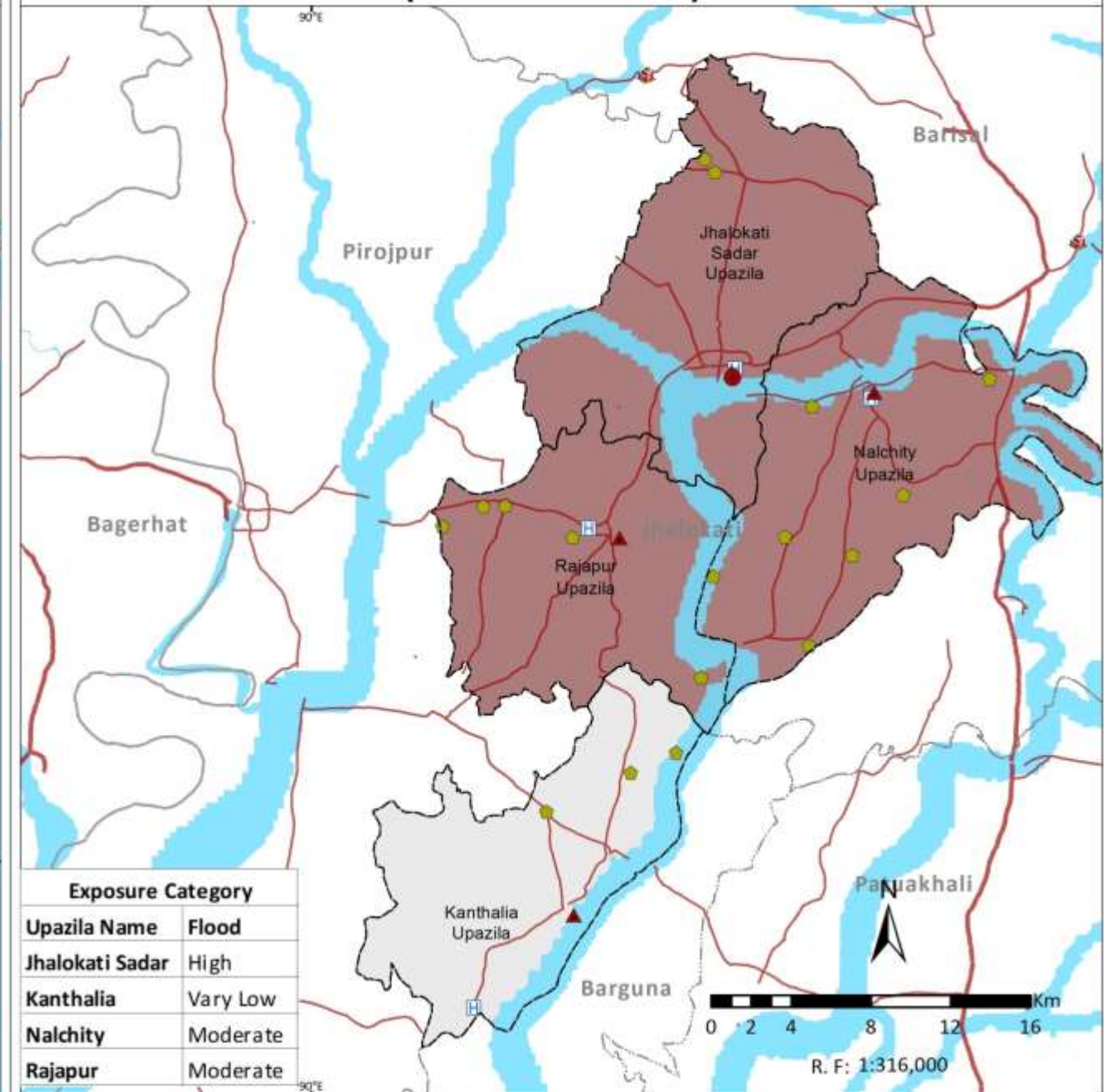




Multi-Hazard Population Exposure (Bhola District)



Multi-Hazard Population Exposure (Jhalokati District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- Disrict Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Population Exposure for Moderate and Above Category
- Flood
- Storm Surge
- Tsunami
- Exposure below moderate

Note

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

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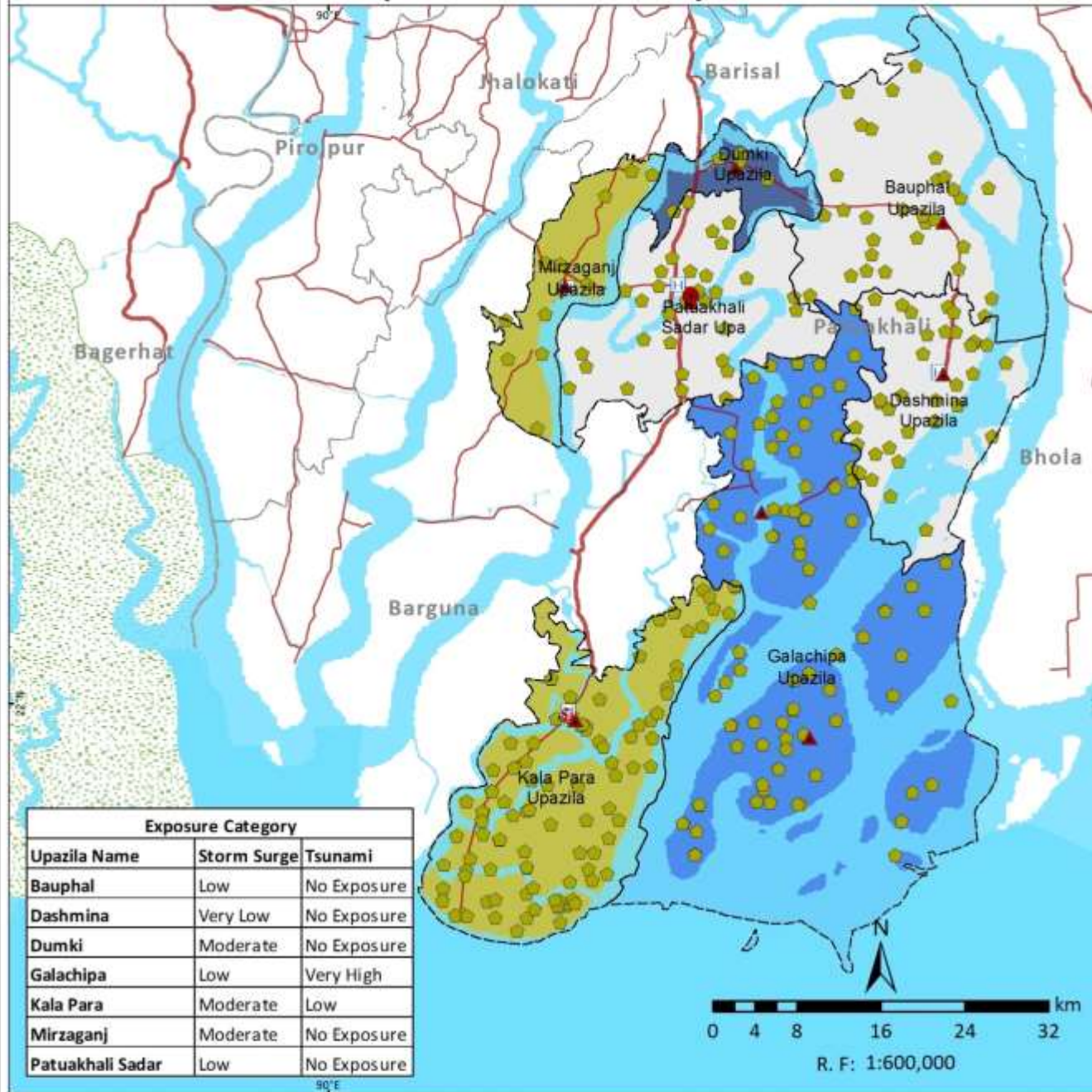
Multi-Hazard Risk and Vulnerability Assessment, Modelling and Mapping in Bangladesh



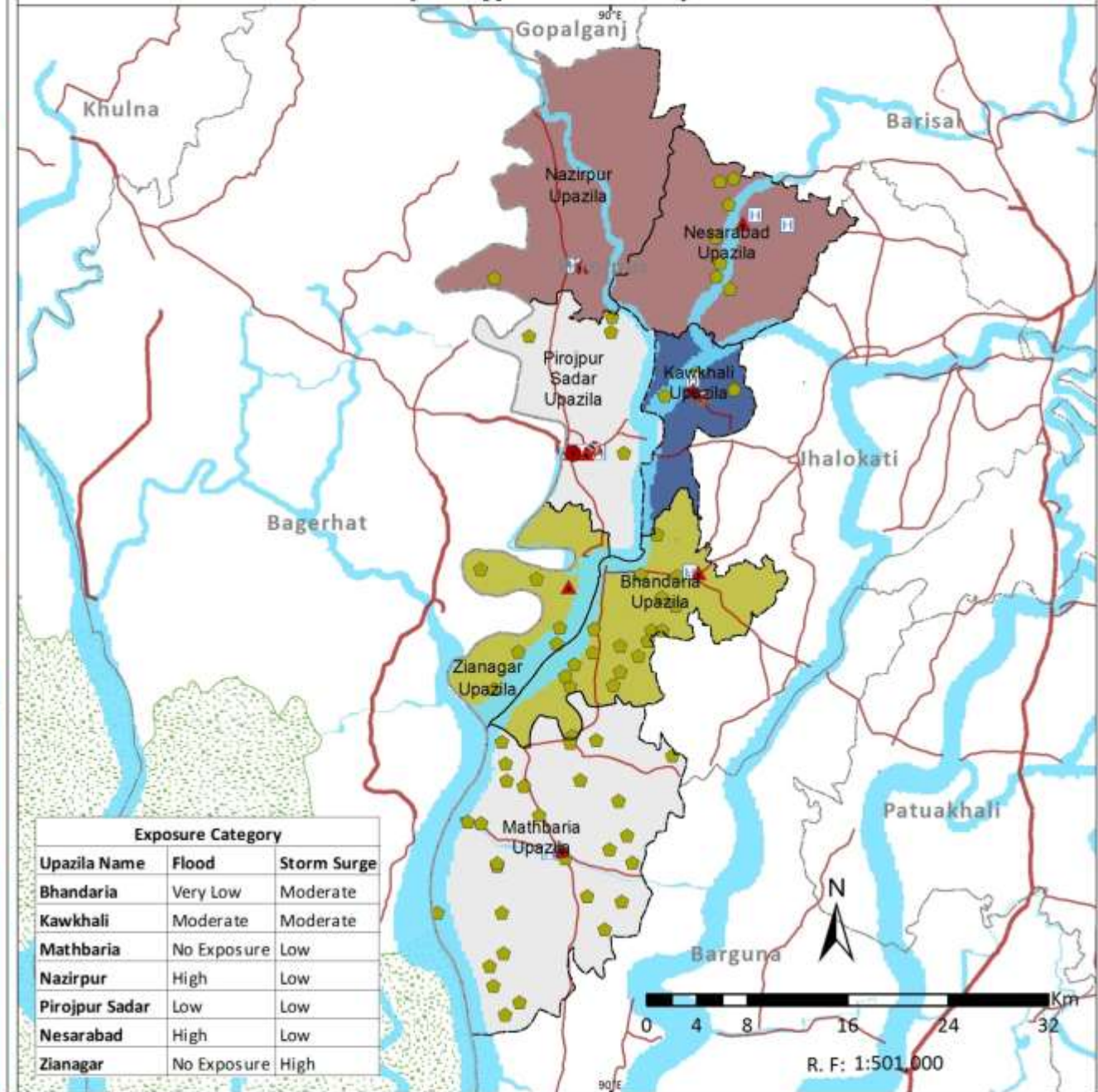
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Multi-Hazard Population Exposure (Patuakhali District)



Multi-Hazard Population Exposure (Pirojpur District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Population Exposure for Moderate and Above Category
- Flood, Storm Surge
- Flood
- Storm Surge
- Tsunami
- Exposure below moderate

Note

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

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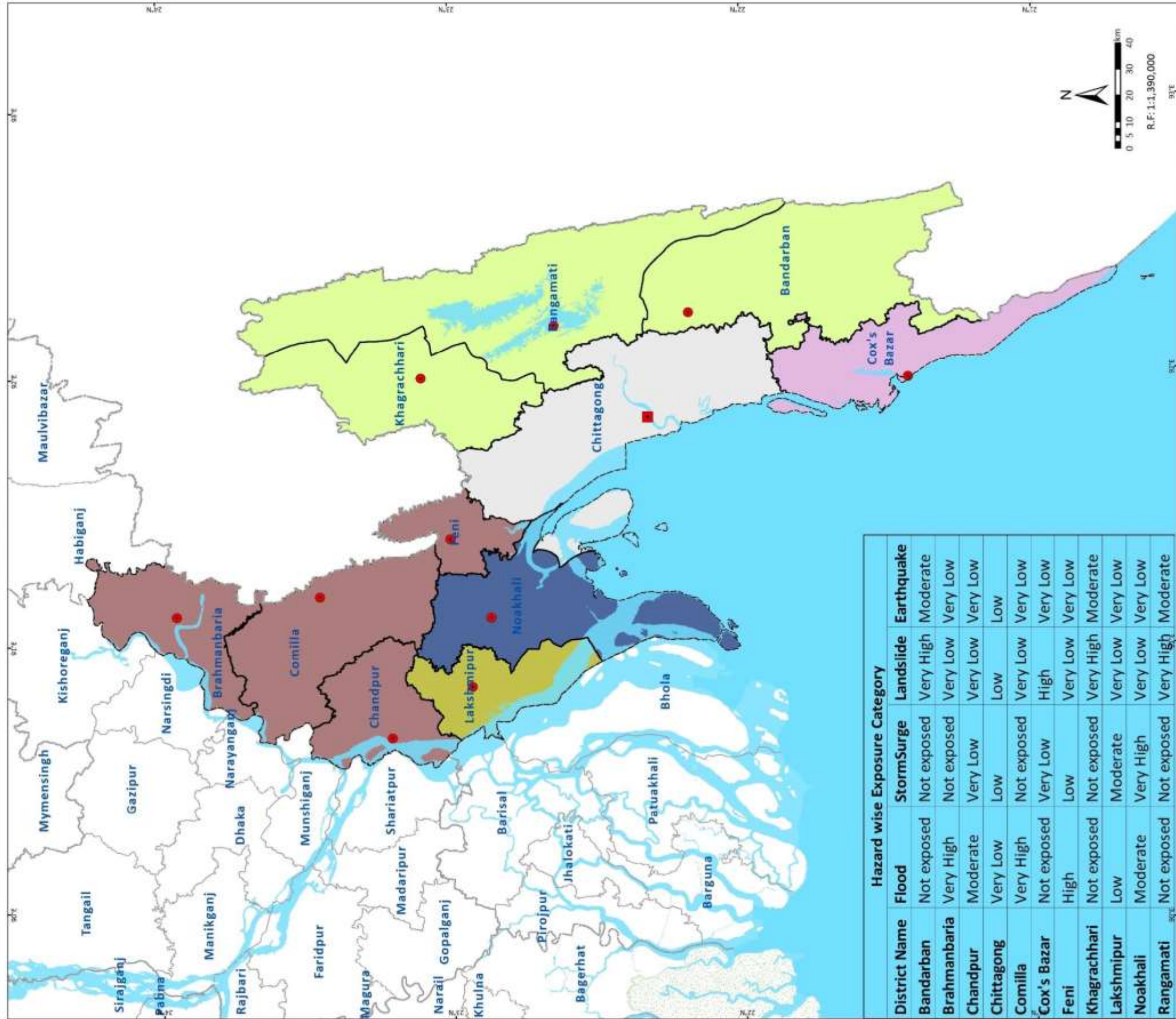


Multi-Hazard Risk and Vulnerability Assessment, Modelling and Mapping in Bangladesh



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Ministry of Disaster Management and Relief

Population Exposure to Multi-Hazard (Chittagong Division)



District Name	Hazard wise Exposure Category			
	Flood	Storm Surge	Landslide	Earthquake
Bandarban	Not exposed	Not exposed	Very High	Moderate
Brahmanbaria	Very High	Not exposed	Very Low	Very Low
Chandpur	Moderate	Very Low	Very Low	Very Low
Chittagong	Very Low	Low	Low	Low
Comilla	Very High	Not exposed	Very Low	Very Low
Cox's Bazar	Not exposed	Very Low	High	Very Low
Feni	High	Low	Very Low	Very Low
Khagrachhari	Not exposed	Not exposed	Very High	Moderate
Lakshmipur	Low	Moderate	Very Low	Very Low
Noakhali	Moderate	Very High	Very Low	Very Low
Rangamati	Not exposed	Not exposed	Very High	Moderate

Legend

- Country Boundary
- Division Boundary
- District Boundary
- District Head Quarter
- River/Sea/Lake
- Sundarbans

Multi-Hazard Exposure Category for Moderate and Above

- Landslide, Earthquake
- Flood, Storm Surge
- Landslide
- Flood
- Storm Surge
- Exposure below moderate

Note: Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.



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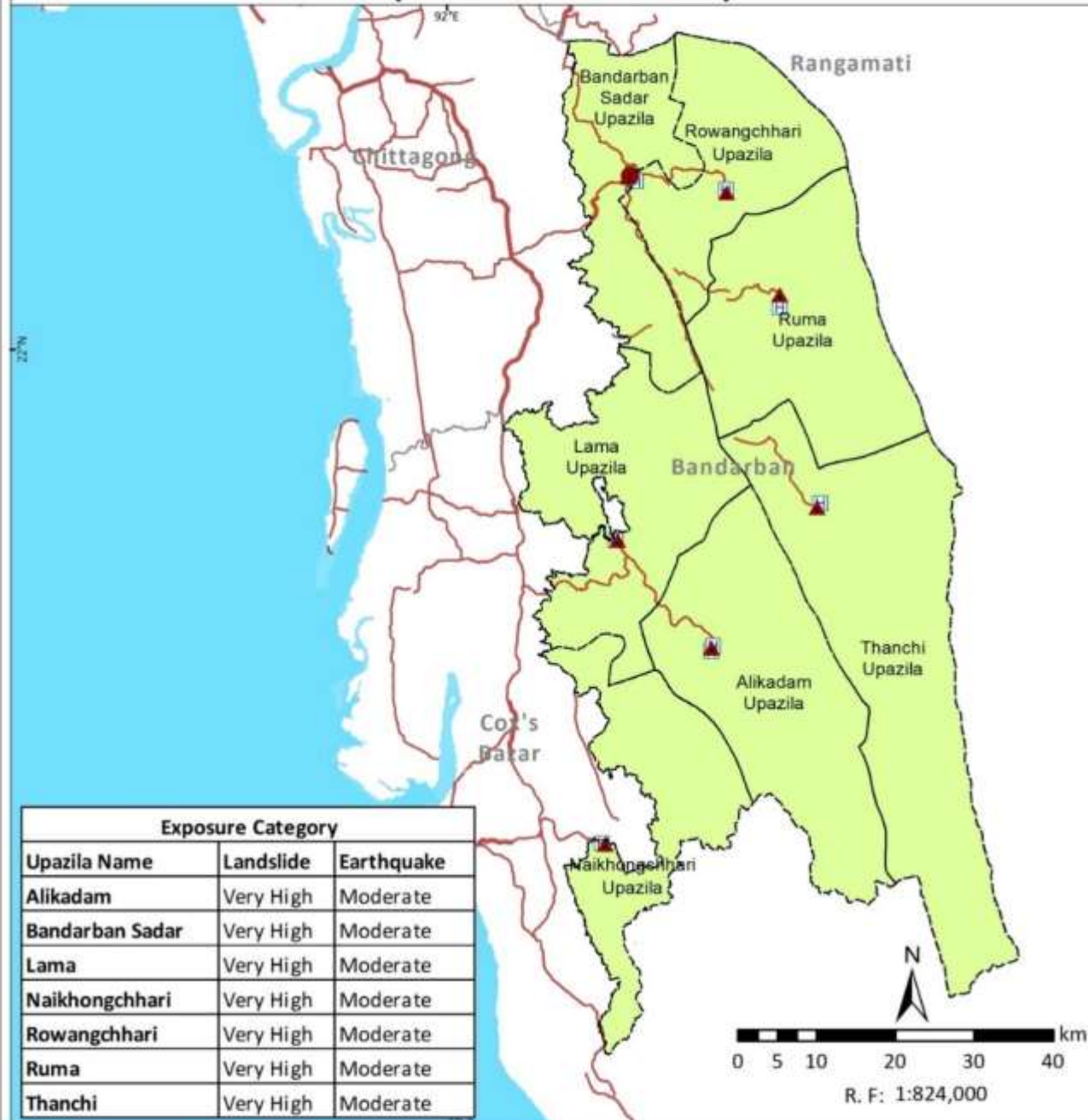


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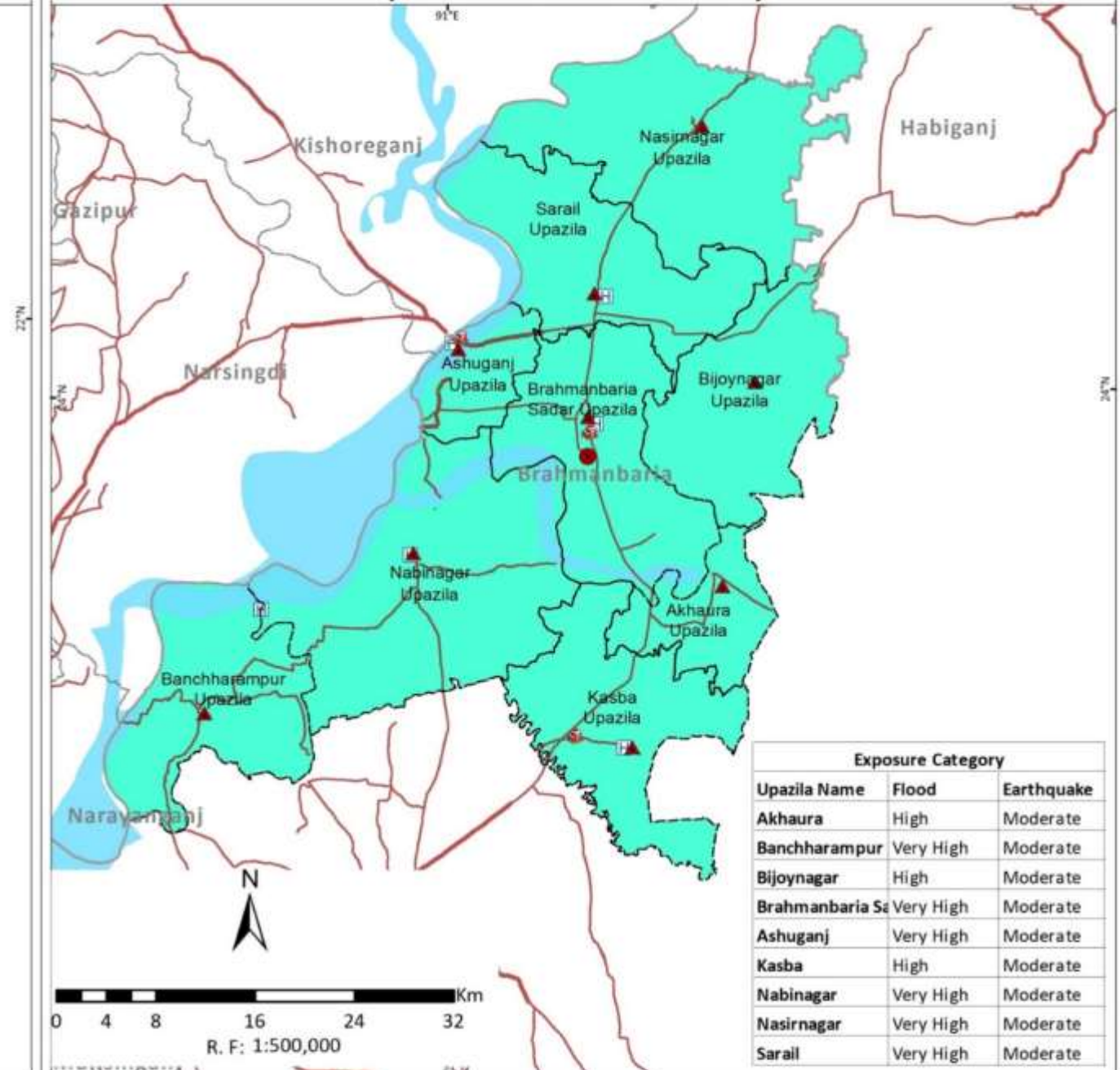




Multi-Hazard Population Exposure (Bandarban District)



Multi-Hazard Population Exposure (Brahmanbaria District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Population Exposure for Moderate and Above Category
- Landslide, Earthquake
- Flood, Earthquake

Note

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

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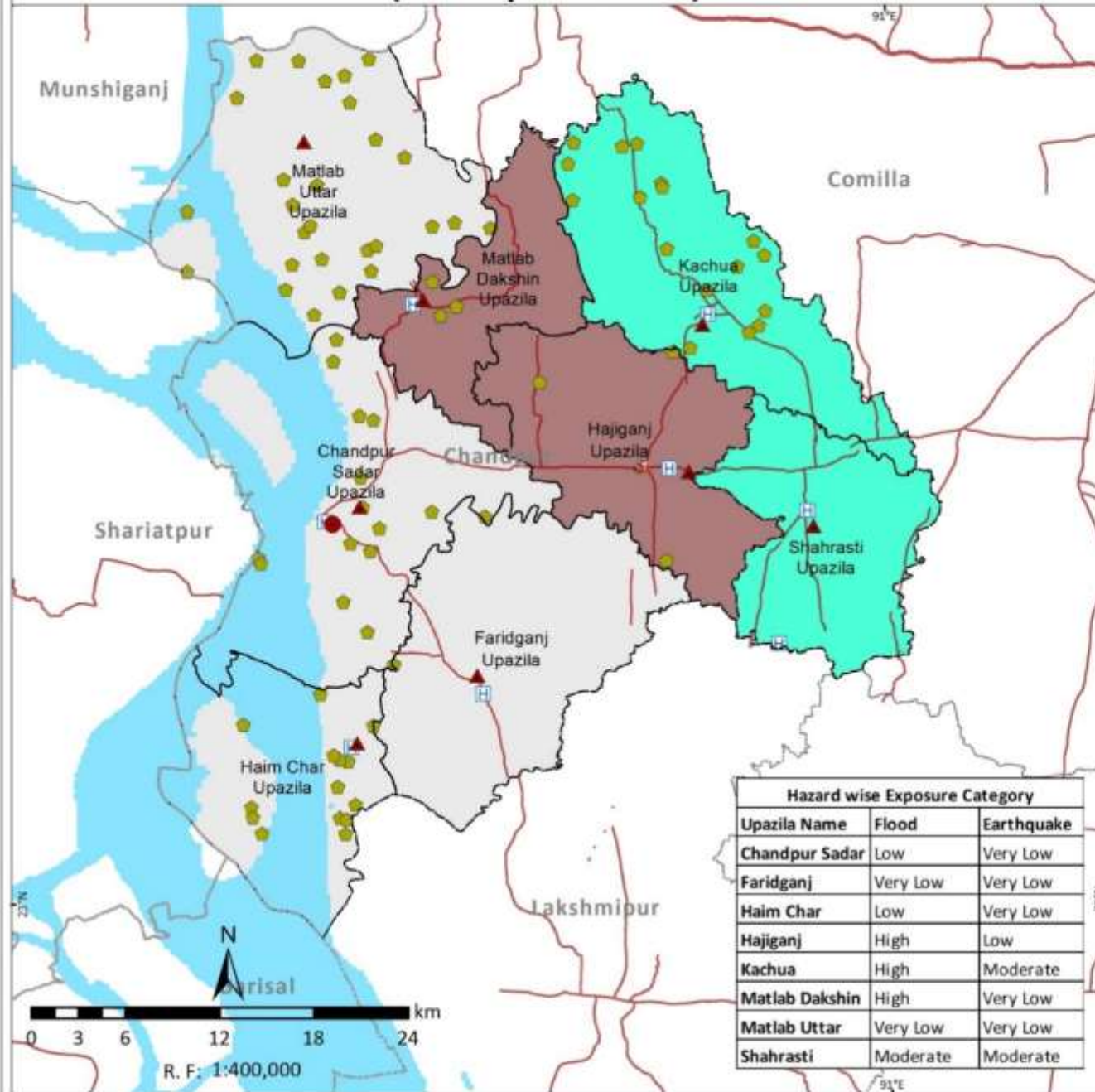
Multi-Hazard Risk and Vulnerability Assessment, Modelling and Mapping in Bangladesh



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Multi-Hazard Population Exposure (Chandpur District)



Hazard wise Exposure Category		
Upazila Name	Flood	Earthquake
Chandpur Sadar	Low	Very Low
Faridganj	Very Low	Very Low
Haim Char	Low	Very Low
Hajiganj	High	Low
Kachua	High	Moderate
Matlab Dakshin	High	Very Low
Matlab Uttar	Very Low	Very Low
Shahrasti	Moderate	Moderate

Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Storm Surge, Landslide, Earthquake
- Landslide, Earthquake
- Flood, Earthquake
- Storm Surge, Earthquake
- Flood
- Earthquake
- Exposure below moderate

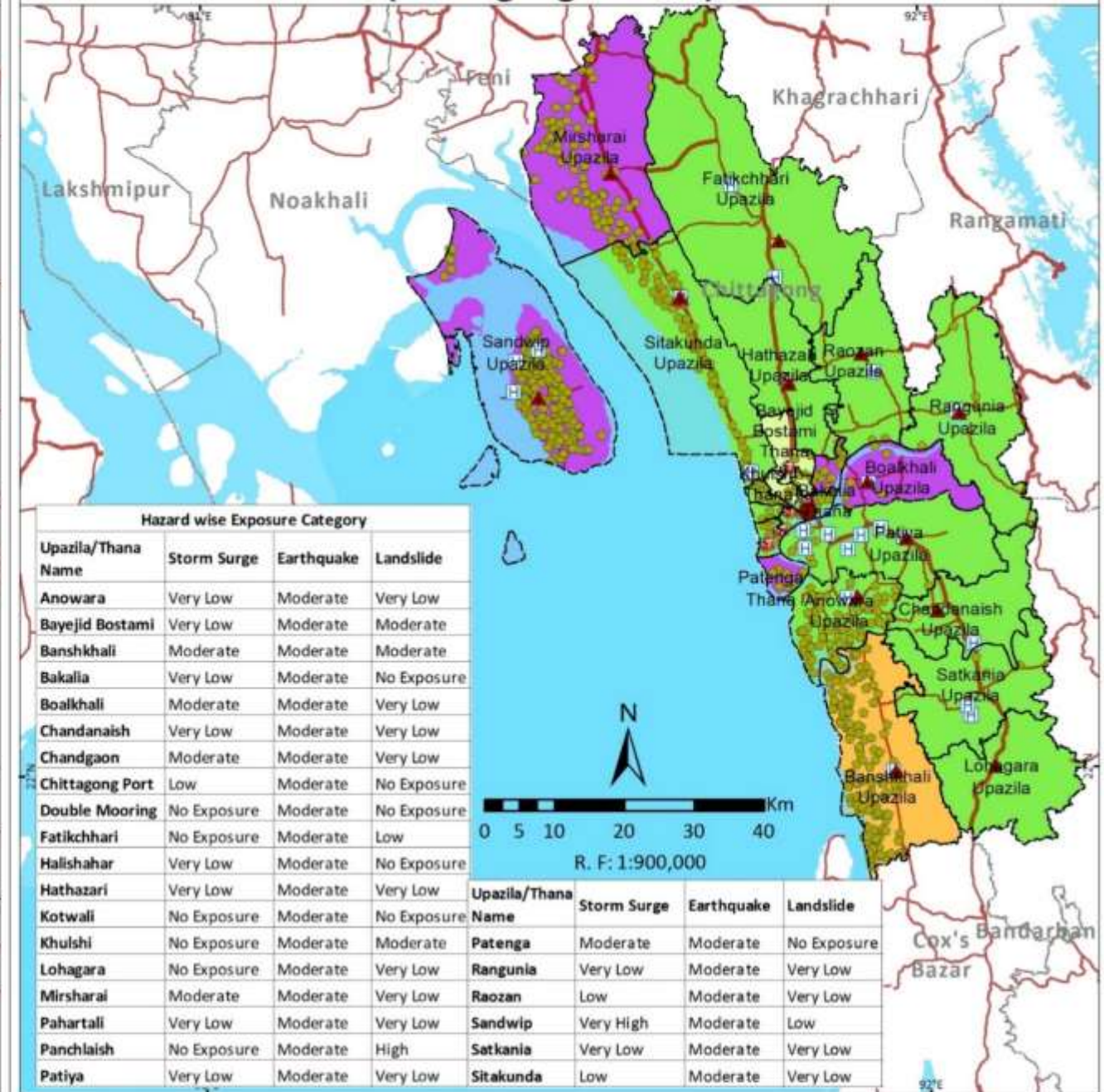
Note

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

Multi-Hazard Population Exposure (Chittagong District)



Hazard wise Exposure Category			
Upazila/Thana Name	Storm Surge	Earthquake	Landslide
Anowara	Very Low	Moderate	Very Low
Bayejid Bostami	Very Low	Moderate	Moderate
Banshkhali	Moderate	Moderate	Moderate
Bakalia	Very Low	Moderate	No Exposure
Boalkhali	Moderate	Moderate	Very Low
Chandanaish	Very Low	Moderate	Very Low
Chandgaon	Moderate	Moderate	Very Low
Chittagong Port	Low	Moderate	No Exposure
Double Mooring	No Exposure	Moderate	No Exposure
Fatikchhari	No Exposure	Moderate	Low
Halishahar	Very Low	Moderate	No Exposure
Hathazari	Very Low	Moderate	Very Low
Kotwali	No Exposure	Moderate	No Exposure
Khulshi	No Exposure	Moderate	Moderate
Lohagara	No Exposure	Moderate	Very Low
Mirsharai	Moderate	Moderate	Very Low
Pahartali	Very Low	Moderate	Very Low
Panchlaish	No Exposure	Moderate	High
Patiya	Very Low	Moderate	Very Low

Upazila/Thana Name	Storm Surge	Earthquake	Landslide
Patenga	Moderate	Moderate	No Exposure
Rangunia	Very Low	Moderate	Very Low
Satkania	Very Low	Moderate	Very Low
Lohagara	Very Low	Moderate	Very Low
Sandwip	Very High	Moderate	Low
Sitakunda	Low	Moderate	Very Low

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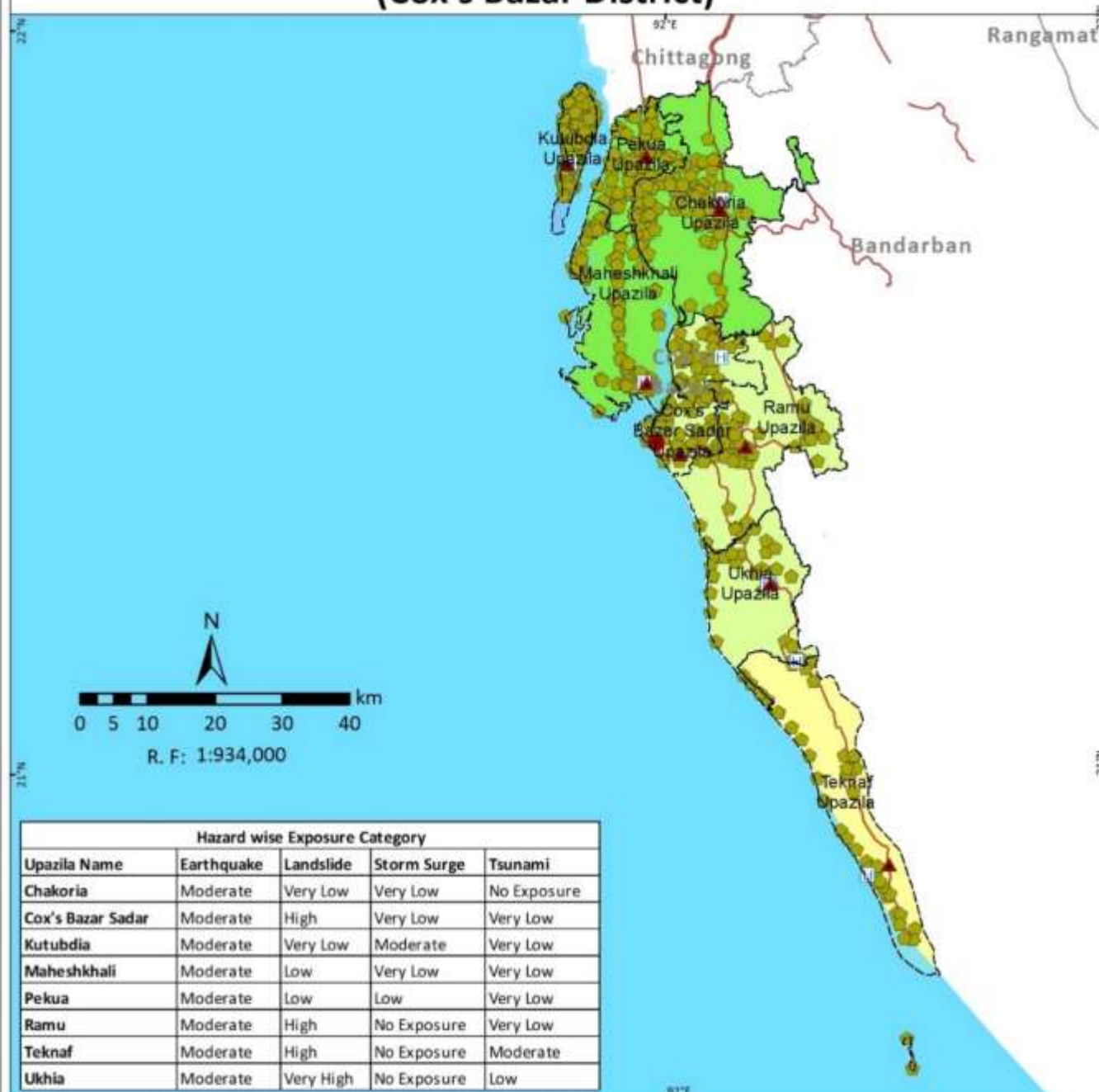
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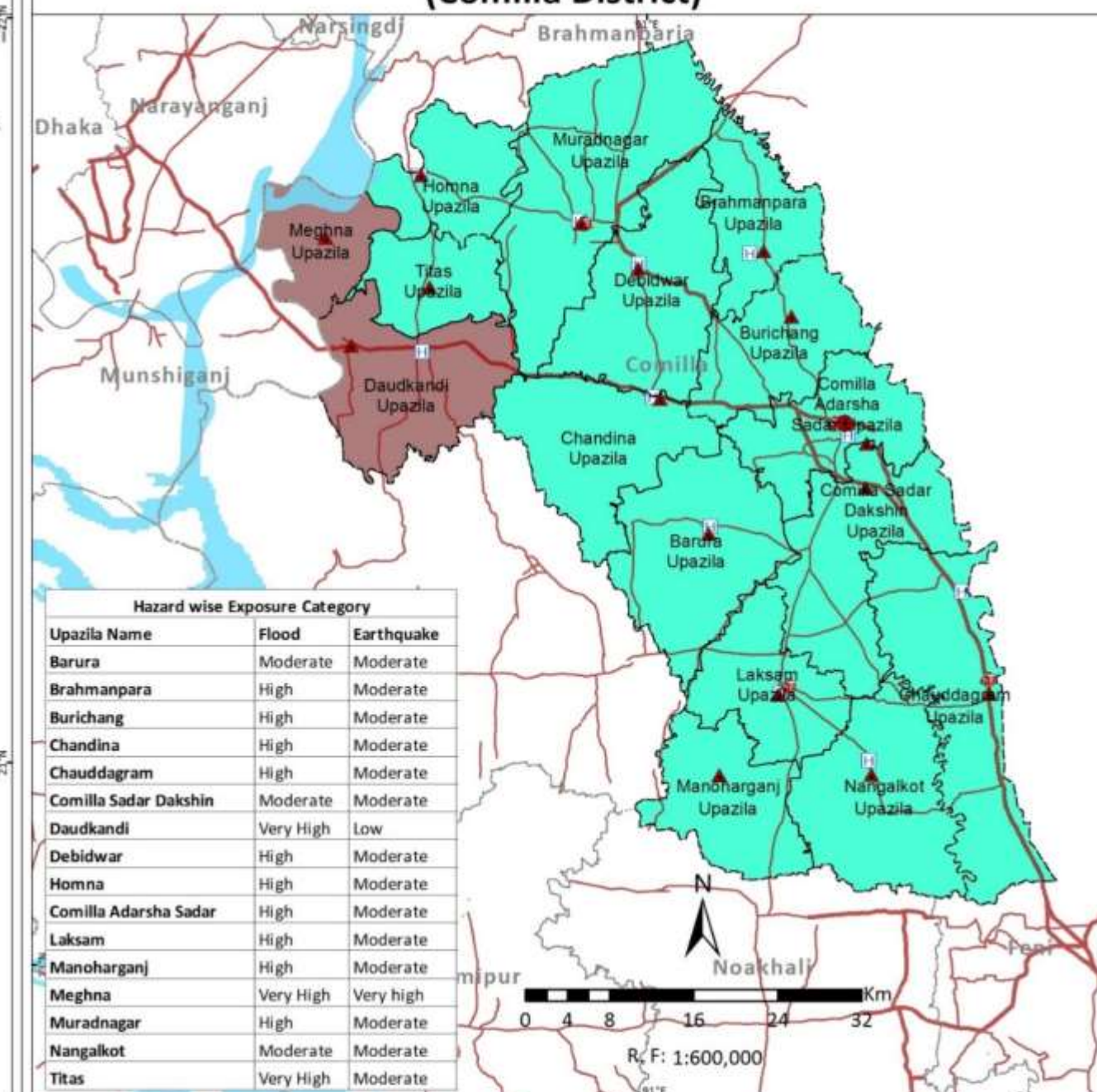
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Multi-Hazard Population Exposure (Cox's Bazar District)



Multi-Hazard Population Exposure (Comilla District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Population Exposure for Moderate and Above Category
- Landslide, Earthquake, Tsunami
- Landslide, Earthquake
- Flood, Earthquake
- Storm Surge, Earthquake
- Flood
- Earthquake
- Exposure below moderate

Note

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

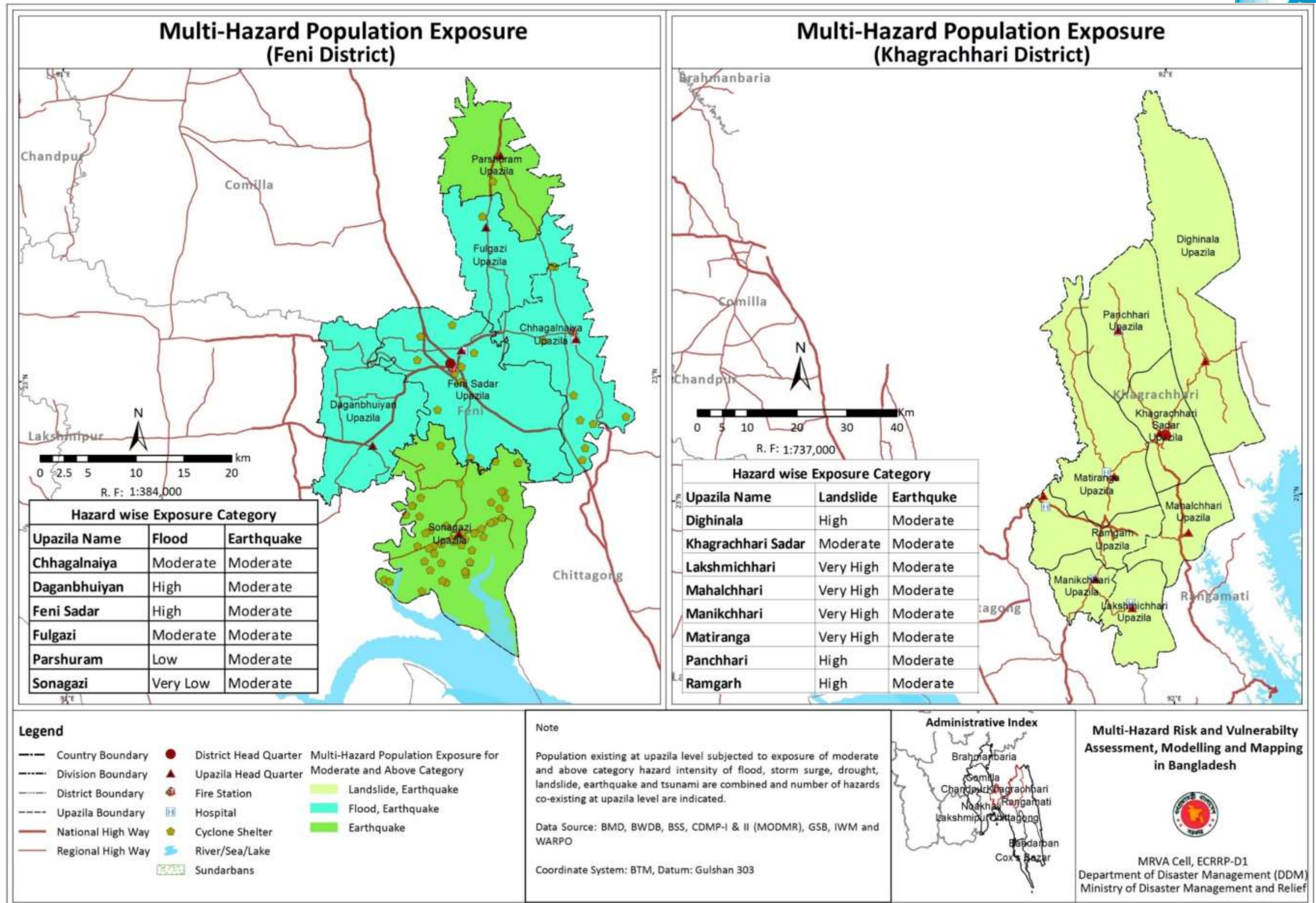
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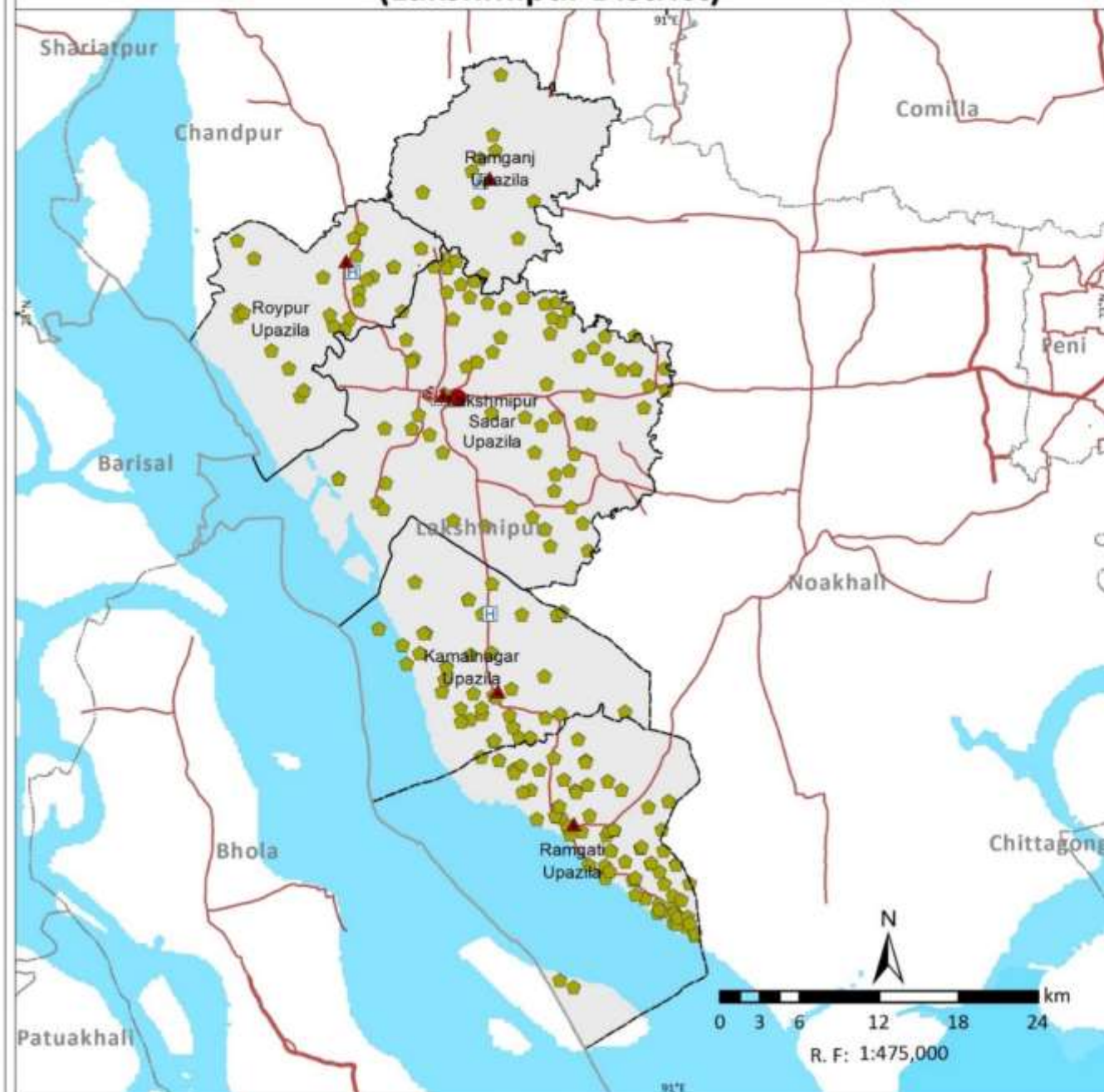


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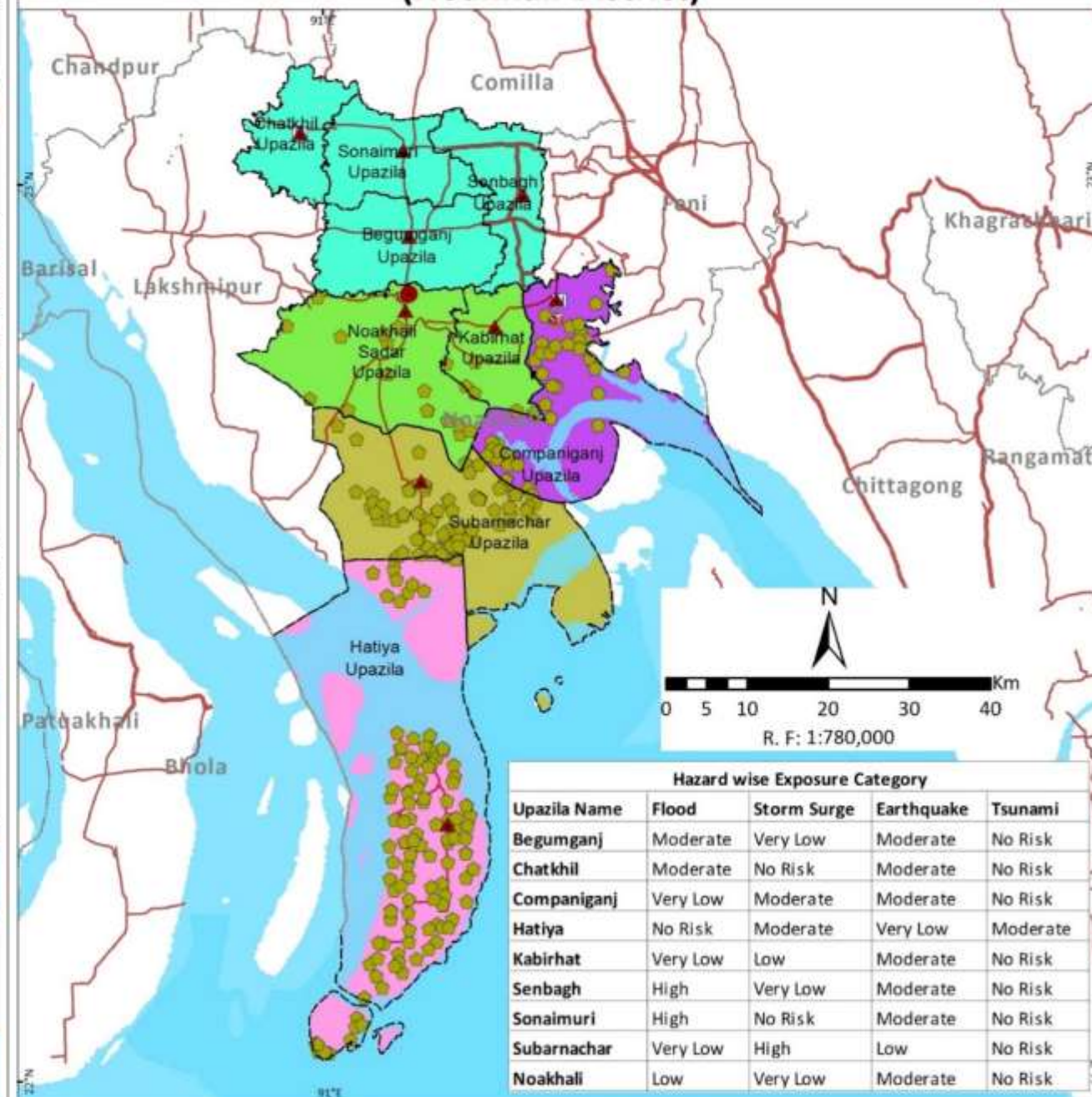




Multi- Hazard Population Exposure (Lakshmipur District)



Multi- Hazard Population Exposure (Noakhali District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Population Exposure for Moderate and Above Category
- Flood, Earthquake
- Storm Surge, Earthquake
- Storm Surge, Tsunami
- Storm Surge
- Earthquake
- Exposure below moderate

Note

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

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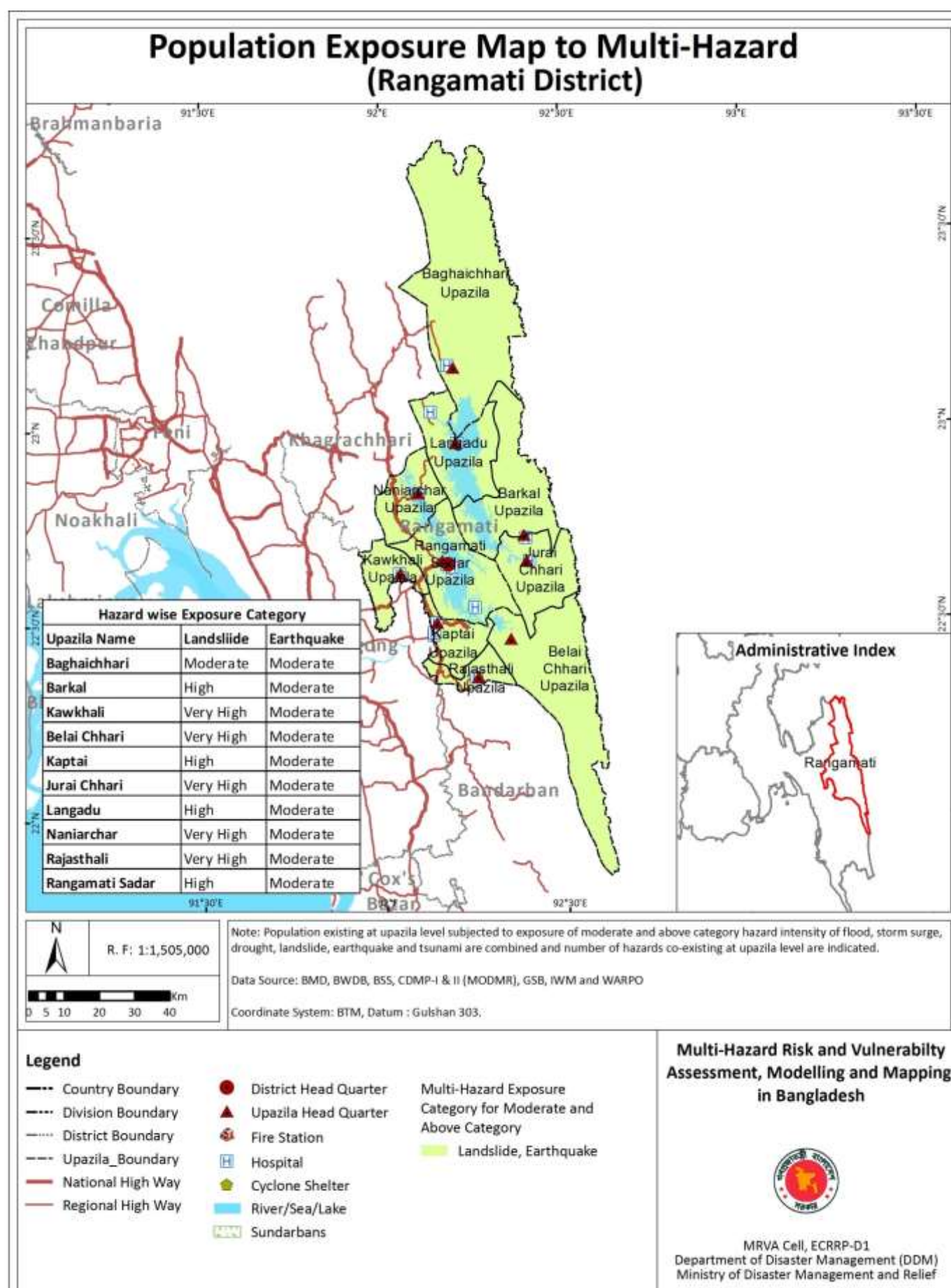
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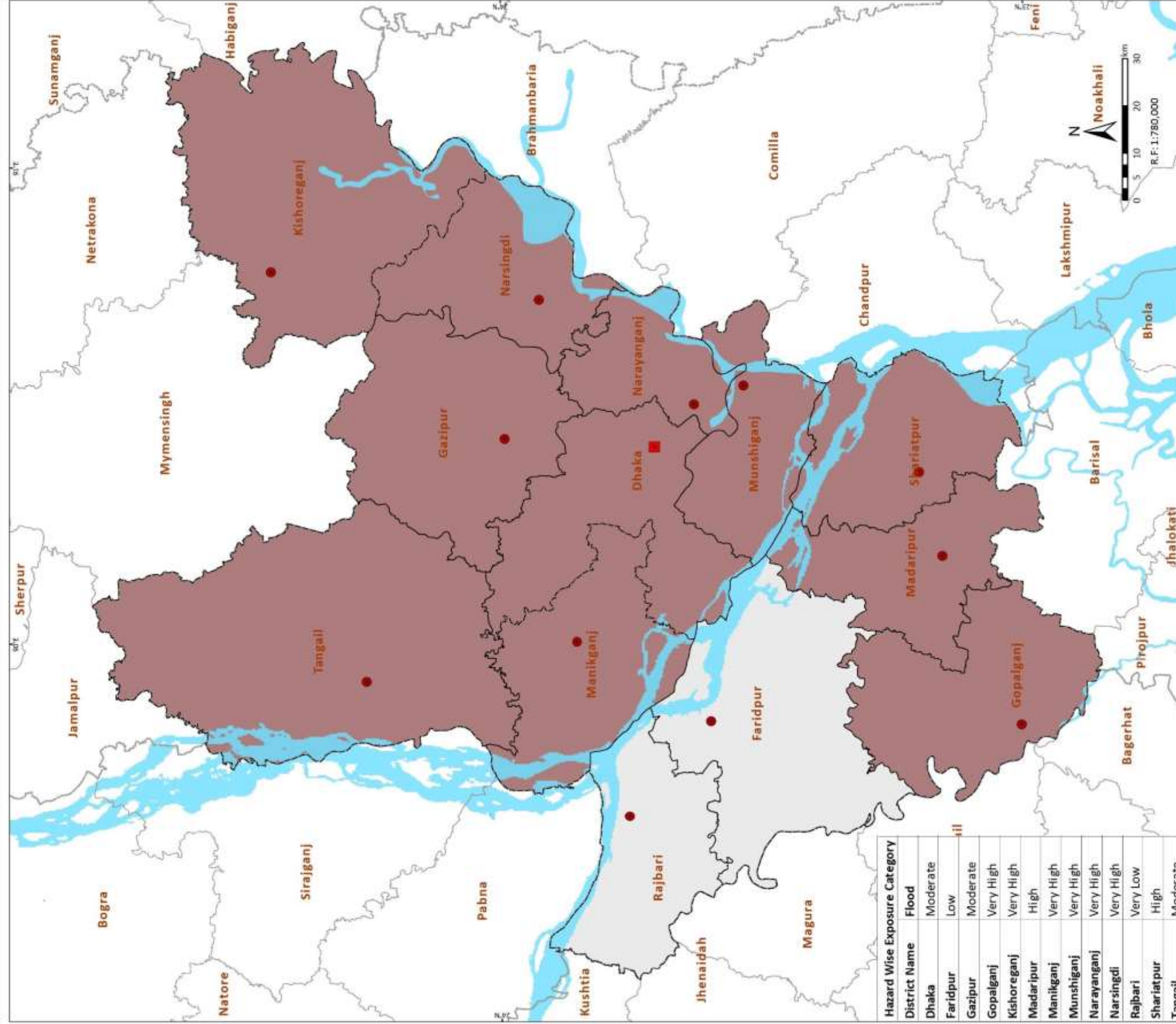


Multi-Hazard Risk and Vulnerability Assessment, Modelling and Mapping in Bangladesh



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Population Exposure to Multi- Hazard (Dhaka Division)



Hazard Wise Exposure Category	
District Name	Flood
Dhaka	Moderate
Faridpur	Low
Gazipur	Moderate
Gopalganj	Very High
Kishoreganj	Very High
Madaripur	High
Manikganj	Very High
Munshiganj	Very High
Narayanganj	Very High
Narsingdi	Very High
Rajbari	Very Low
Shariatpur	High
Tangail	Moderate

Legend	
Country Boundary	Multi- Hazard Population Exposure for Moderate and above Category
Division Boundary	Flood
District Boundary	Exposure below moderate
River/Sea/Lake	
Sundarbans	
Division Head Quarter	
District Head Quarter	

Note:
Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDM-1 & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

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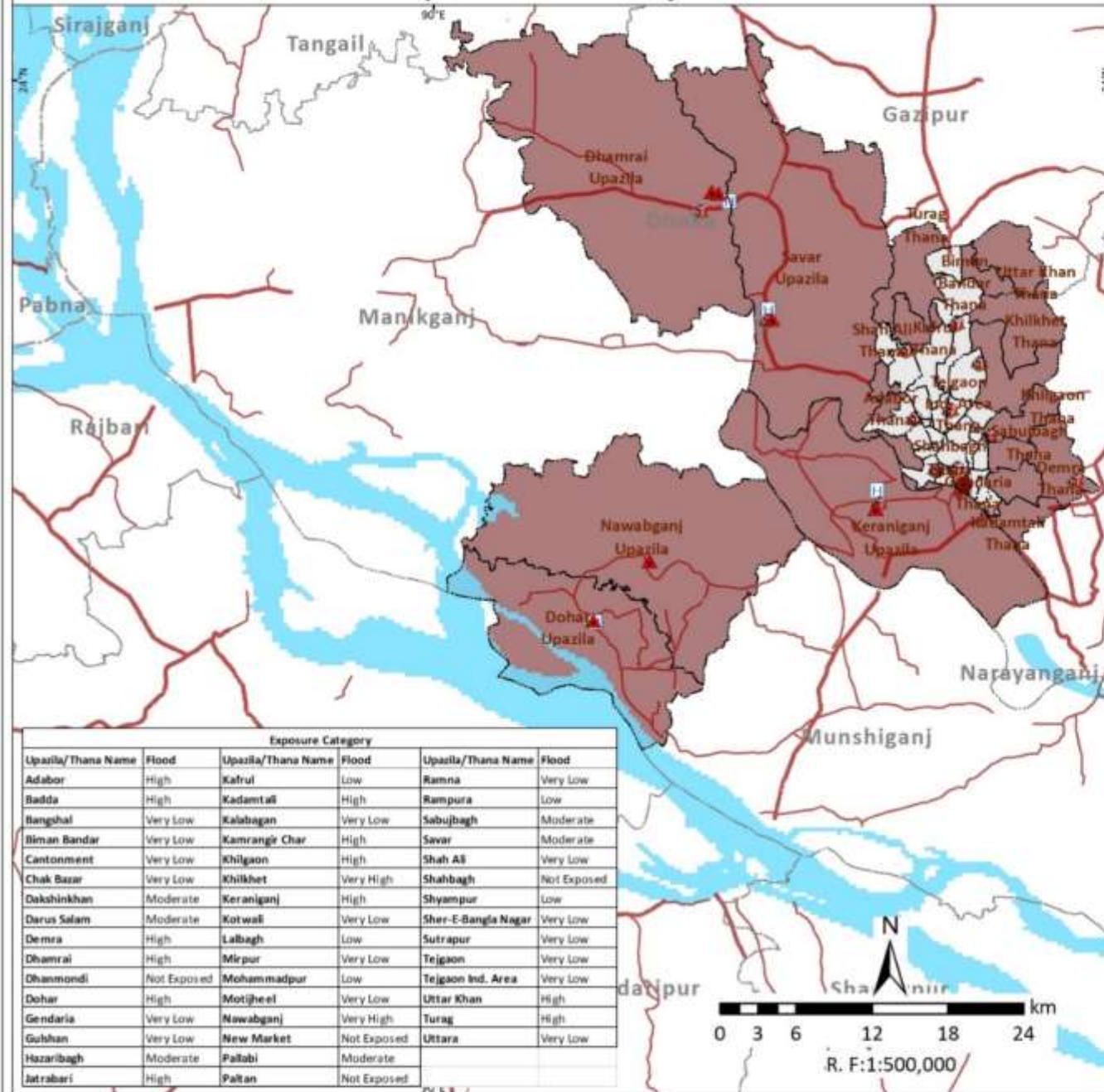
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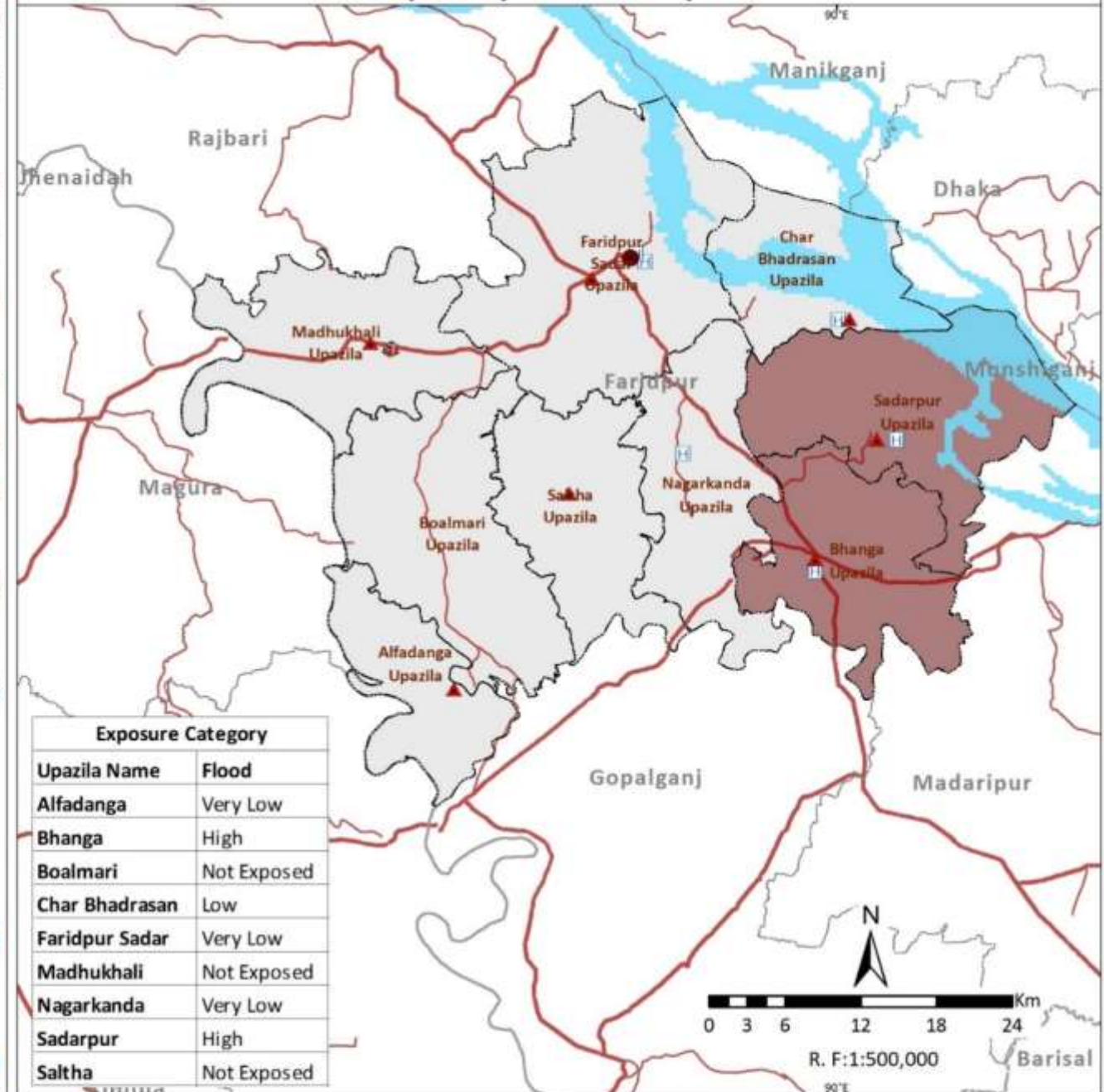
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Multi- Hazard Population Exposure (Dhaka District)



Multi- Hazard Population Exposure (Faridpur District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila_Boundary
- National High Way
- Regional High Way
- Division Head Quarter
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Population Exposure for Moderate and above Category
- Flood
- Exposure below moderate

Note:

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.



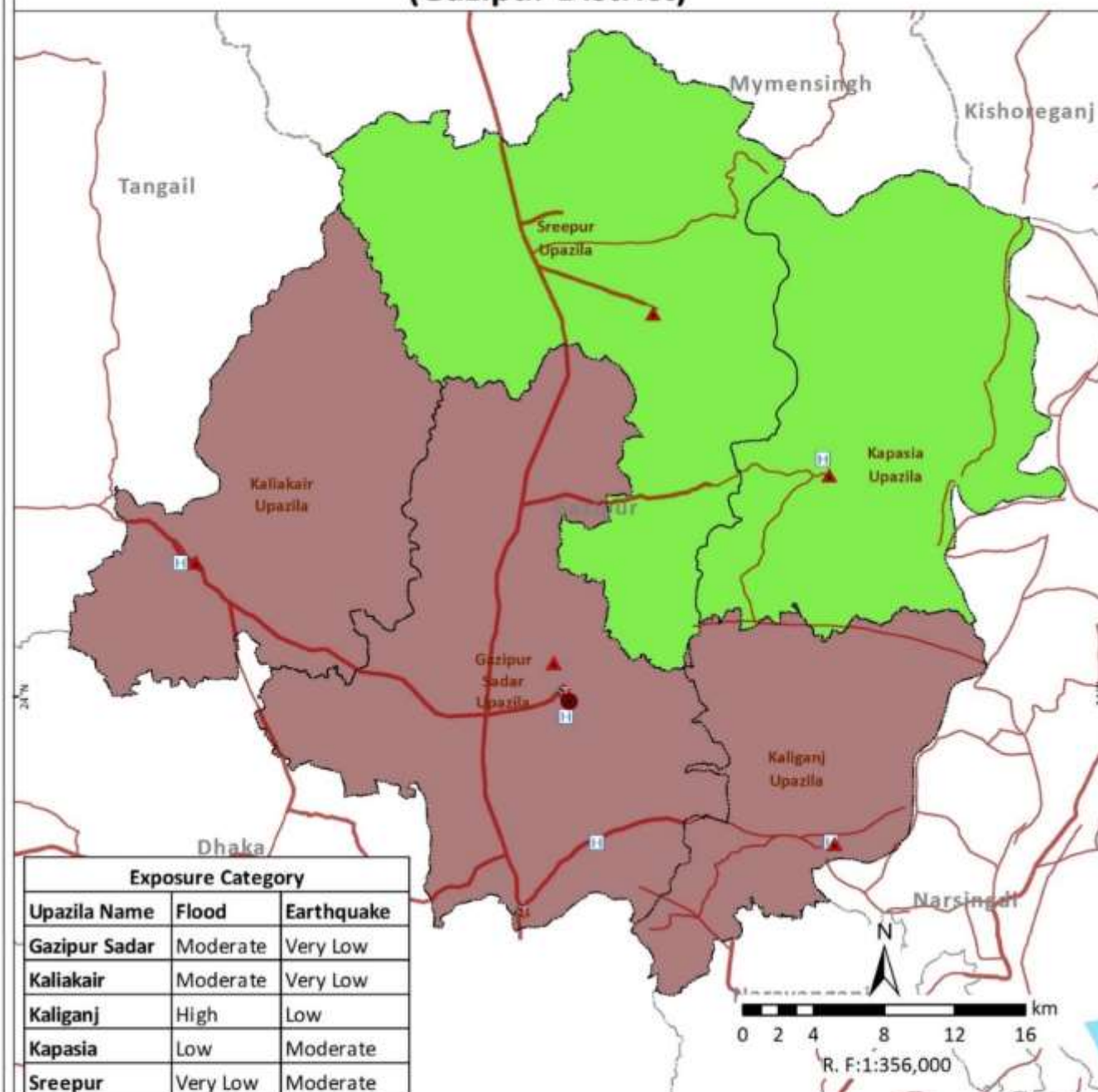
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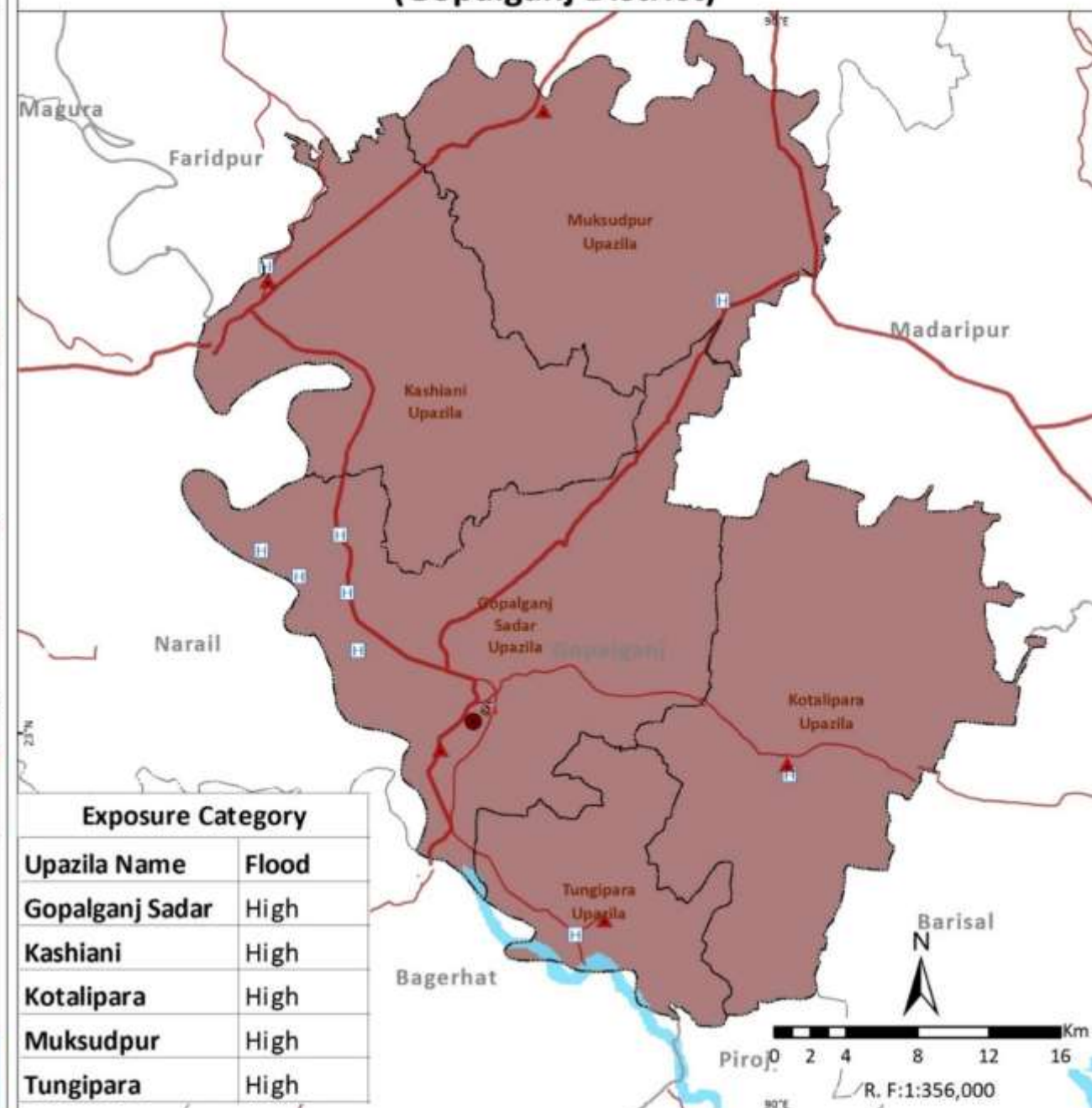
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Multi- Hazard Population Exposure (Gazipur District)



Multi- Hazard Population Exposure (Gopalganj District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Population Exposure for Moderate and above Category
- Flood
- Earthquake

Note:

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

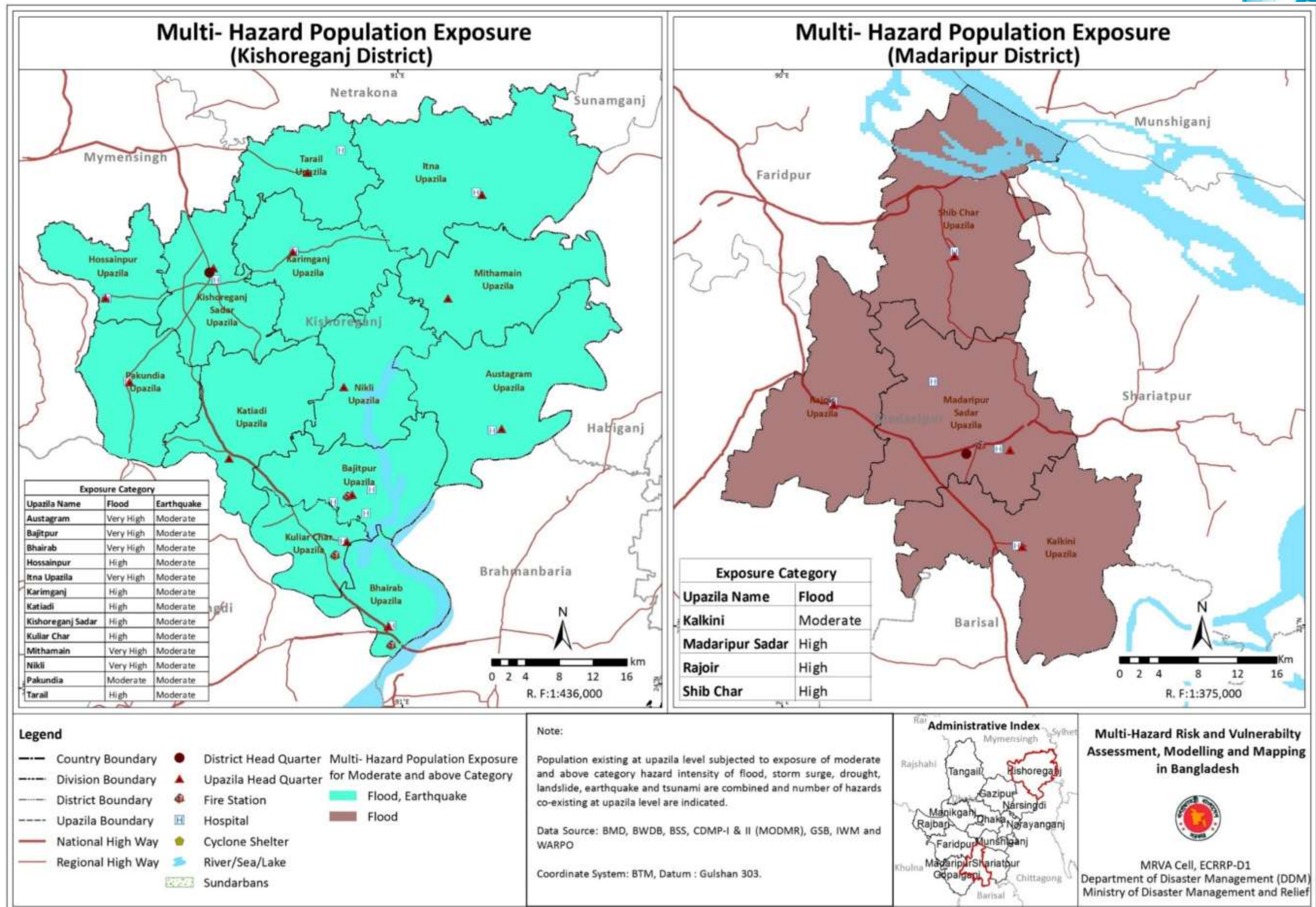
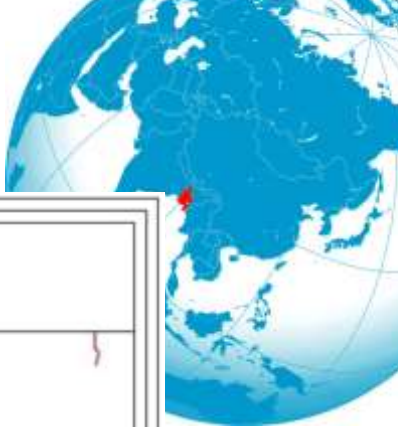
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Multi-Hazard Risk and Vulnerability Assessment, Modelling and Mapping in Bangladesh



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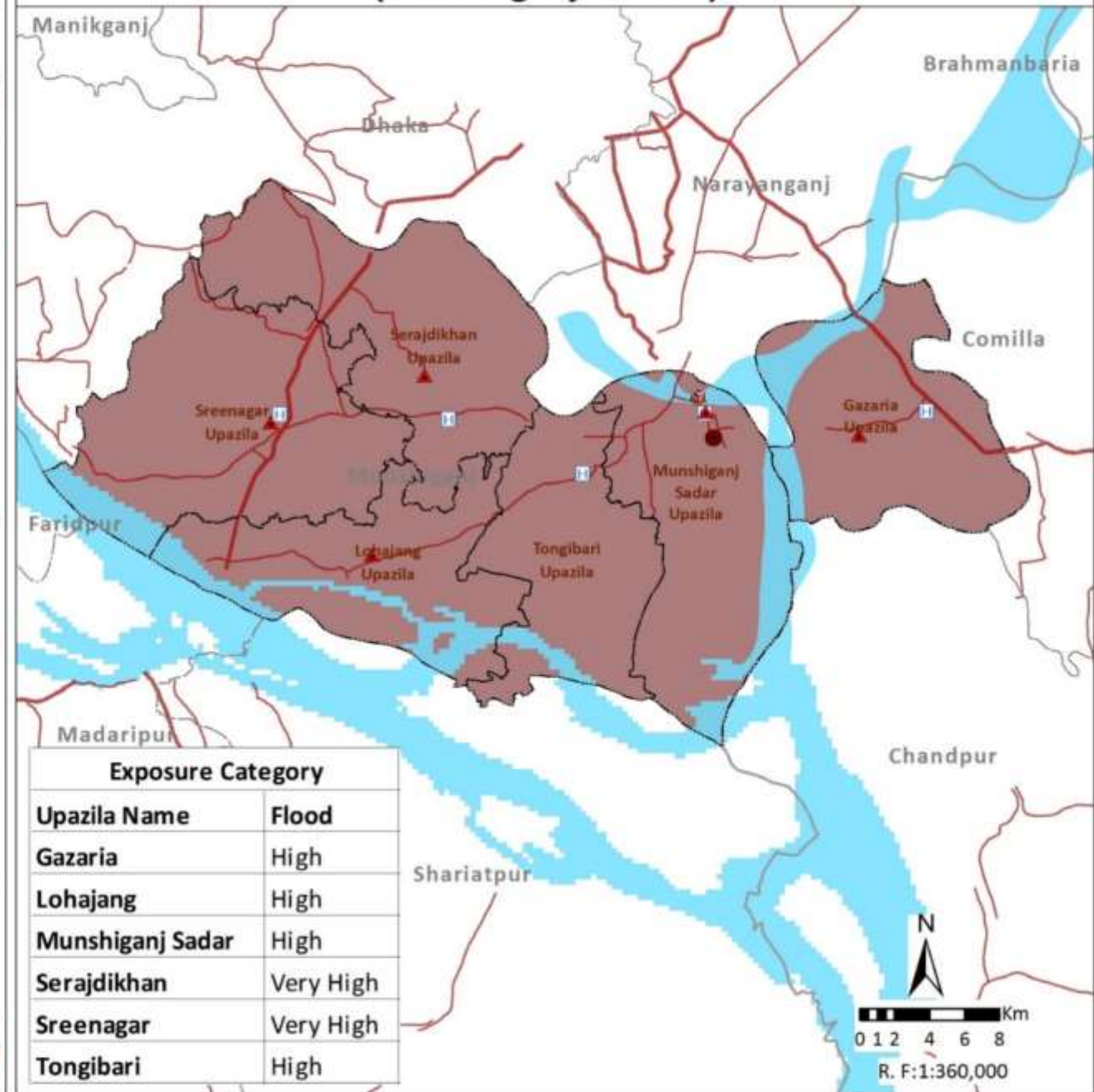




Multi- Hazard Population Exposure (Manikganj District)



Multi- Hazard Population Exposure (Munshiganj District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Population Exposure for Moderate and above Category
- Flood

Note:

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.



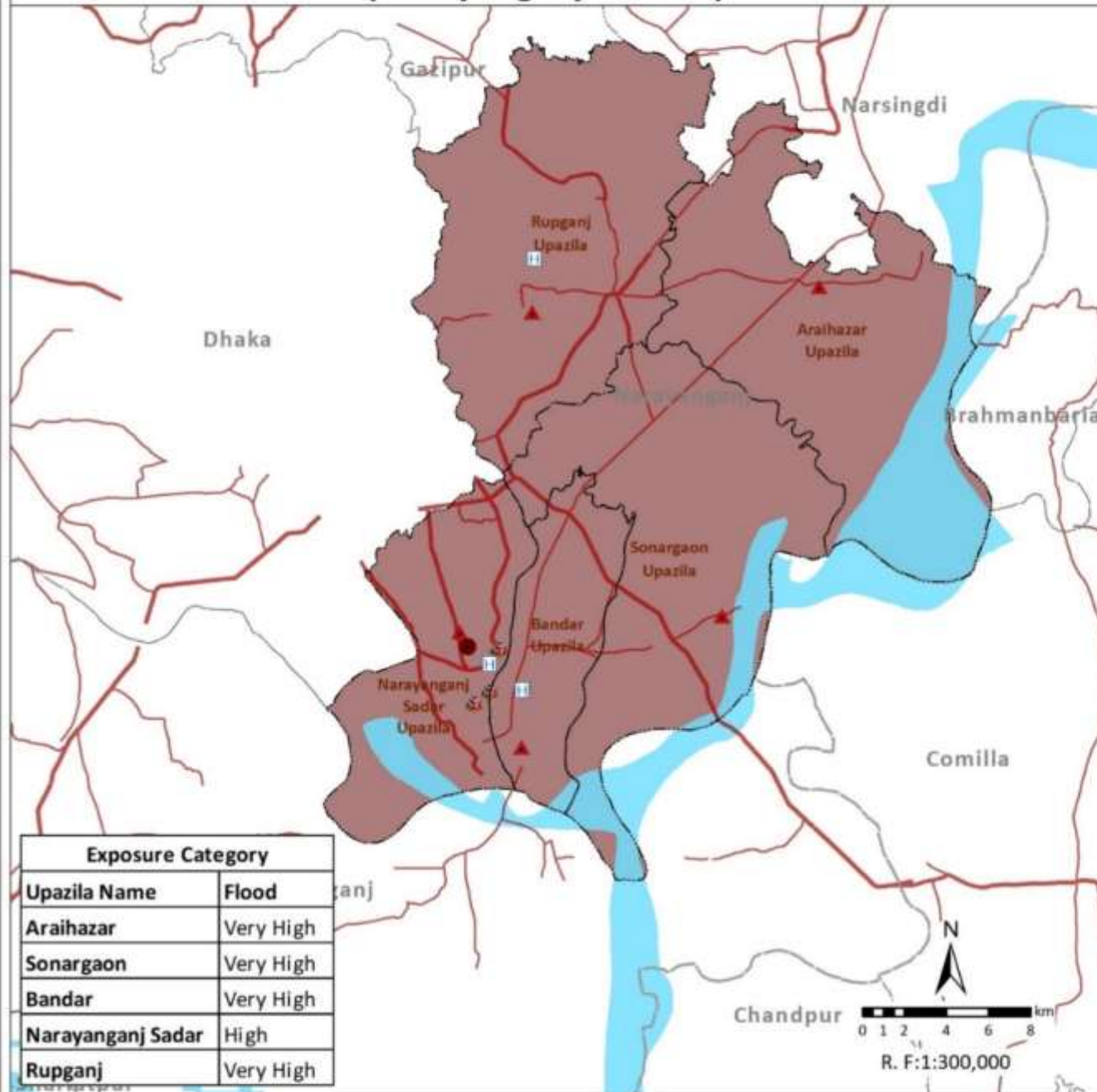
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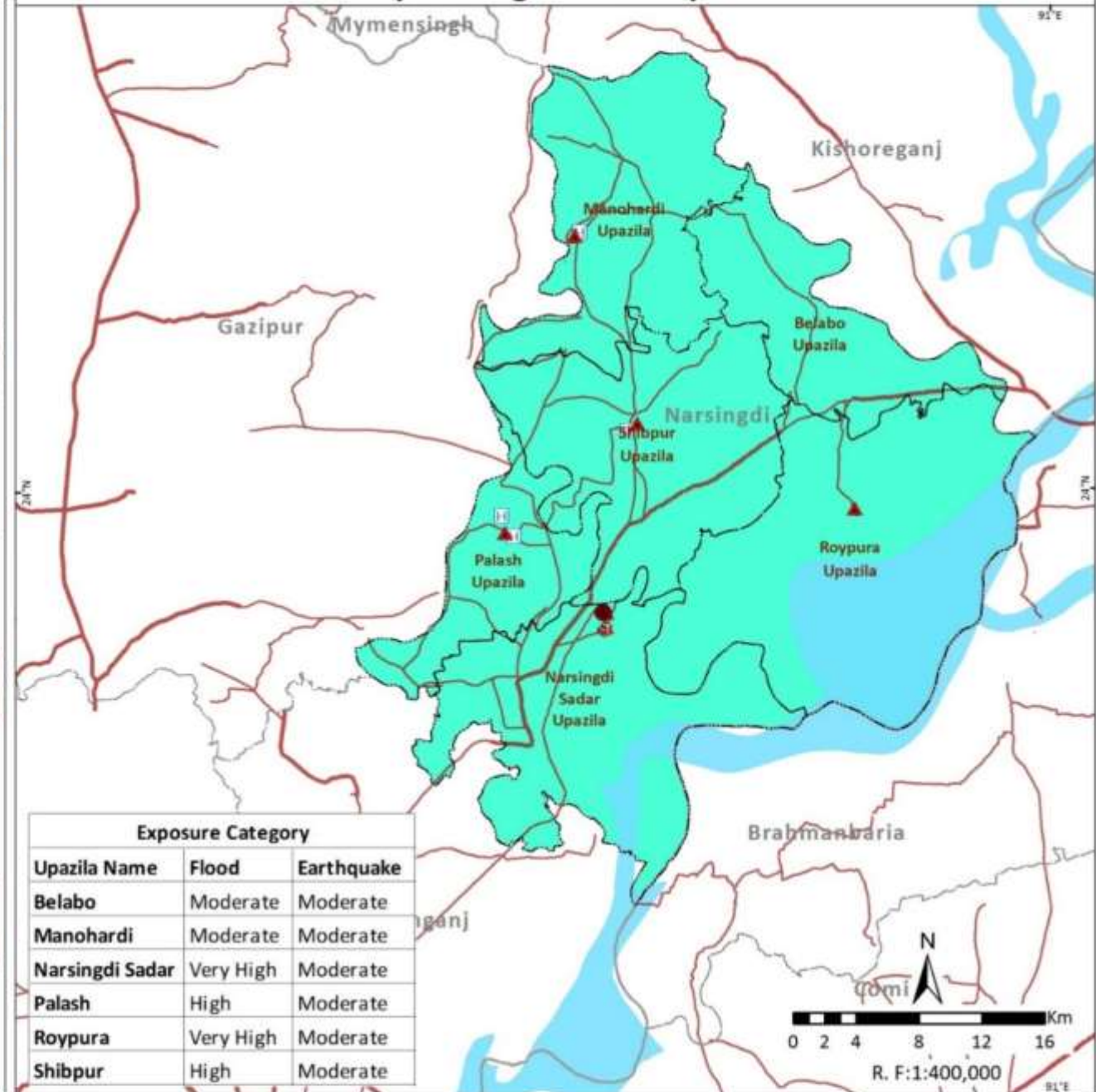
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Multi- Hazard Population Exposure (Narayanganj District)



Multi- Hazard Population Exposure (Narsingdi District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Population Exposure for Moderate and above Category
- Flood, Earthquake
- Flood

Note:

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

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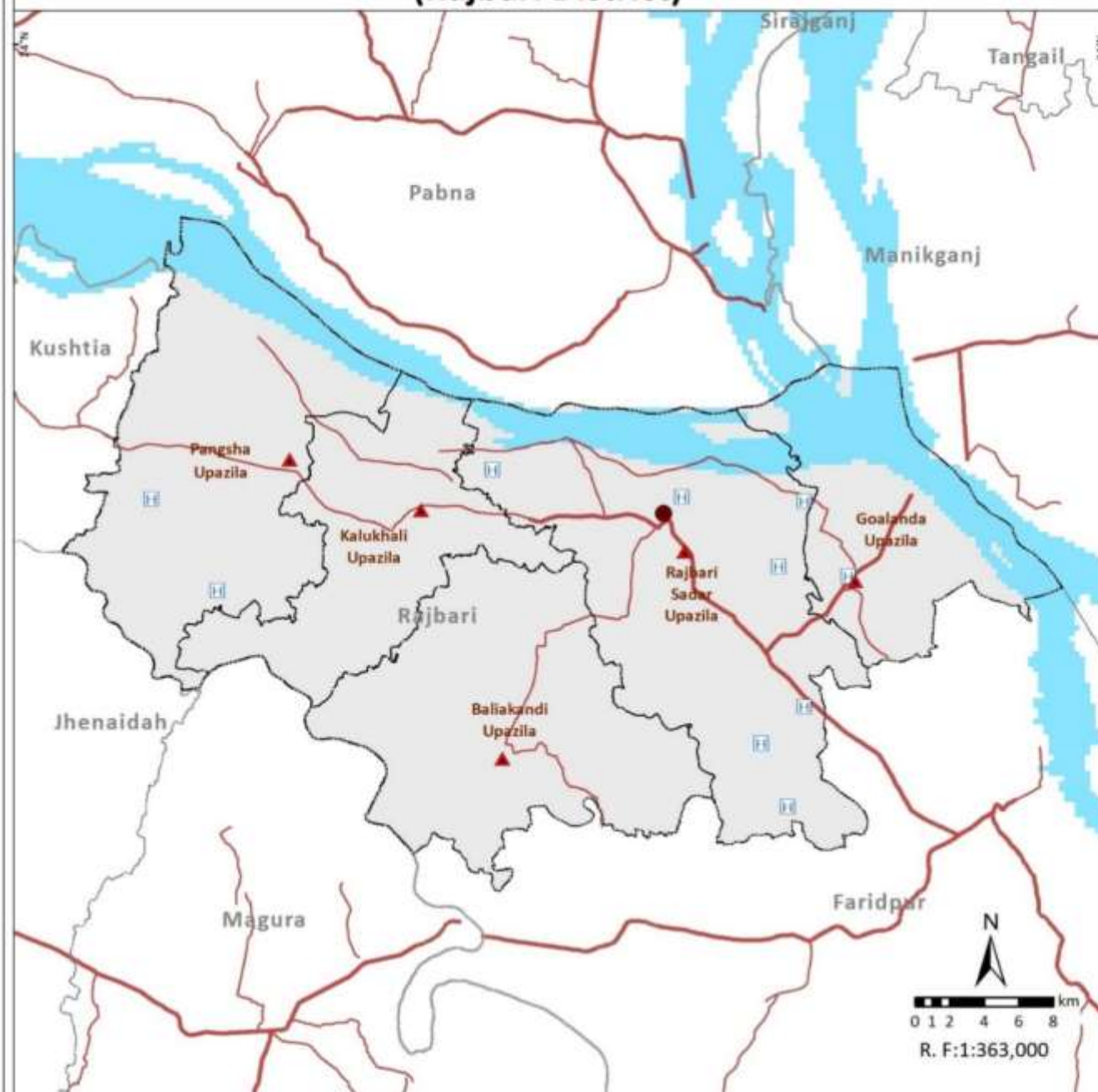
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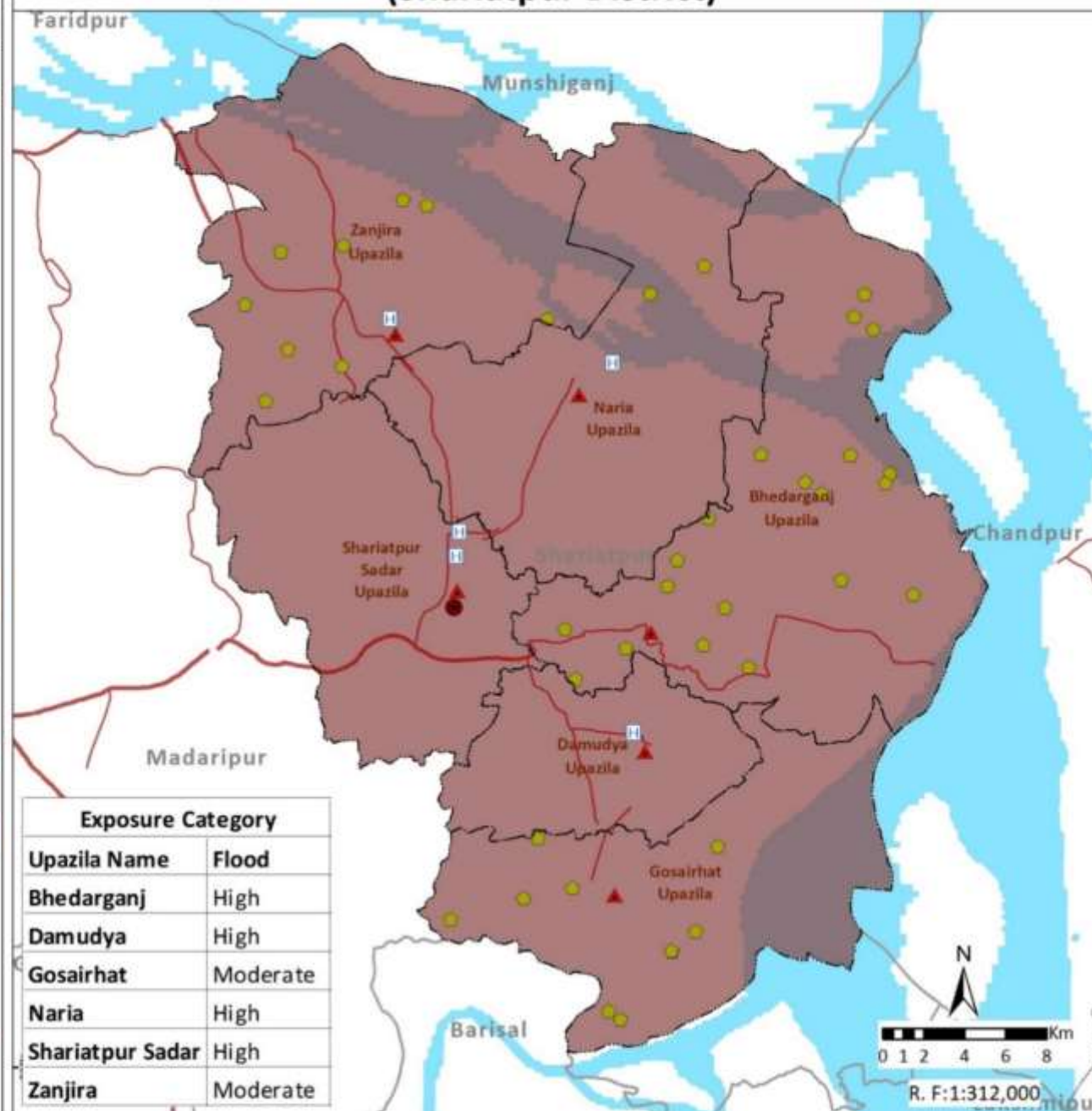
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Multi- Hazard Population Exposure (Rajbari District)



Multi- Hazard Population Exposure (Shariatpur District)



Exposure Category	
Upazila Name	Flood
Bhedarganj	High
Damudya	High
Gosairhat	Moderate
Naria	High
Shariatpur Sadar	High
Zanjira	Moderate

Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Population Exposure for Moderate and above Category
- Flood
- Exposure below moderate

Note:

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.



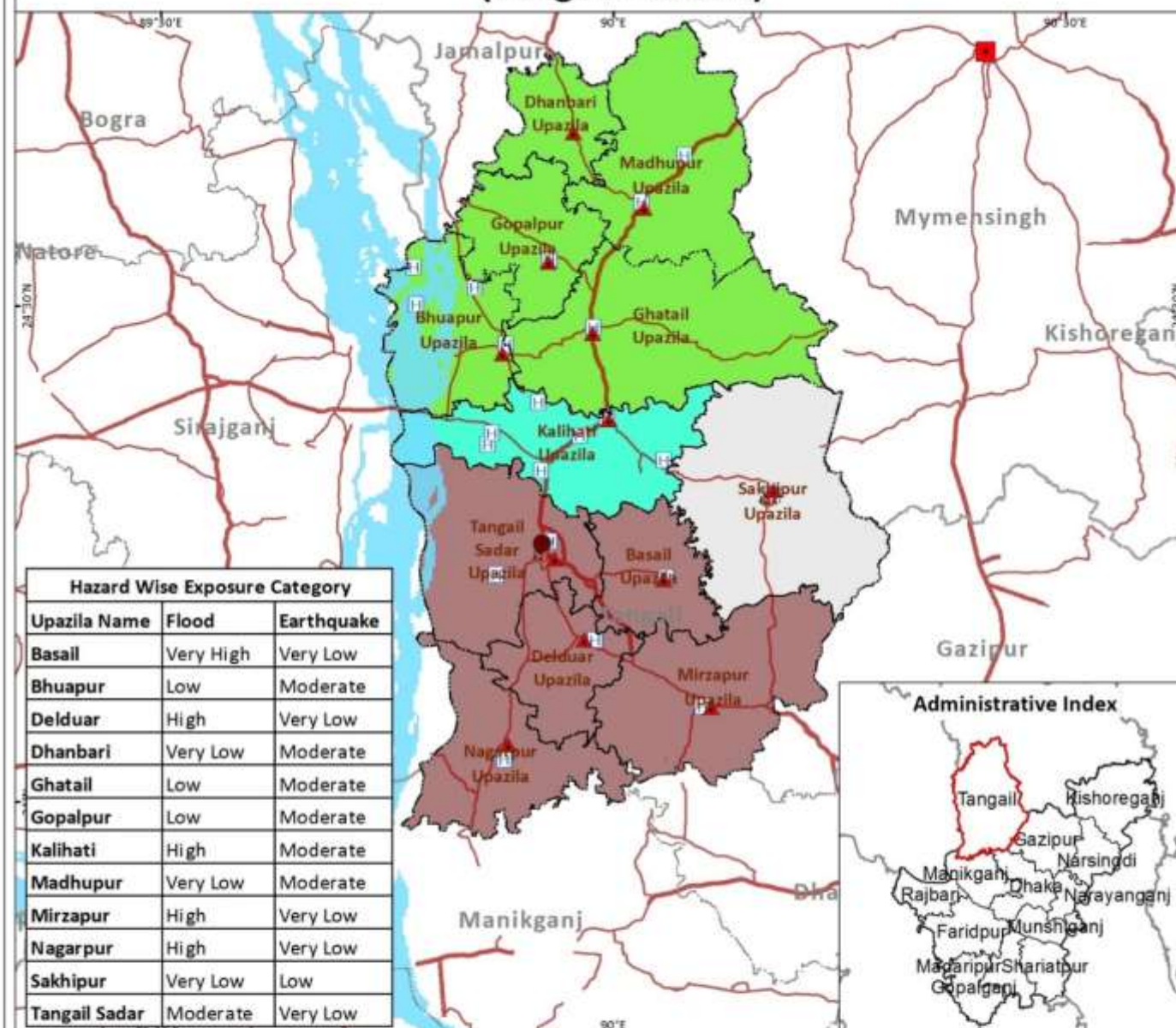
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Multi- Hazard Population Exposure (Tangail District)



Note: Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

Legend

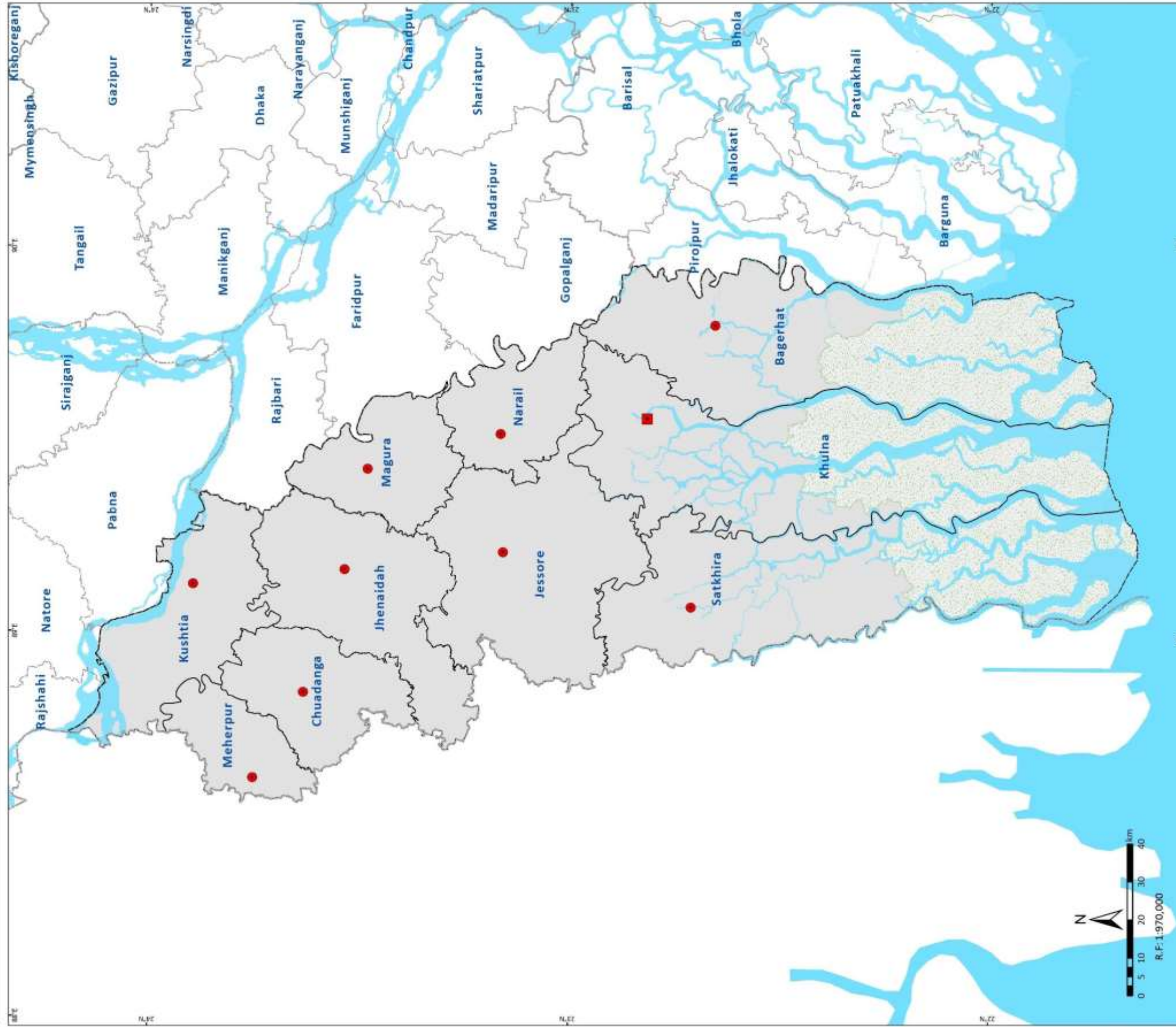
- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- ▲ Upazila Head Quarter
- 🚒 Fire Station
- 🏥 Hospital
- 🏠 Cyclone Shelter
- 🌊 River/Sea/Lake
- 🌿 Sundarbans
- Multi- Hazard Population Exposure for Moderate and above Category
- 🟢 Flood, Earthquake
- 🟤 Flood
- 🟡 Earthquake
- 🟡 Exposure below moderate

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



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Population Exposure to Multi-Hazard (Khulna Division)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Division Head Quarter
- District Head Quarter
- River/Sea/Lake
- Sundarbans

Note:
Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO
Coordinate System: BTM, Datum : Gulshan 303.



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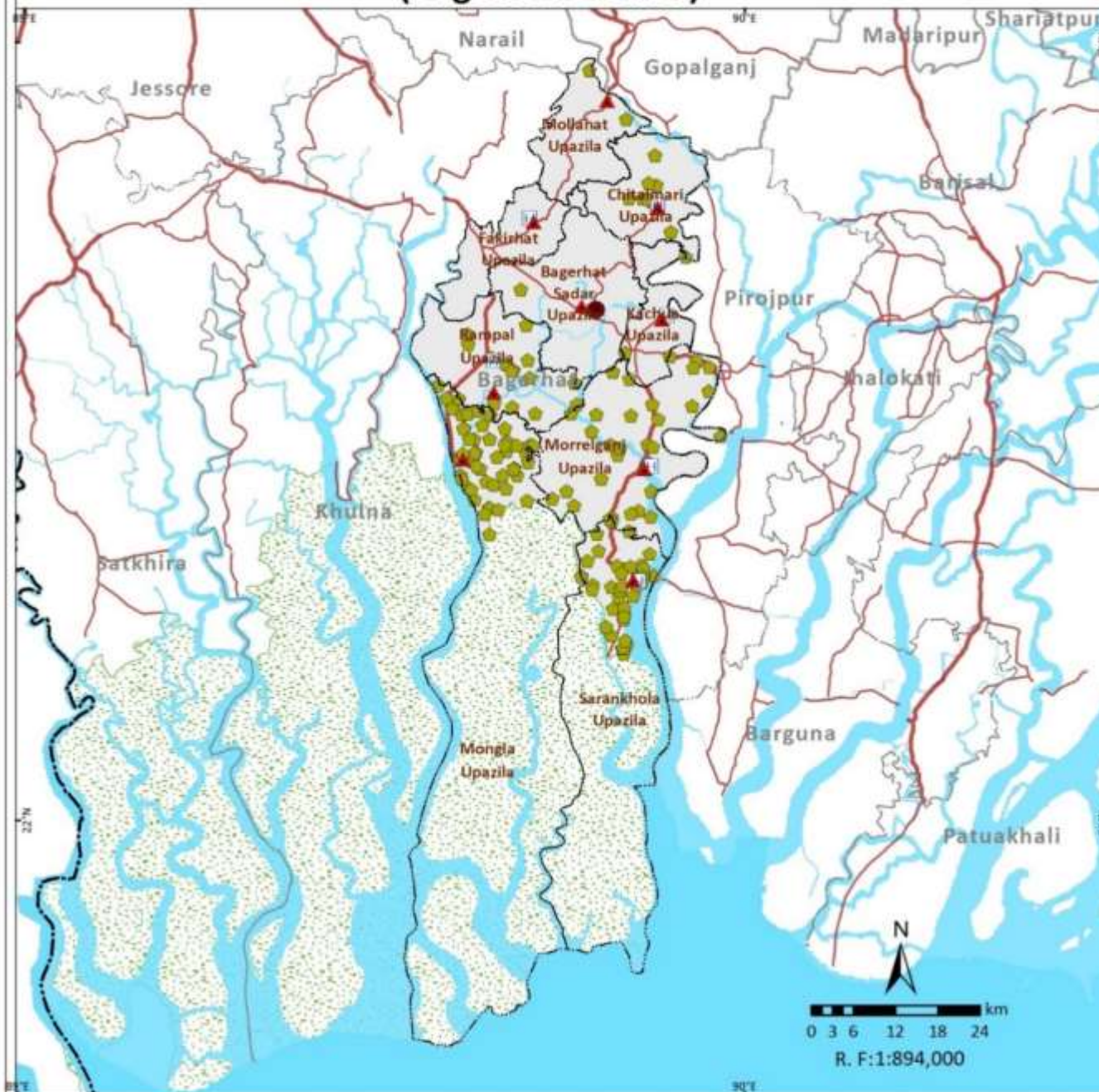


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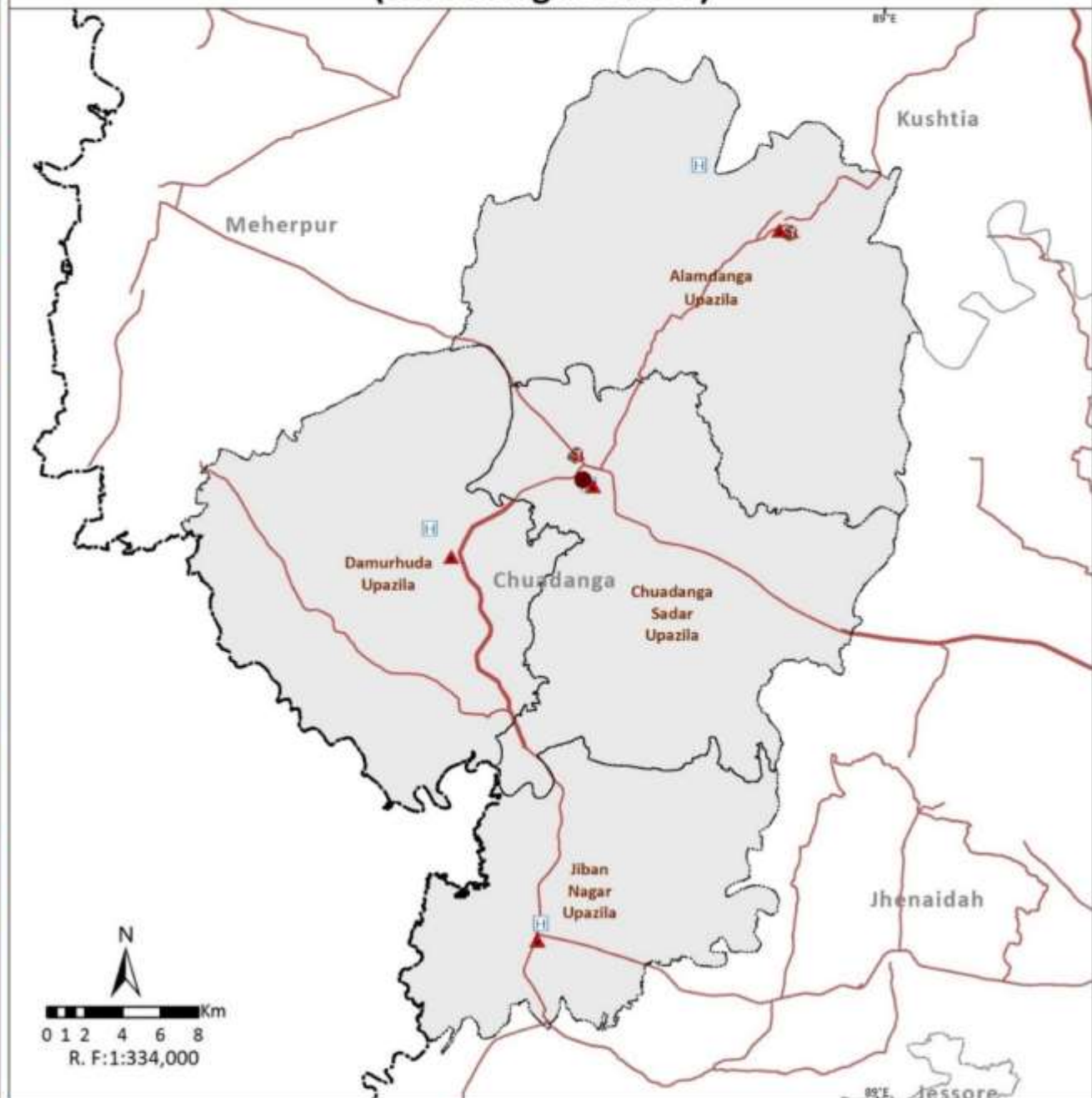




Multi- Hazard Population Exposure (Bagerhat District)



Multi- Hazard Population Exposure (Chuadanga District)



Legend

- | | | |
|-------------------|-----------------------|---|
| Country Boundary | District Head Quarter | Multi- Hazard Population Exposure for Moderate and above Category |
| Division Boundary | Upazila Head Quarter | Exposure below moderate |
| District Boundary | Fire Station | |
| Upazila Boundary | Hospital | |
| National High Way | Cyclone Shelter | |
| Regional High Way | River/Sea/Lake | |
| | Sundarbans | |

Note:

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

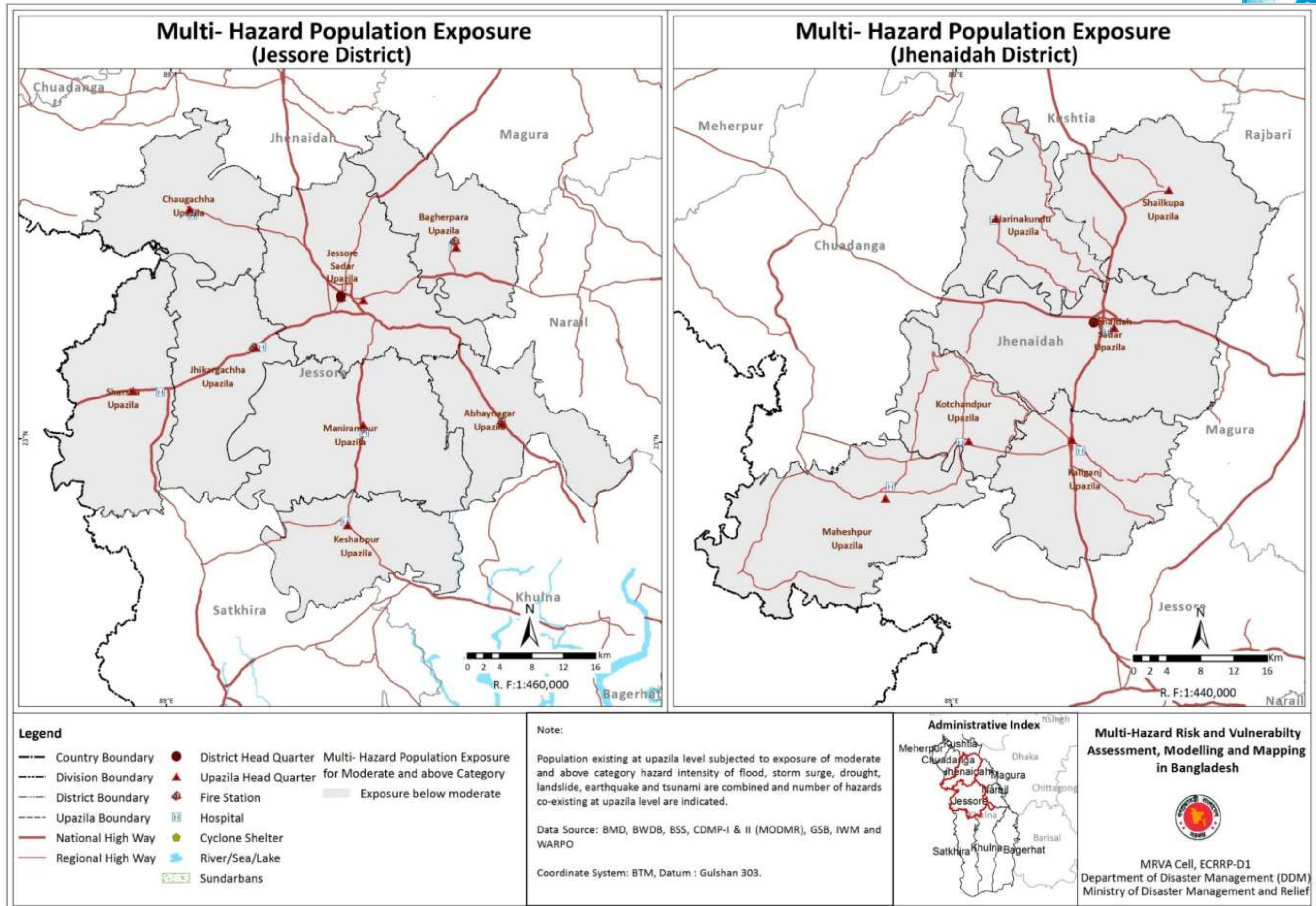
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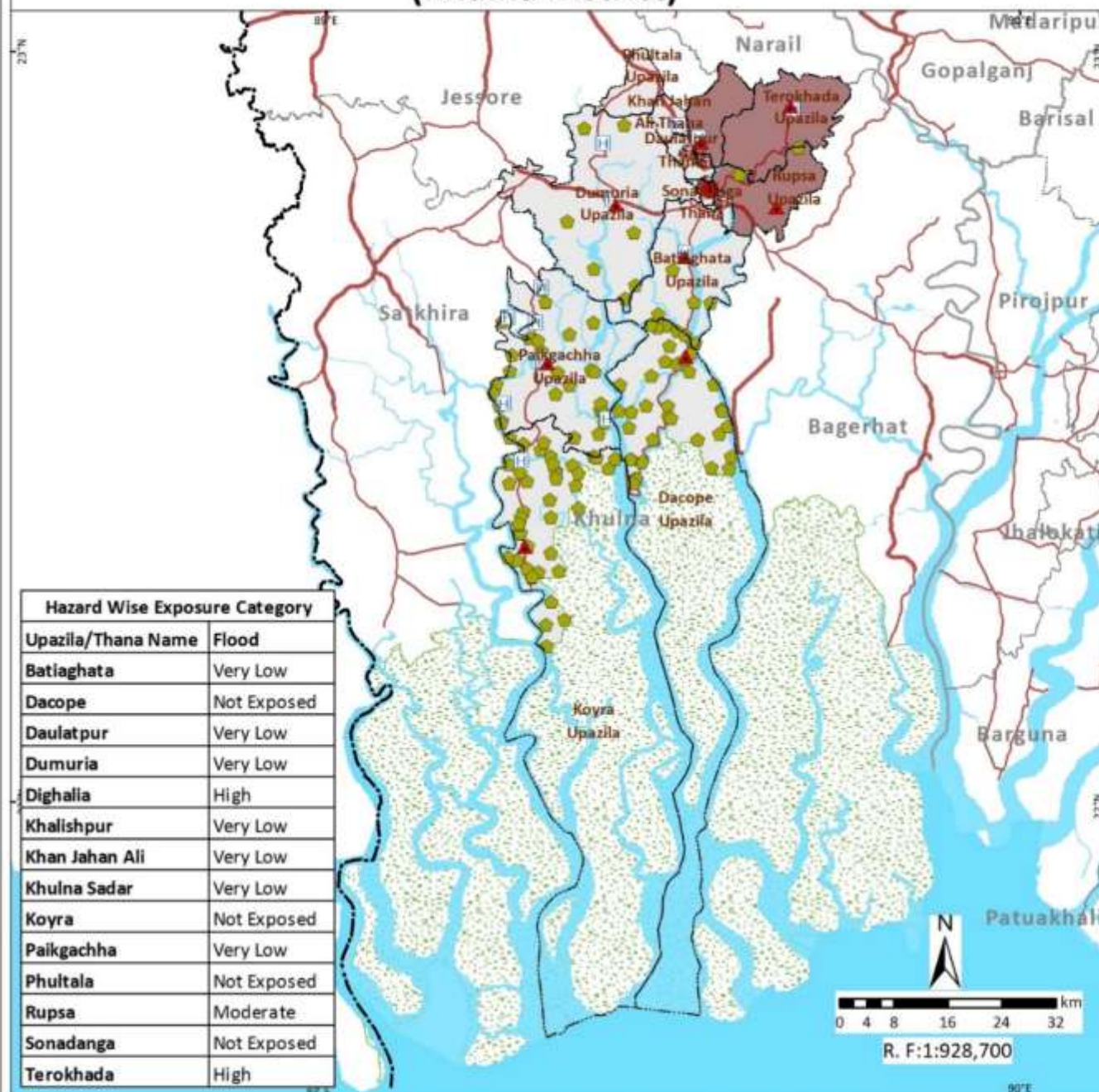


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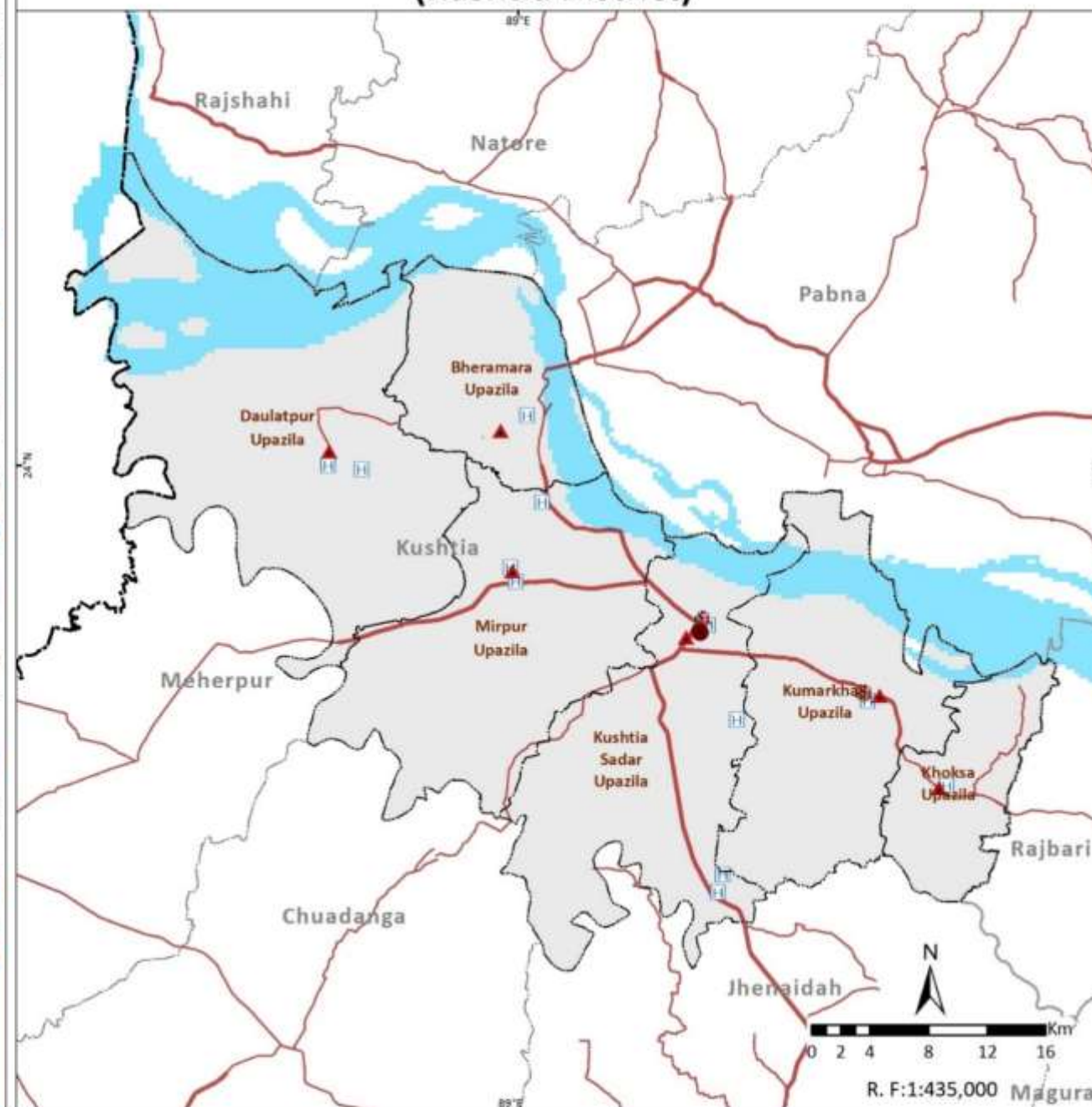




Multi- Hazard Population Exposure (Khulna District)



Multi- Hazard Population Exposure (Kushtia District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila_Boundary
- National High Way
- Regional High Way
- Division Head Quarter
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Population Exposure for Moderate and above Category
- Flood
- Exposure below moderate

Note:

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

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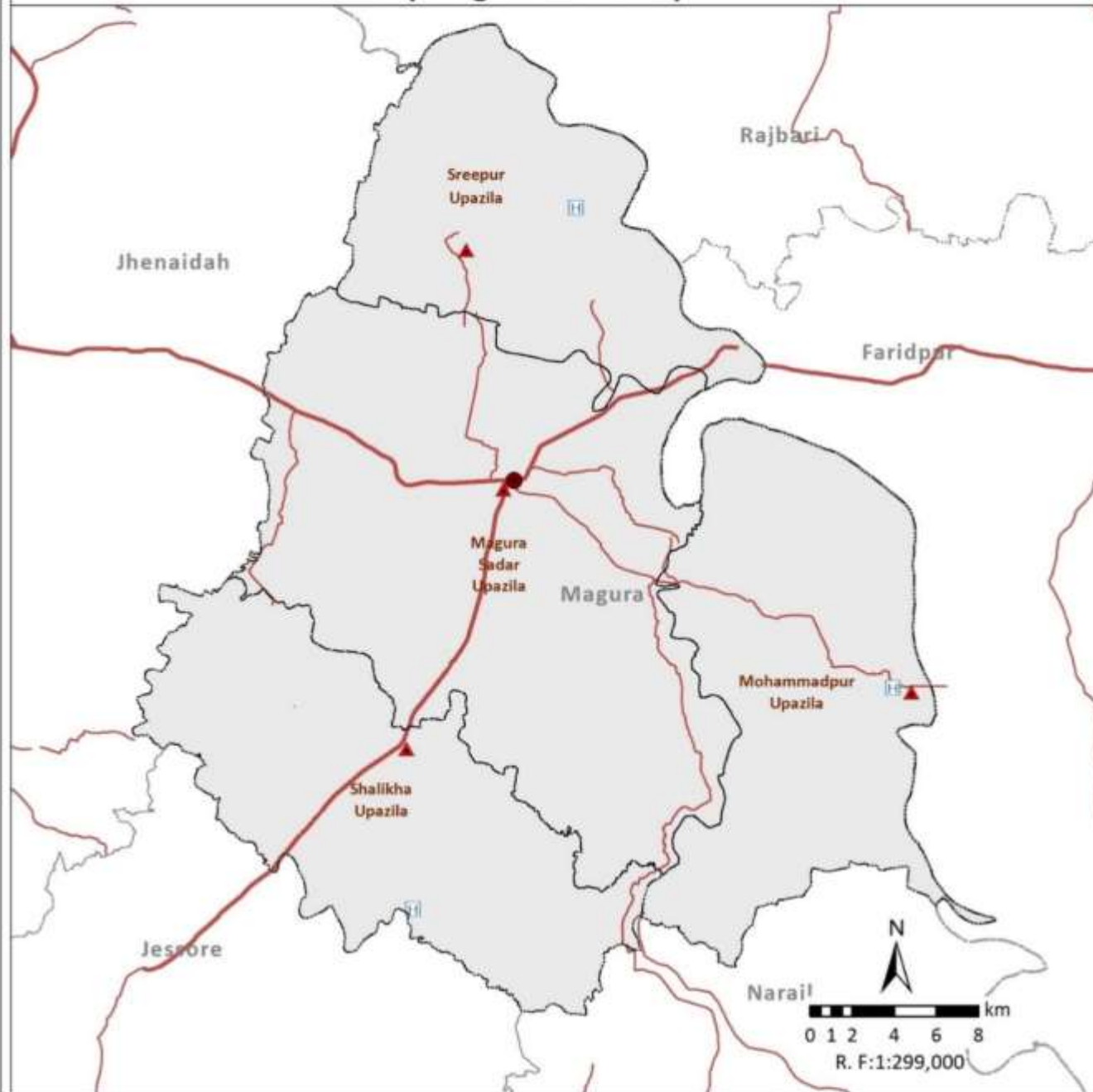
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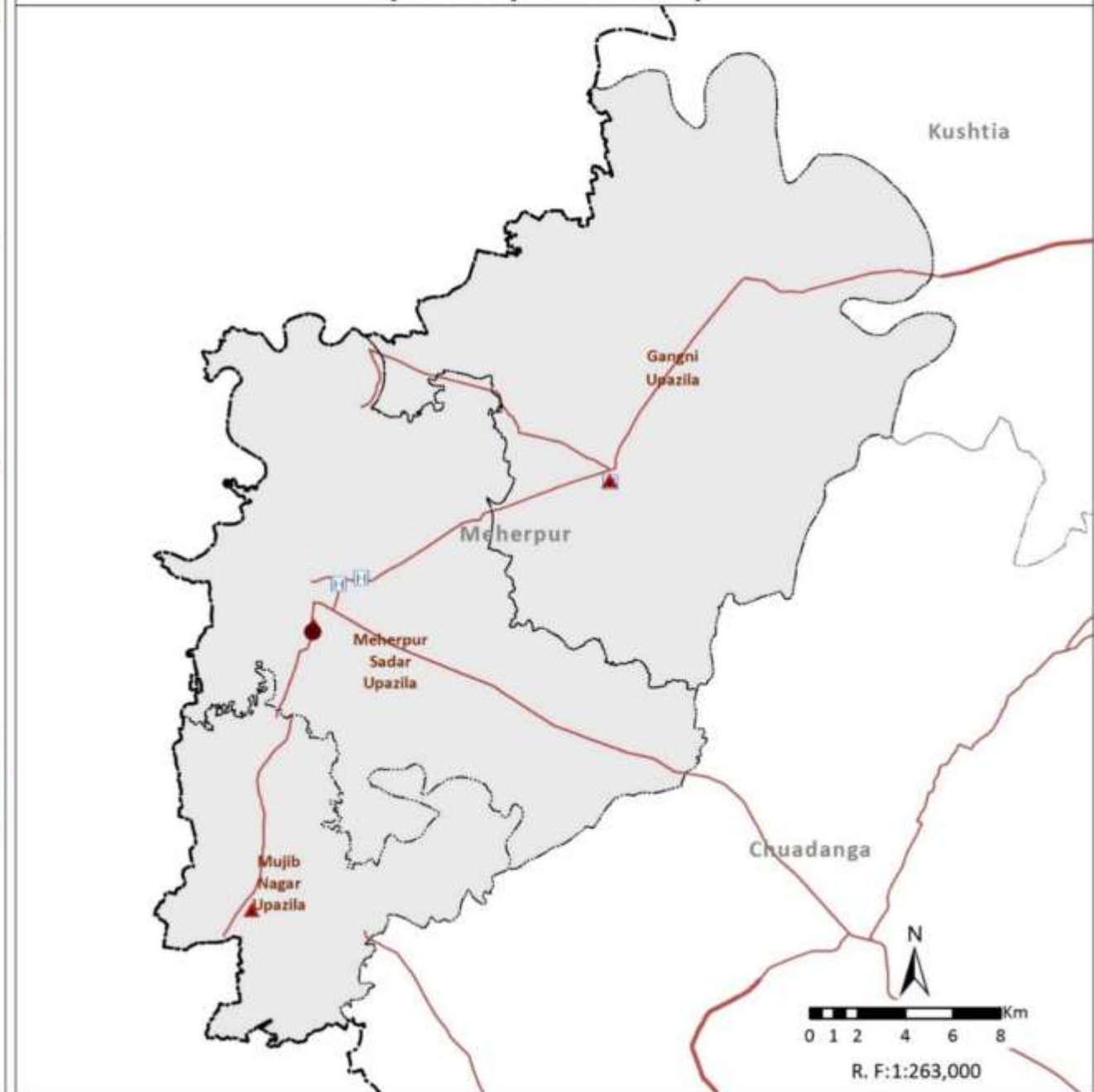
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Multi- Hazard Population Exposure (Magura District)



Multi- Hazard Population Exposure (Meherpur District)



Legend

- | | | |
|-------------------|-----------------------|---|
| Country Boundary | District Head Quarter | Multi- Hazard Population Exposure for Moderate and above Category |
| Division Boundary | Upazila Head Quarter | |
| District Boundary | Fire Station | Exposure below moderate |
| Upazila Boundary | Hospital | |
| National High Way | Cyclone Shelter | |
| Regional High Way | River/Sea/Lake | |
| | Sundarbans | |

Note:

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

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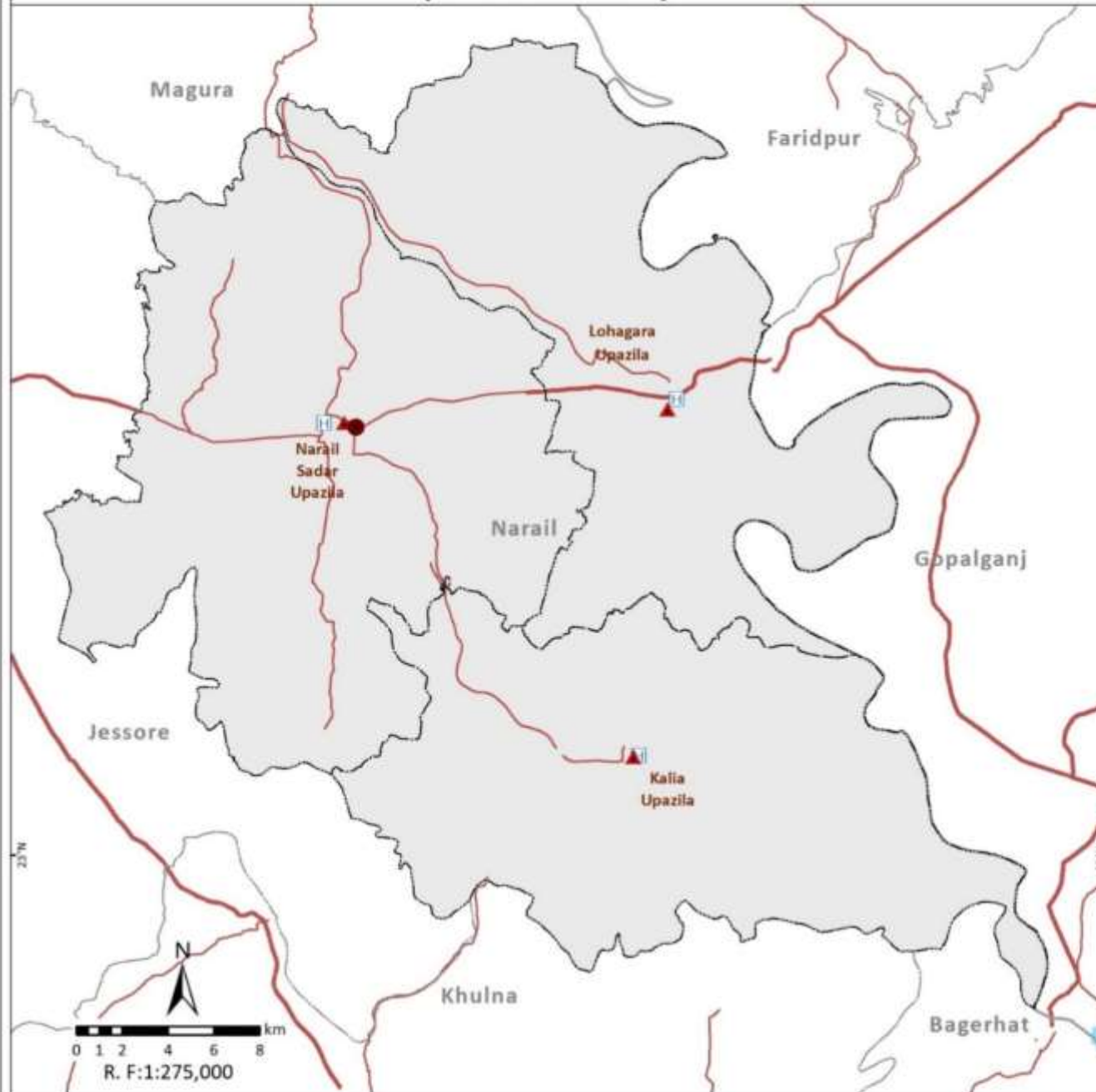
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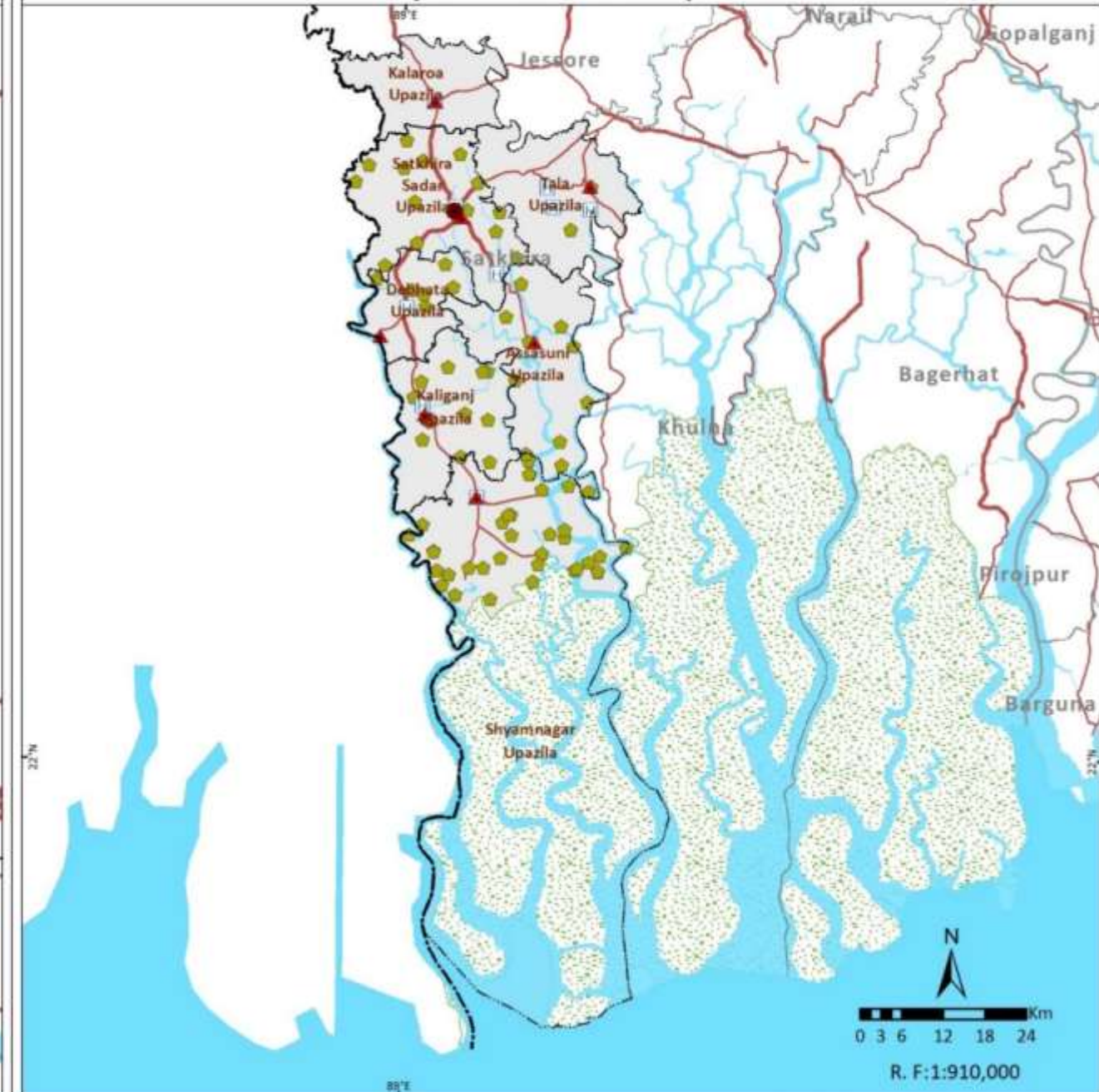
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Multi- Hazard Population Exposure (Narail District)



Multi- Hazard Population Exposure (Satkhira District)



Legend

- | | | |
|-----------------------|-------------------------|---|
| — Country Boundary | ● District Head Quarter | Multi- Hazard Population Exposure for Moderate and above Category |
| --- Division Boundary | ▲ Upazila Head Quarter | Exposure below moderate |
| --- District Boundary | 🚒 Fire Station | |
| --- Upazila Boundary | 🏥 Hospital | |
| — National High Way | 🟡 Cyclone Shelter | |
| — Regional High Way | 🌊 River/Sea/Lake | |
| | 🌿 Sundarbans | |

Note:

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

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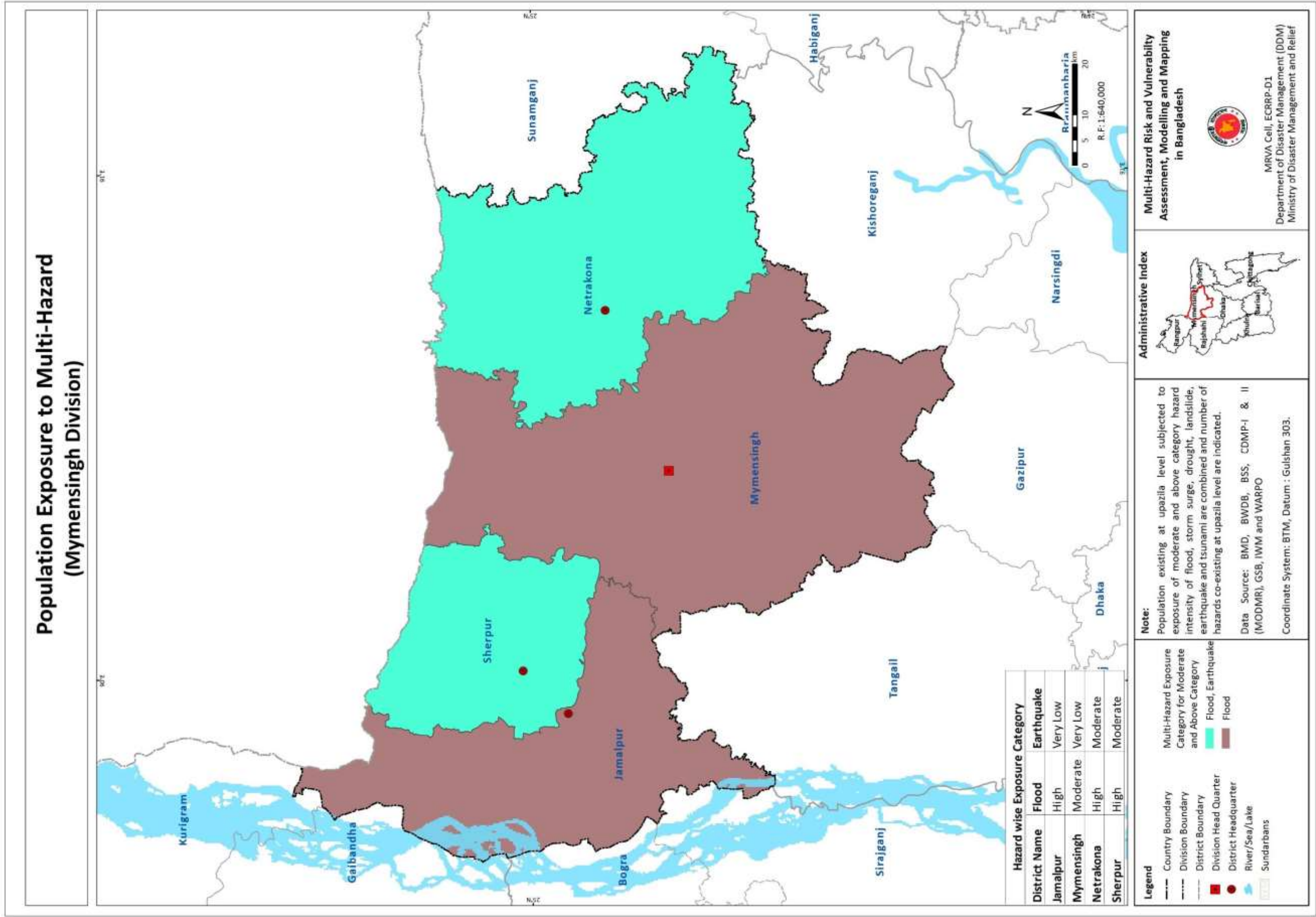
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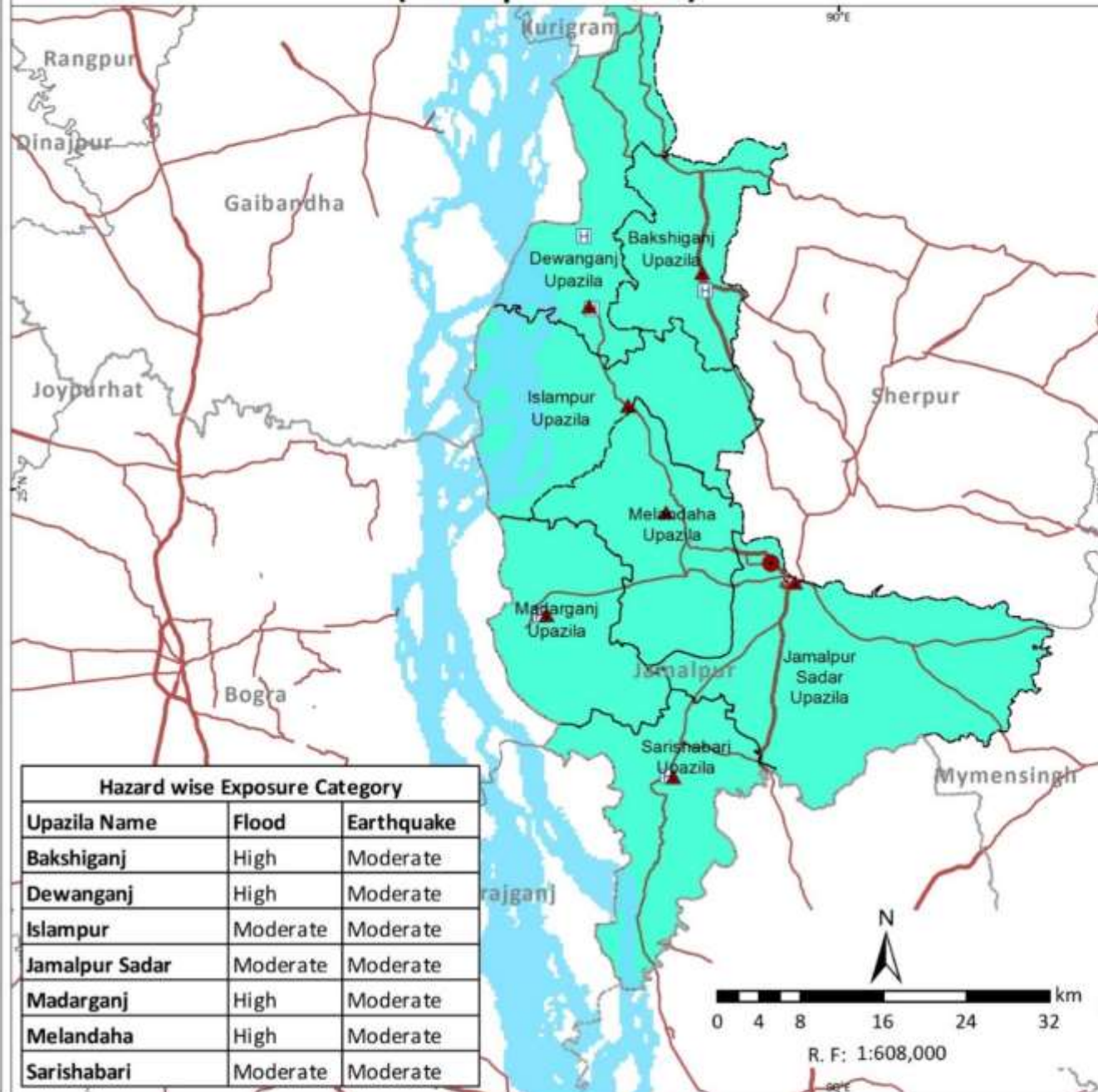


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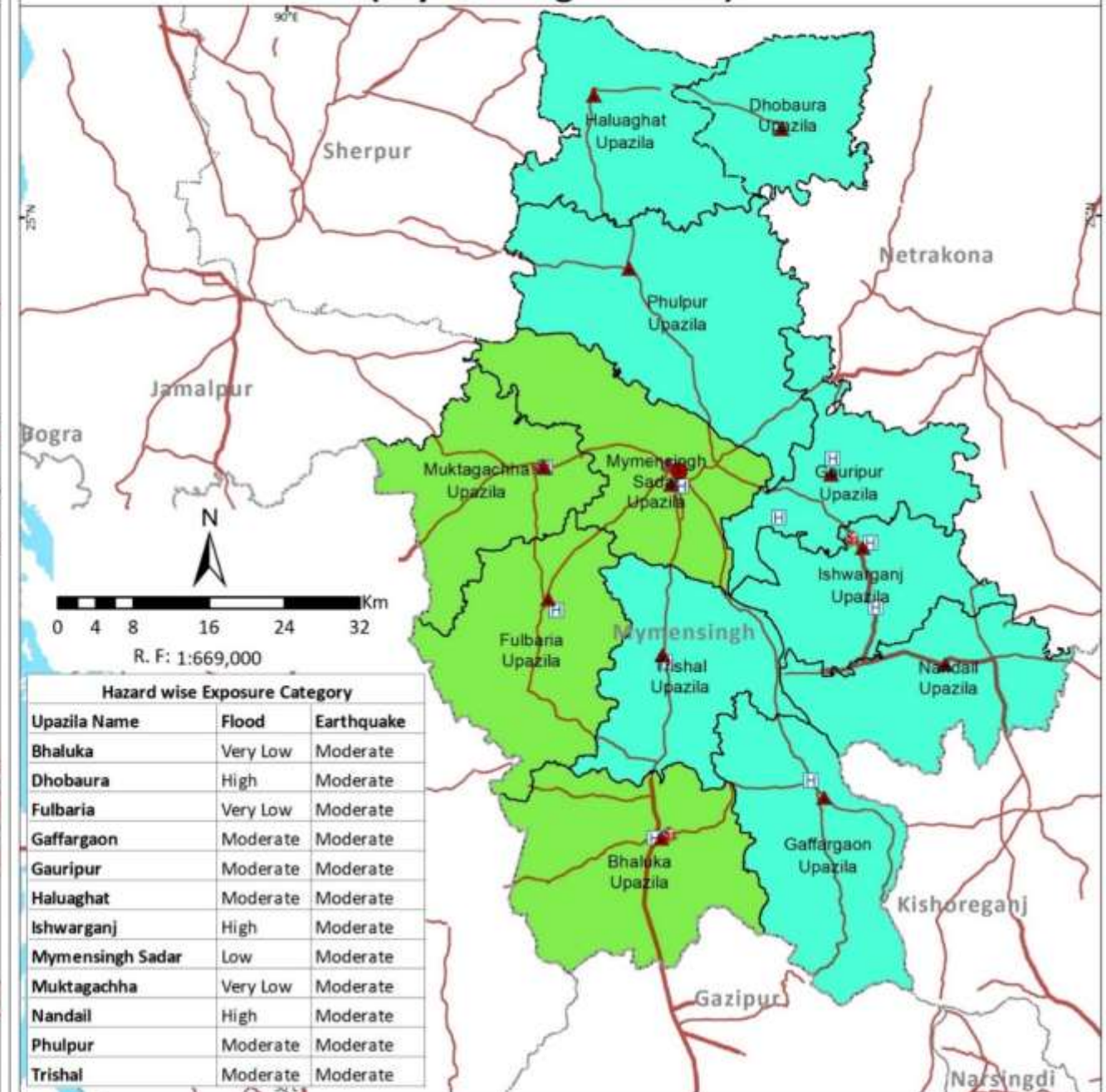




Multi-Hazard Population Exposure (Jamalpur District)



Multi-Hazard Population Exposure (Mymensingh District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Population Exposure for Moderate and Above Category
- Flood, Earthquake
- Earthquake

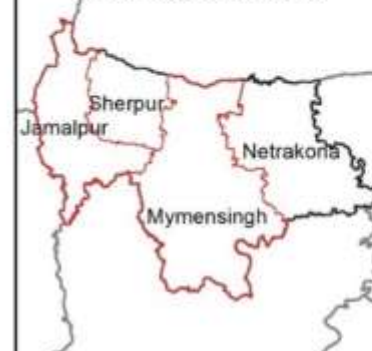
Note

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

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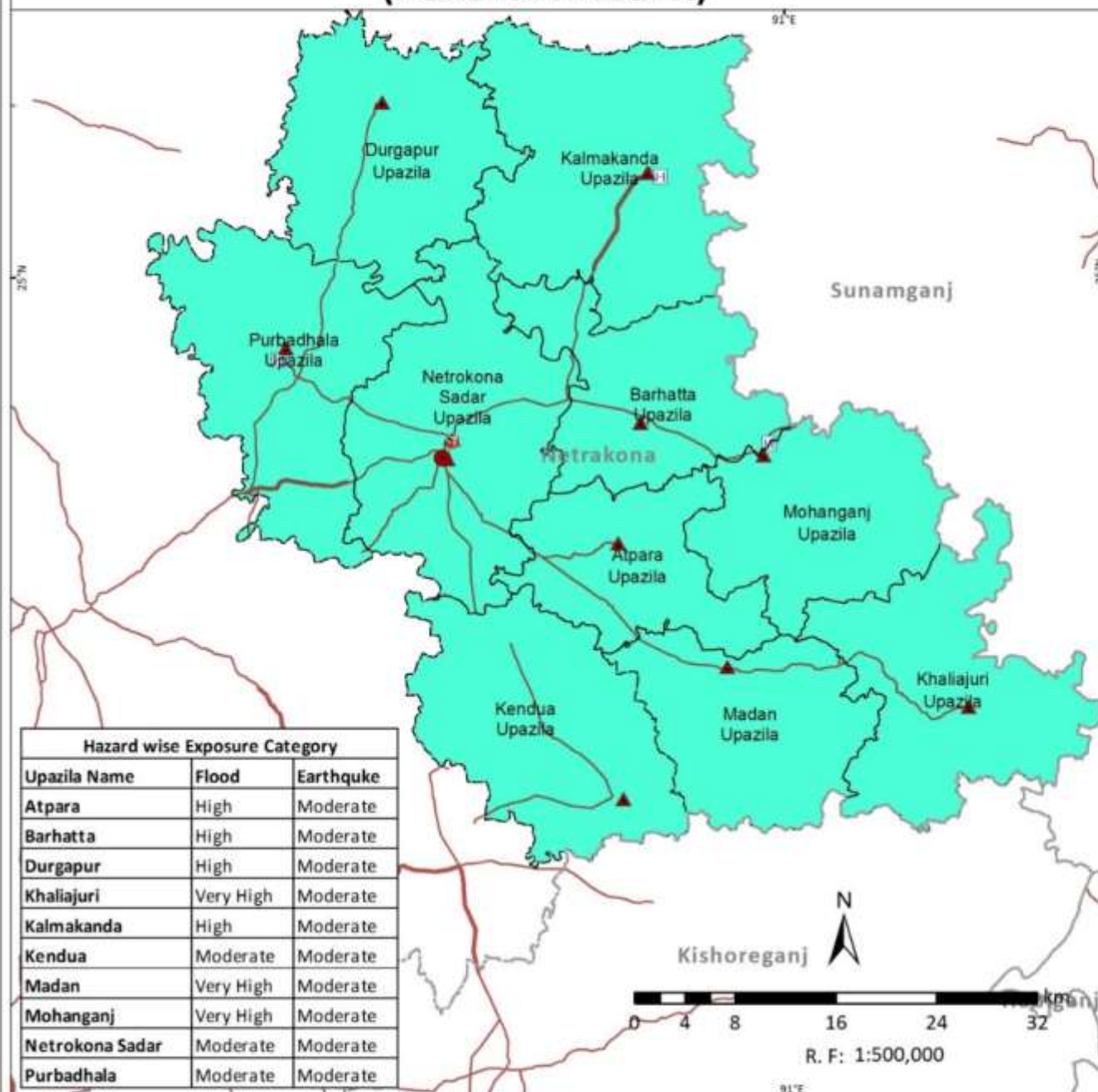
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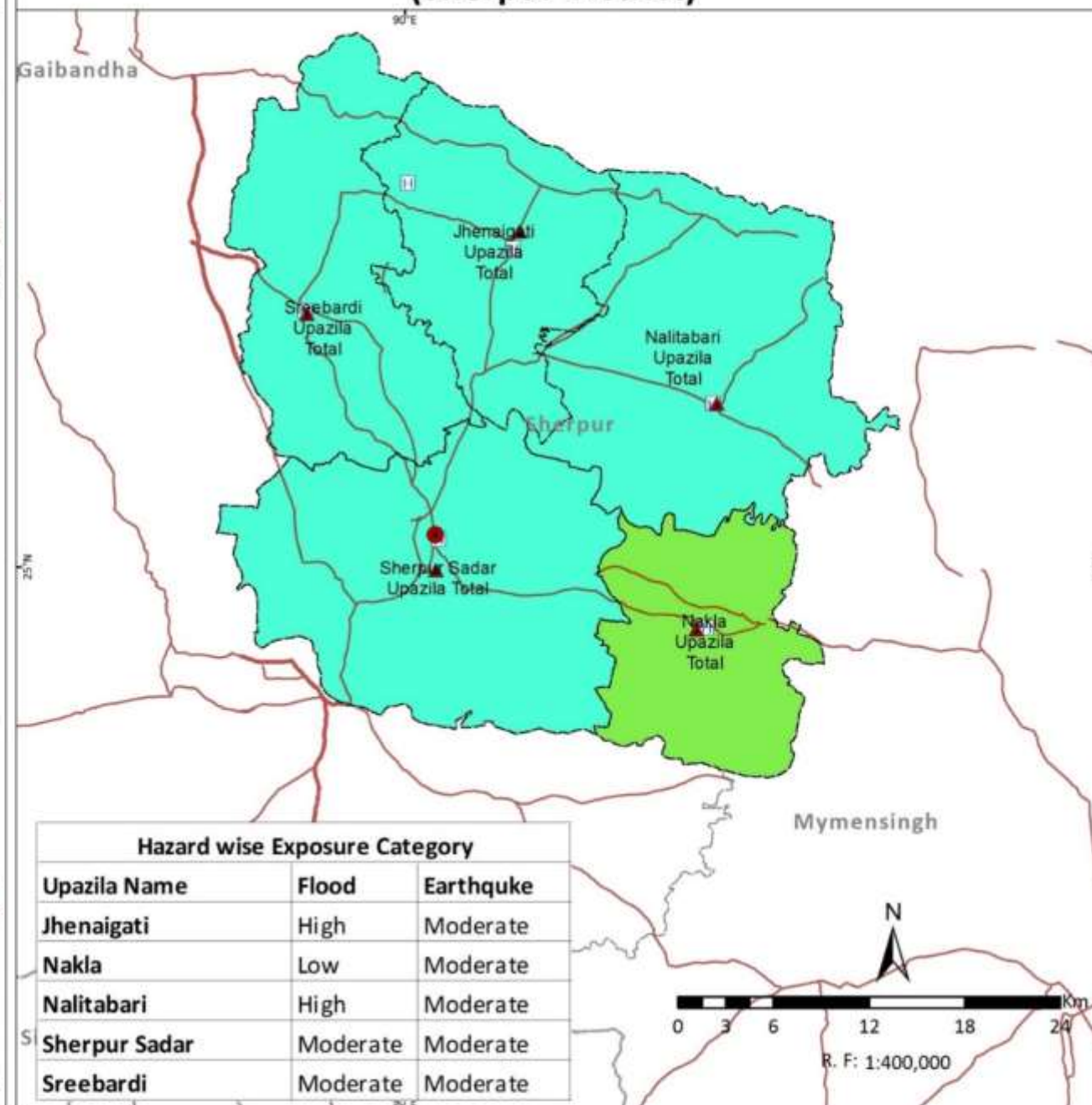
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Multi- Hazard Population Exposure (Netrakona District)



Multi- Hazard Population Exposure (Sherpur District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Population Exposure for Moderate and Above Category
- Flood, Earthquake
- Earthquake

Note

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

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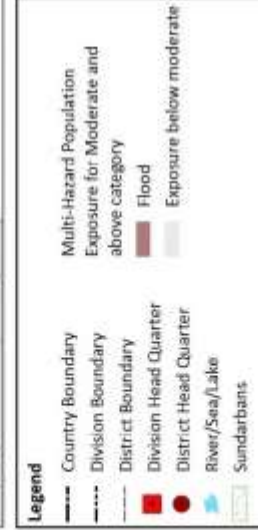
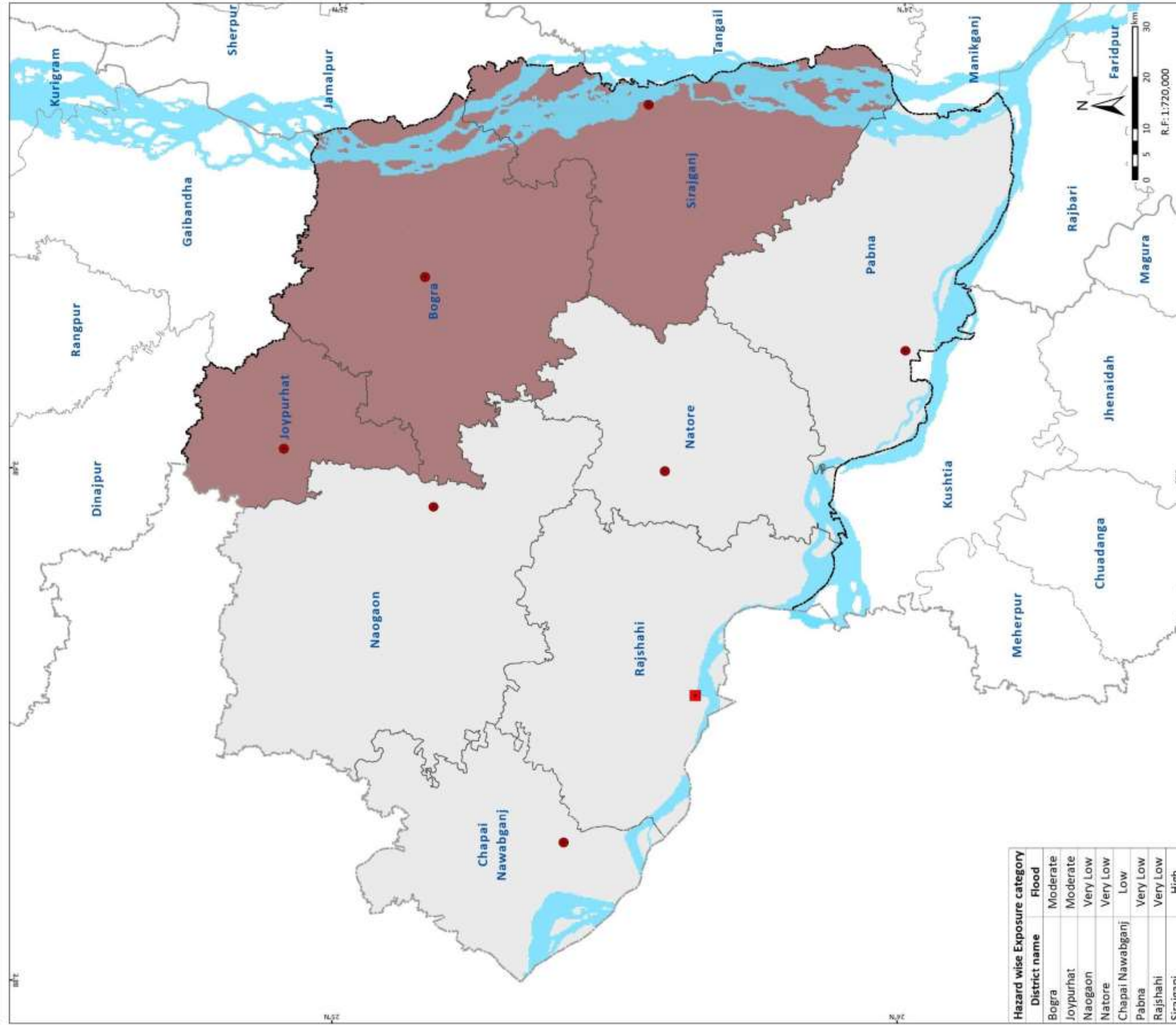


Multi-Hazard Risk and Vulnerability Assessment, Modelling and Mapping in Bangladesh



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Ministry of Disaster Management and Relief

Population Exposure to Multi-Hazards (Rajshahi Division)



Note:
Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWD8, BSS, COMPI & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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

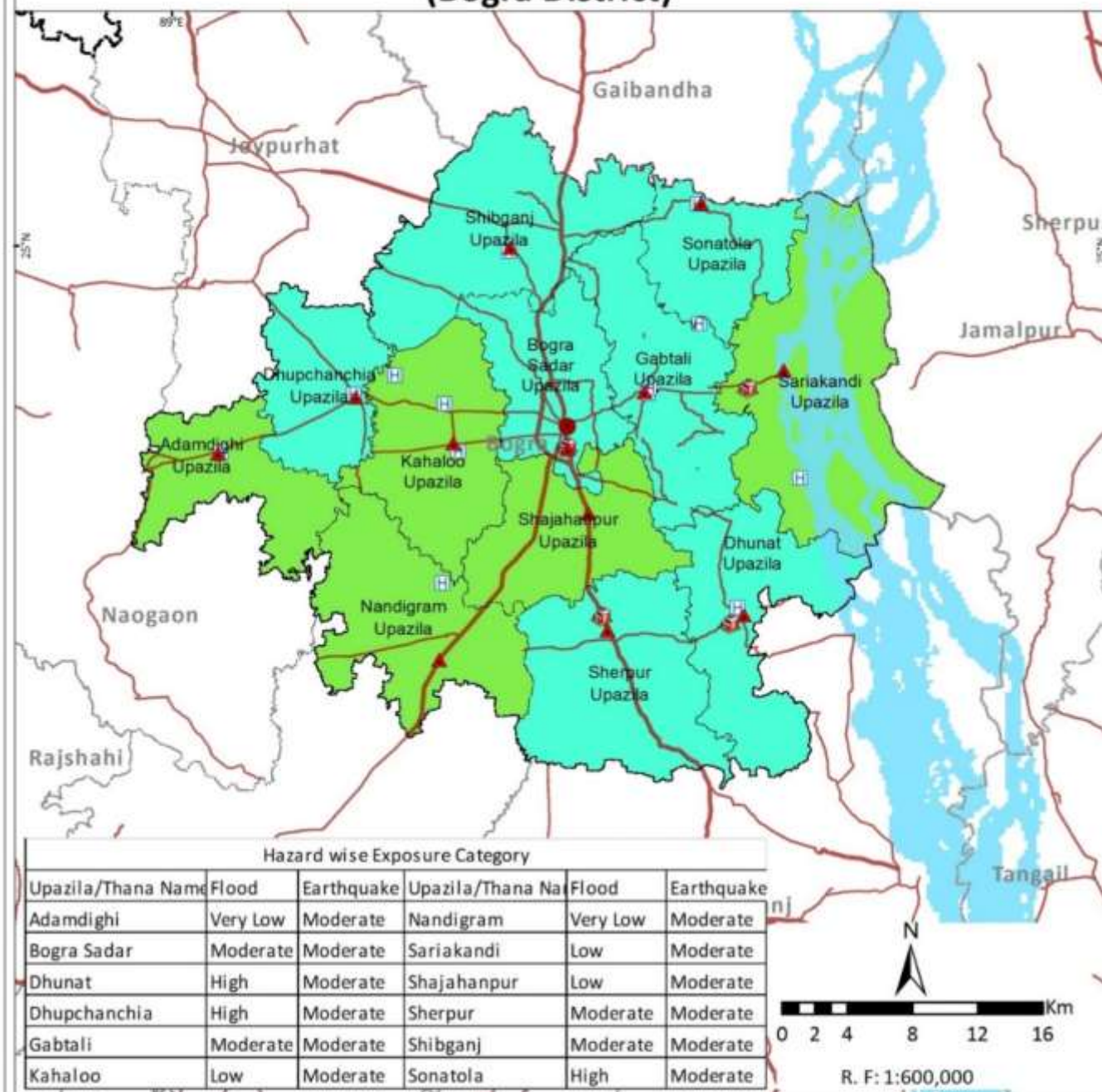


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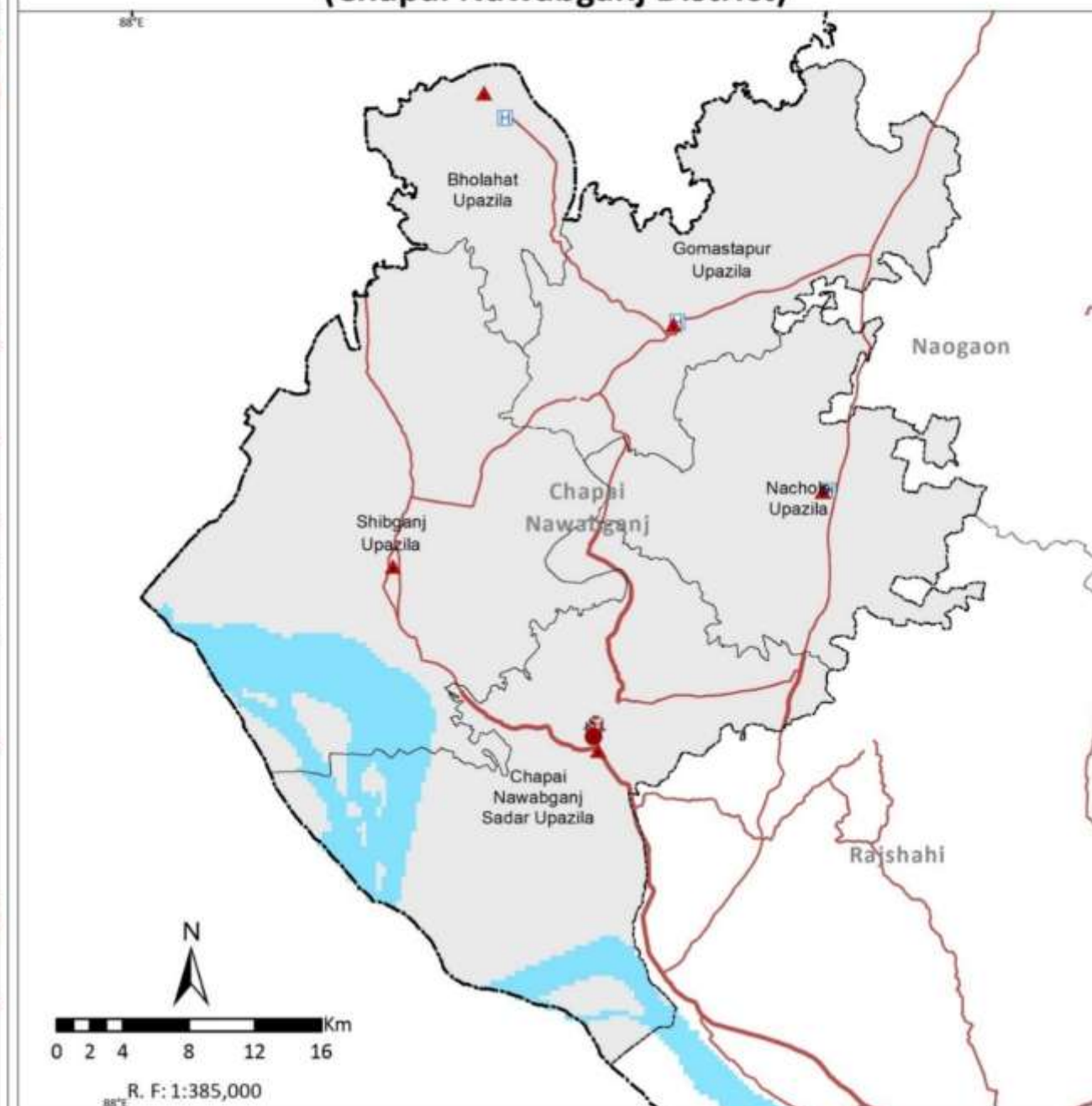




Population Exposure to Multi-Hazard (Bogra District)



Population Exposure to Multi-Hazard (Chapai Nawabganj District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Population Exposure for Moderate and above category
- Flood, Earthquake
- Earthquake
- Exposure below moderate

Note

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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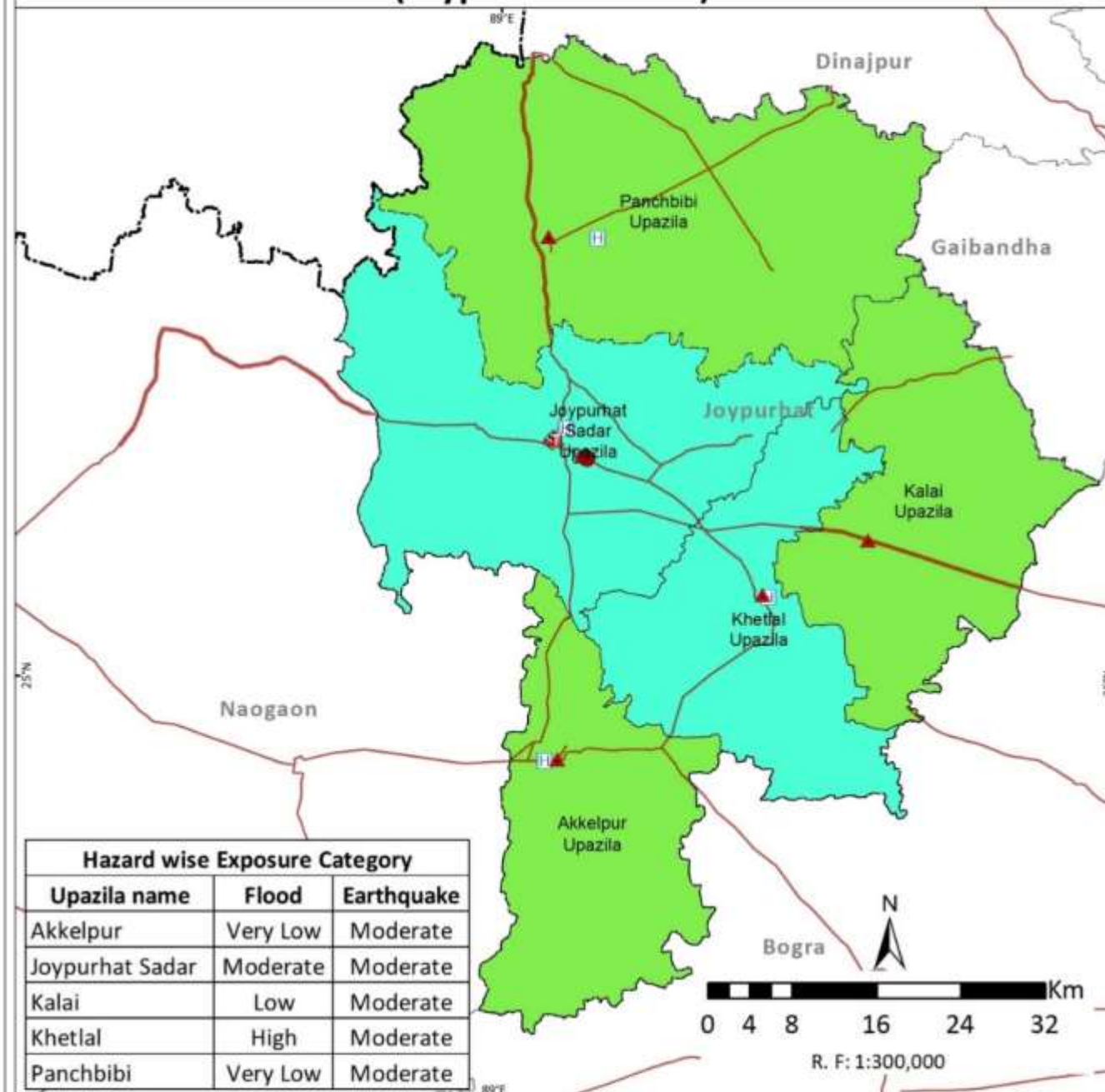
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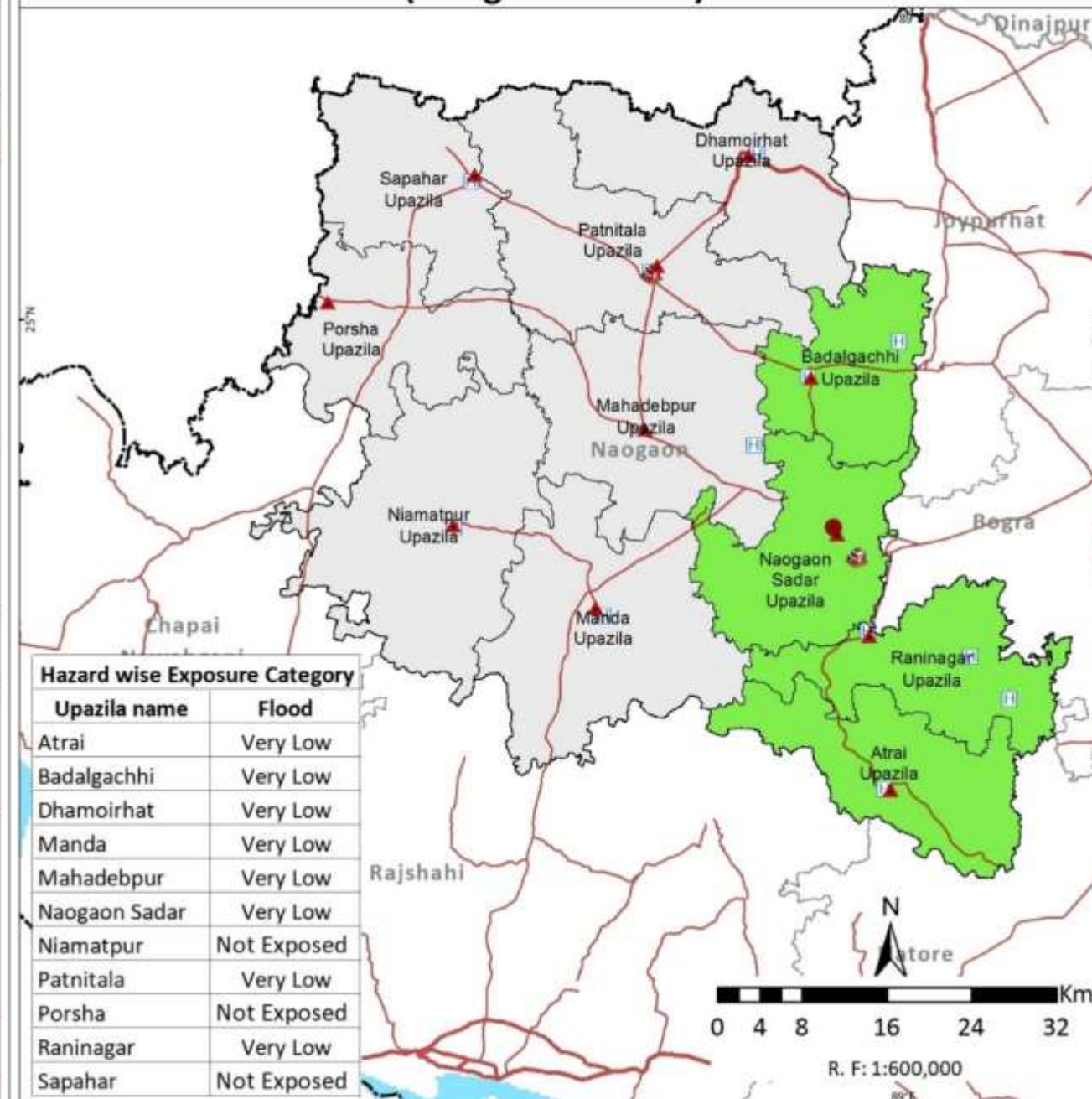
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Population Exposure to Multi-Hazard (Joypurhat District)



Population Exposure to Multi-Hazard (Naogaon District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Population Exposure for Moderate and above category
- Flood, Earthquake
- Earthquake
- Exposure below moderate

Note

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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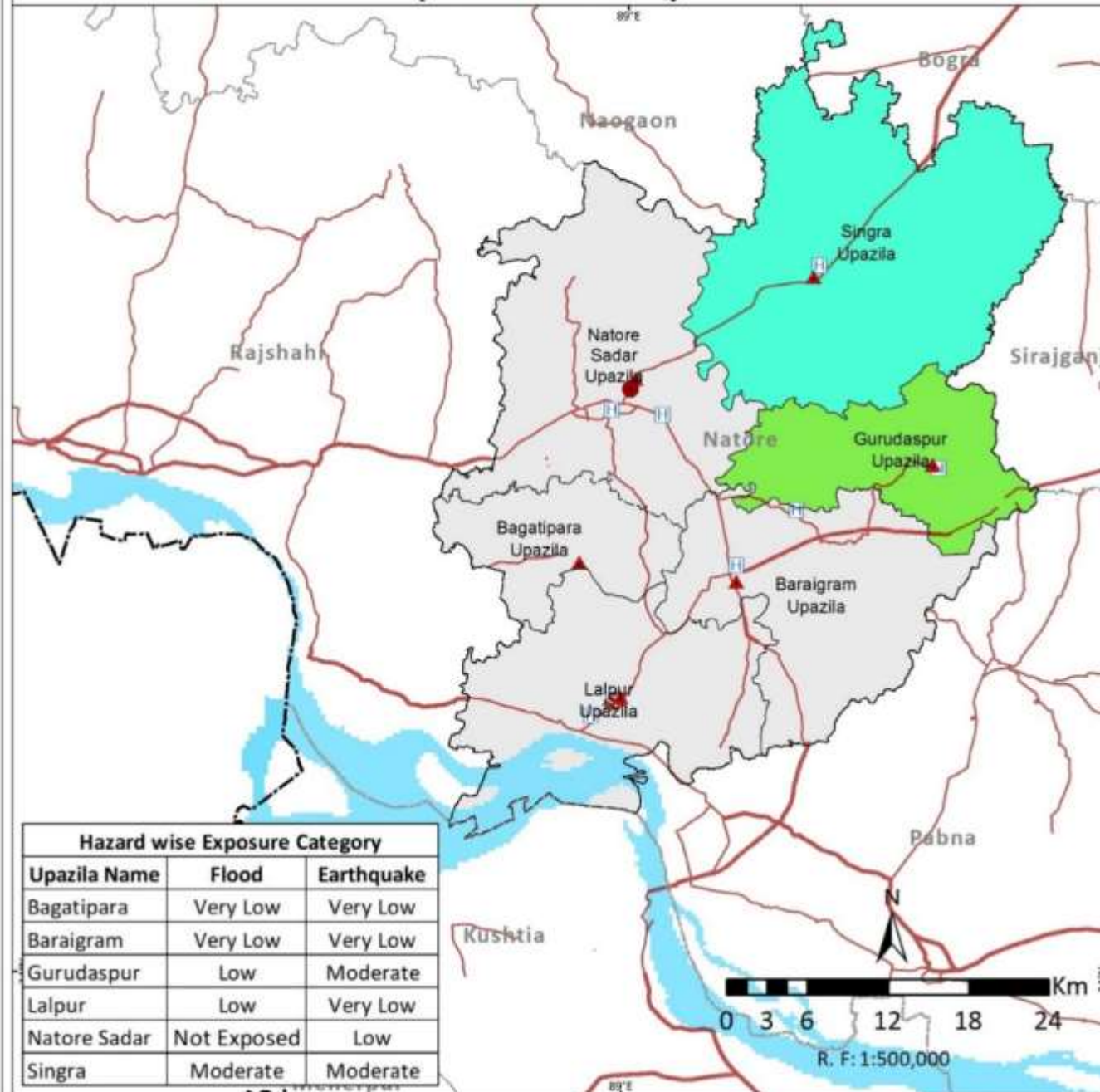
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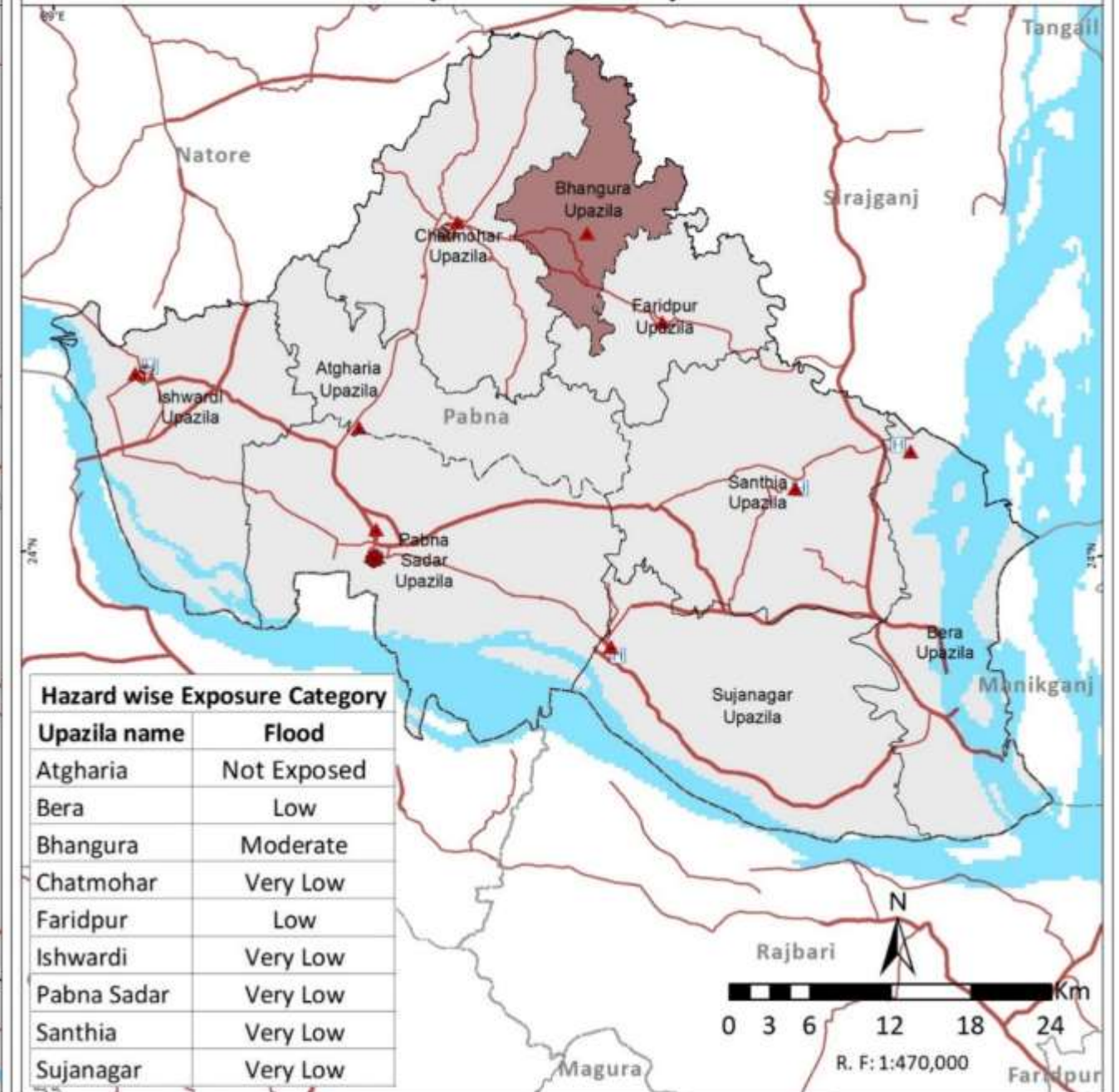
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Population Exposure to Multi-Hazard (Natore District)



Population Exposure to Multi-Hazard (Pabna District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Population Exposure for Moderate and above category
- Flood, Earthquake
- Flood
- Earthquake
- Exposure below moderate

Note

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

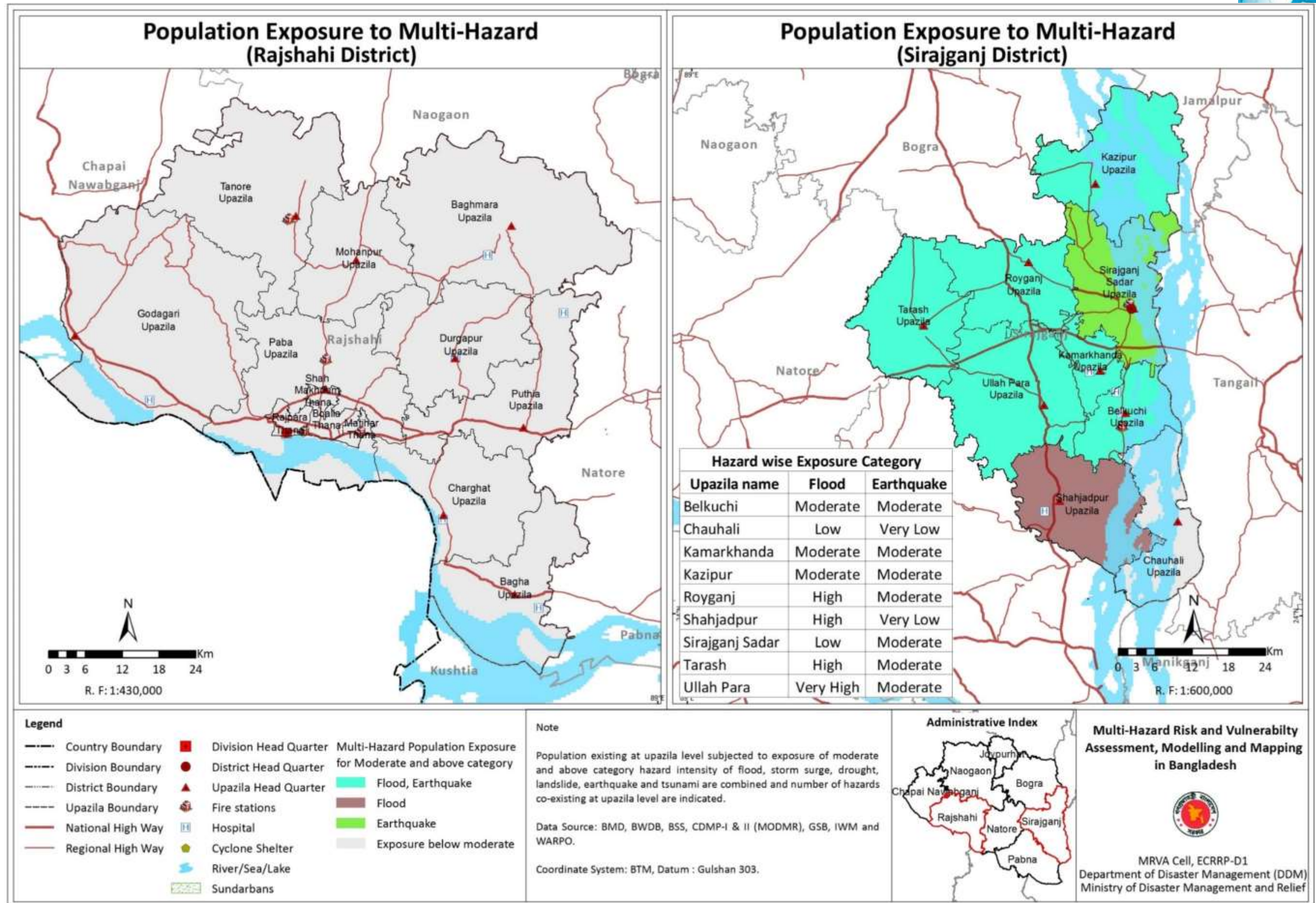
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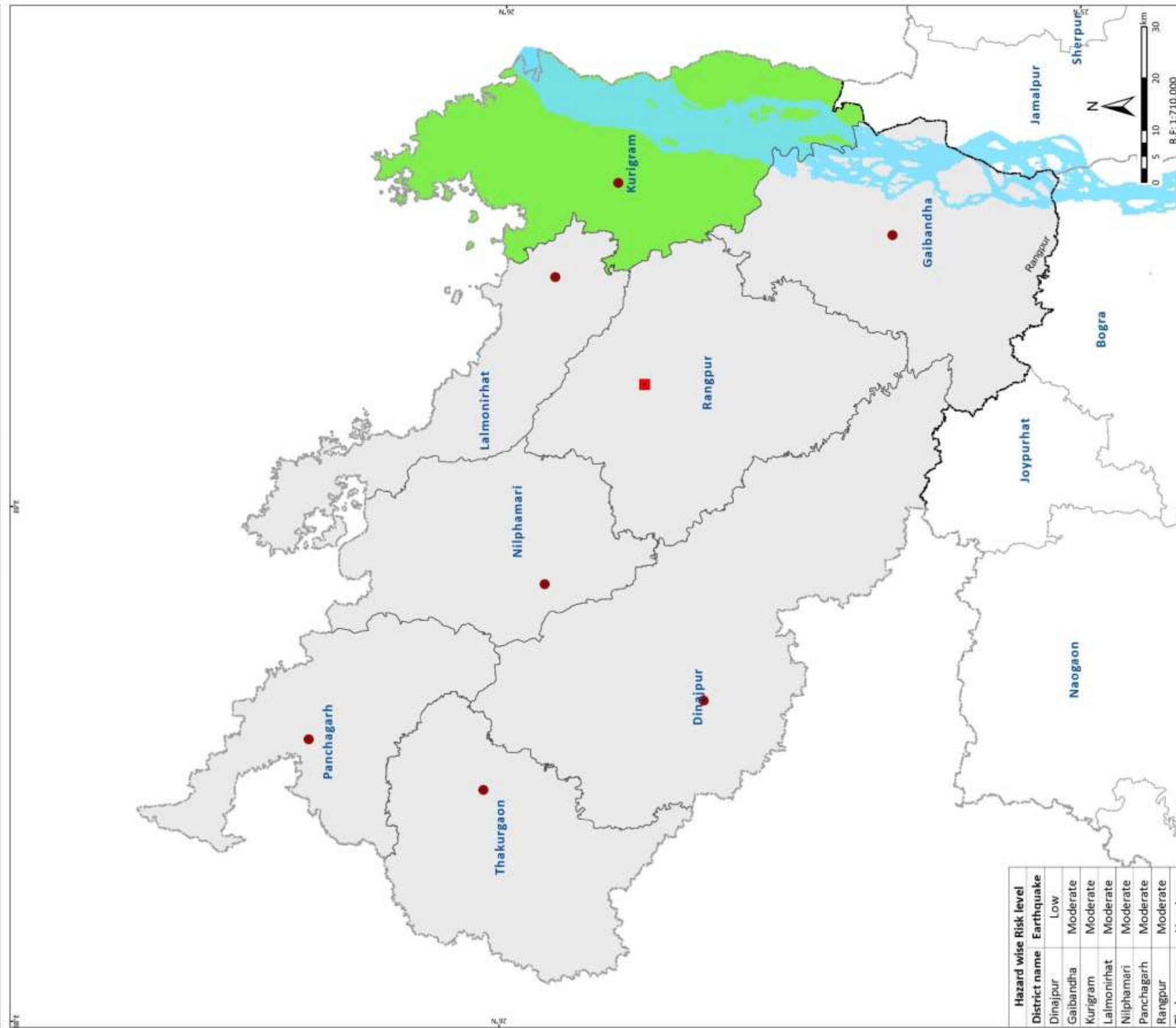
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Population Exposure to Multi-Hazards (Rangpur Division)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Division Head Quarter
- District Head Quarter
- River/Sea/Lake
- Sundarbans

Note:
Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.
Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.
Coordinate System: BTM, Datum : Gulshan 303.



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

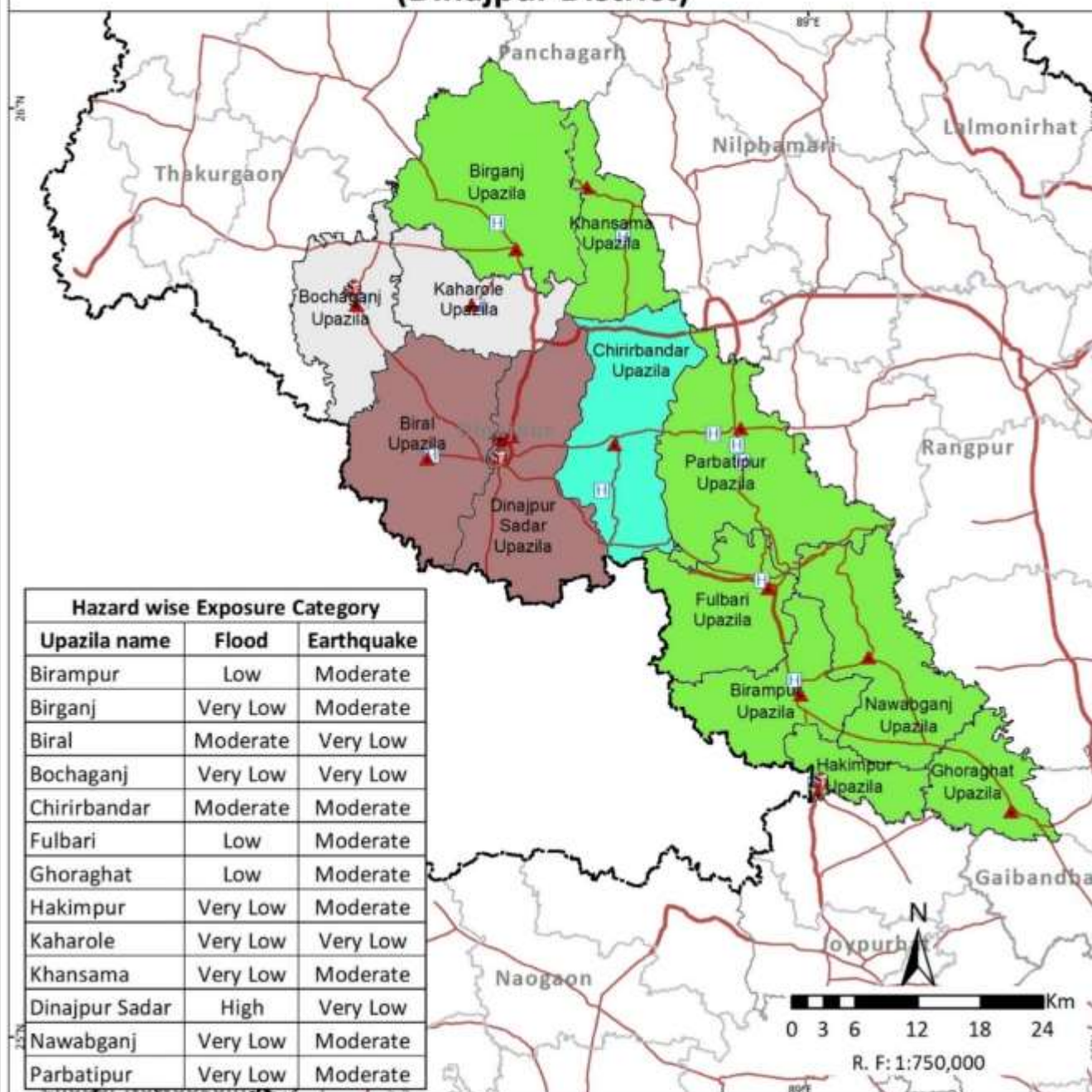


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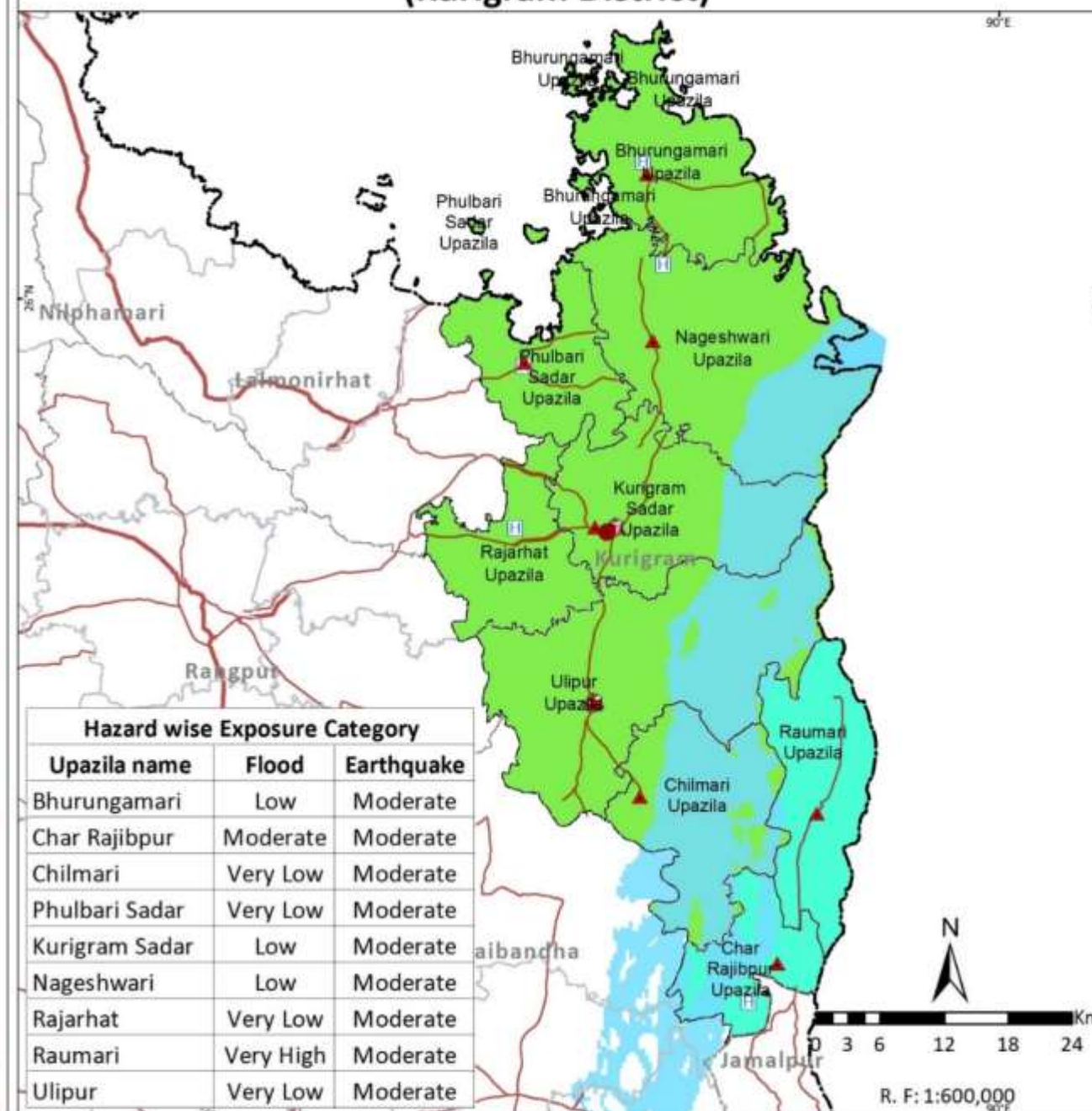




Population Exposure to Multi-Hazard (Dinajpur District)



Population Exposure to Multi-Hazard (Kurigram District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Population Exposure for Moderate and above category
- Flood, Earthquake
- Flood
- Earthquake
- Exposure below moderate

Note

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMR-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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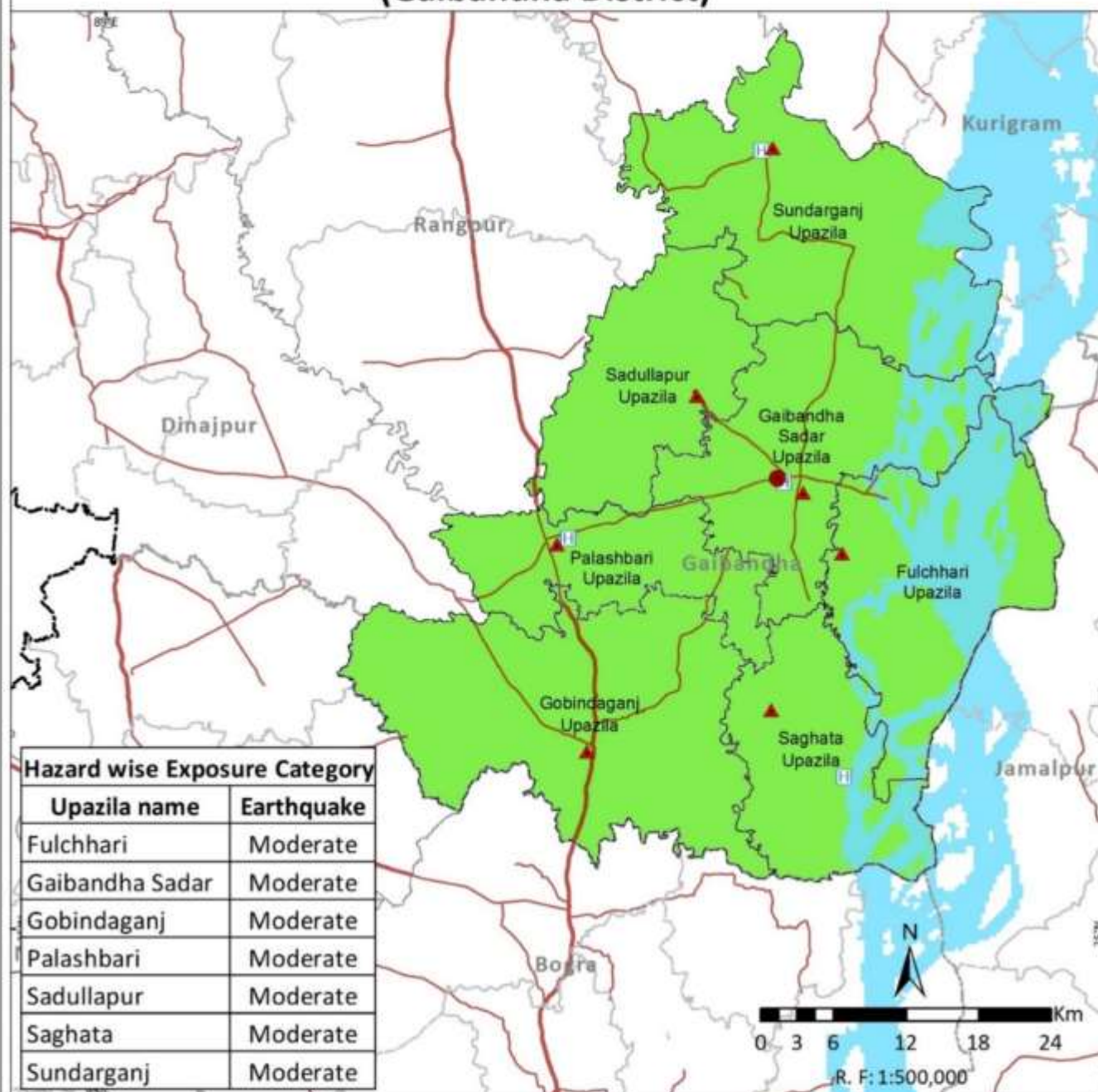
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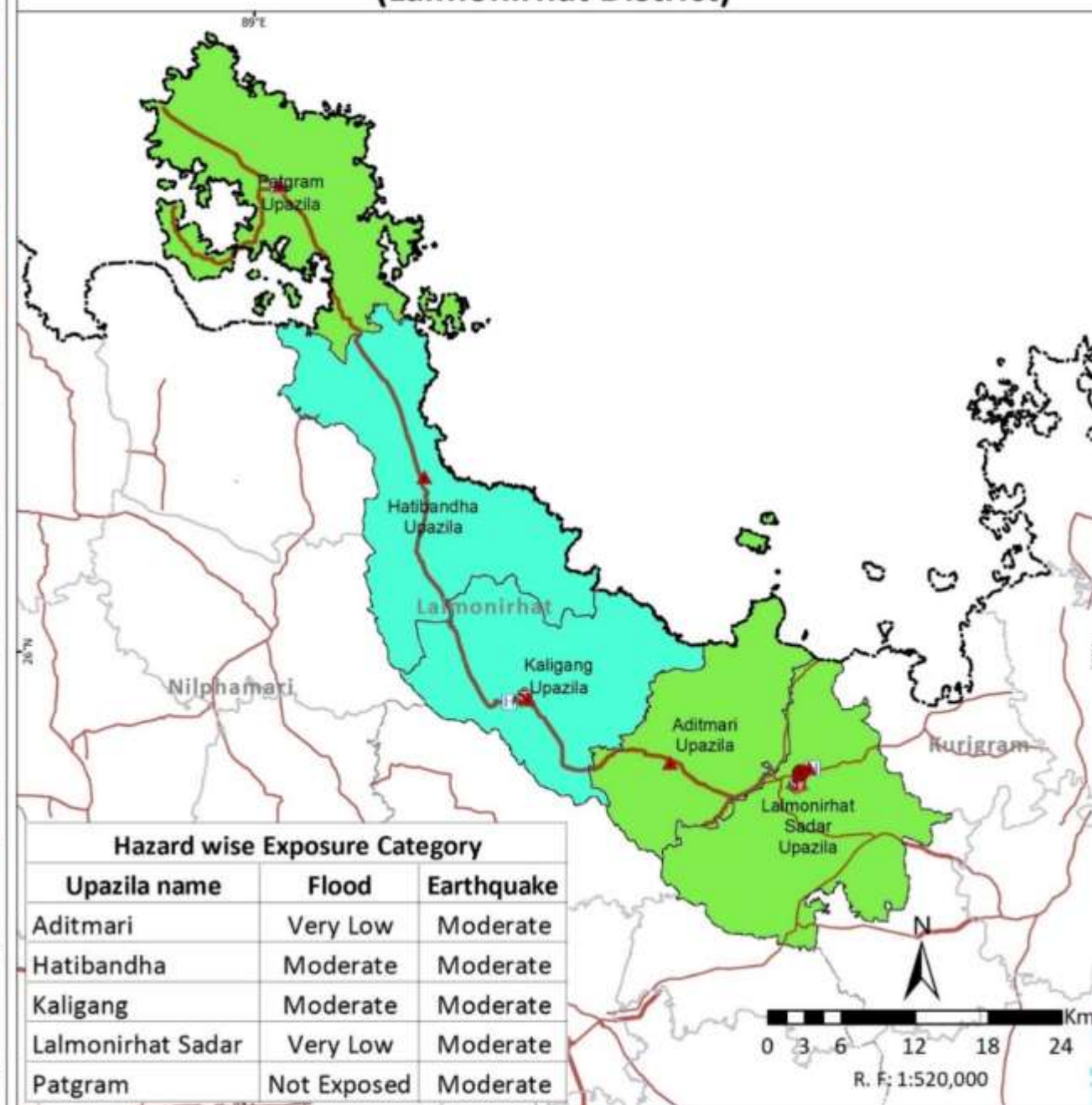
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Population Exposure to Multi-Hazard (Gaibandha District)



Population Exposure to Multi-Hazard (Lalmonirhat District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Population Exposure for Moderate and above category
- Flood, Earthquake
- Earthquake

Note

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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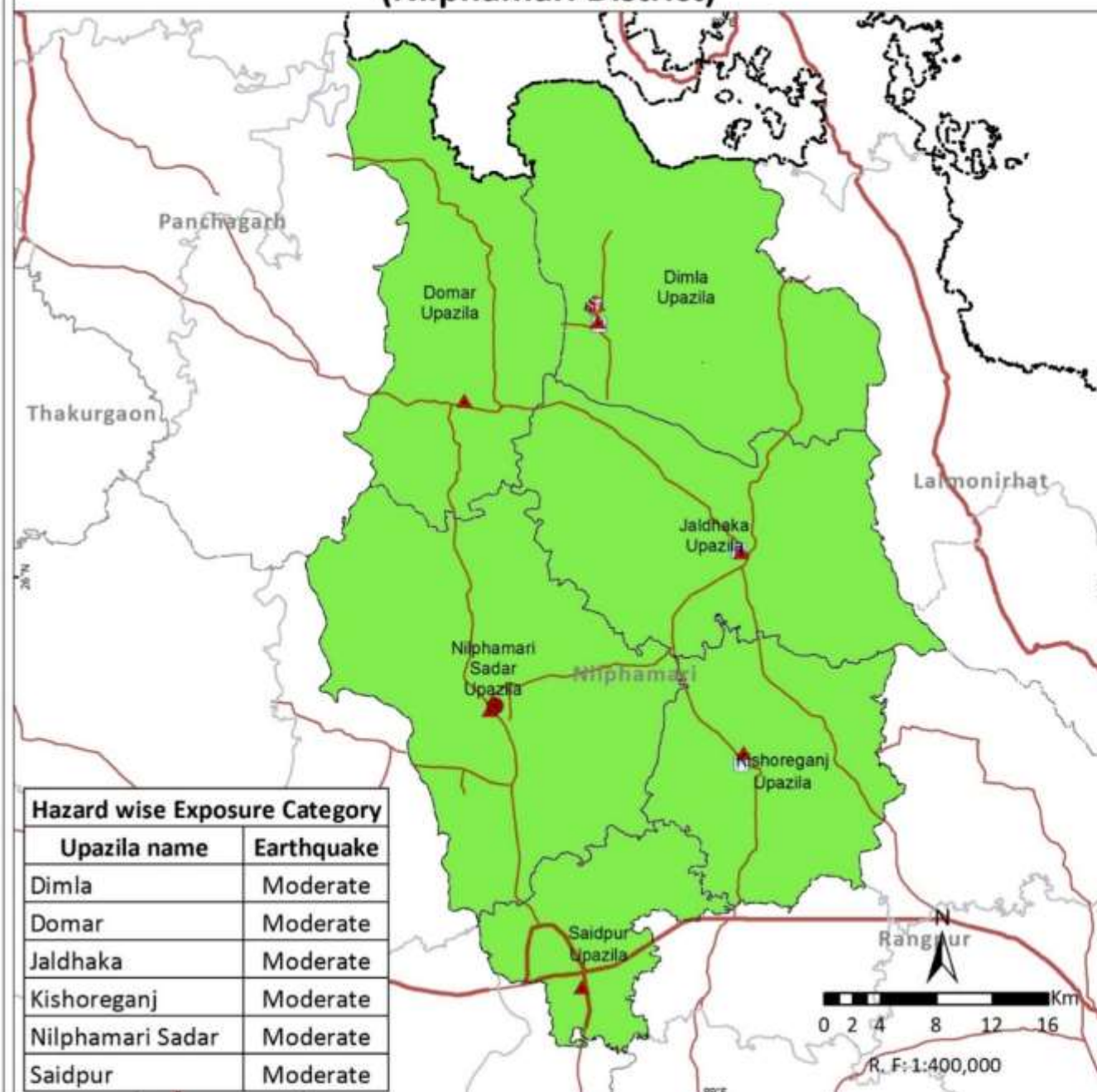
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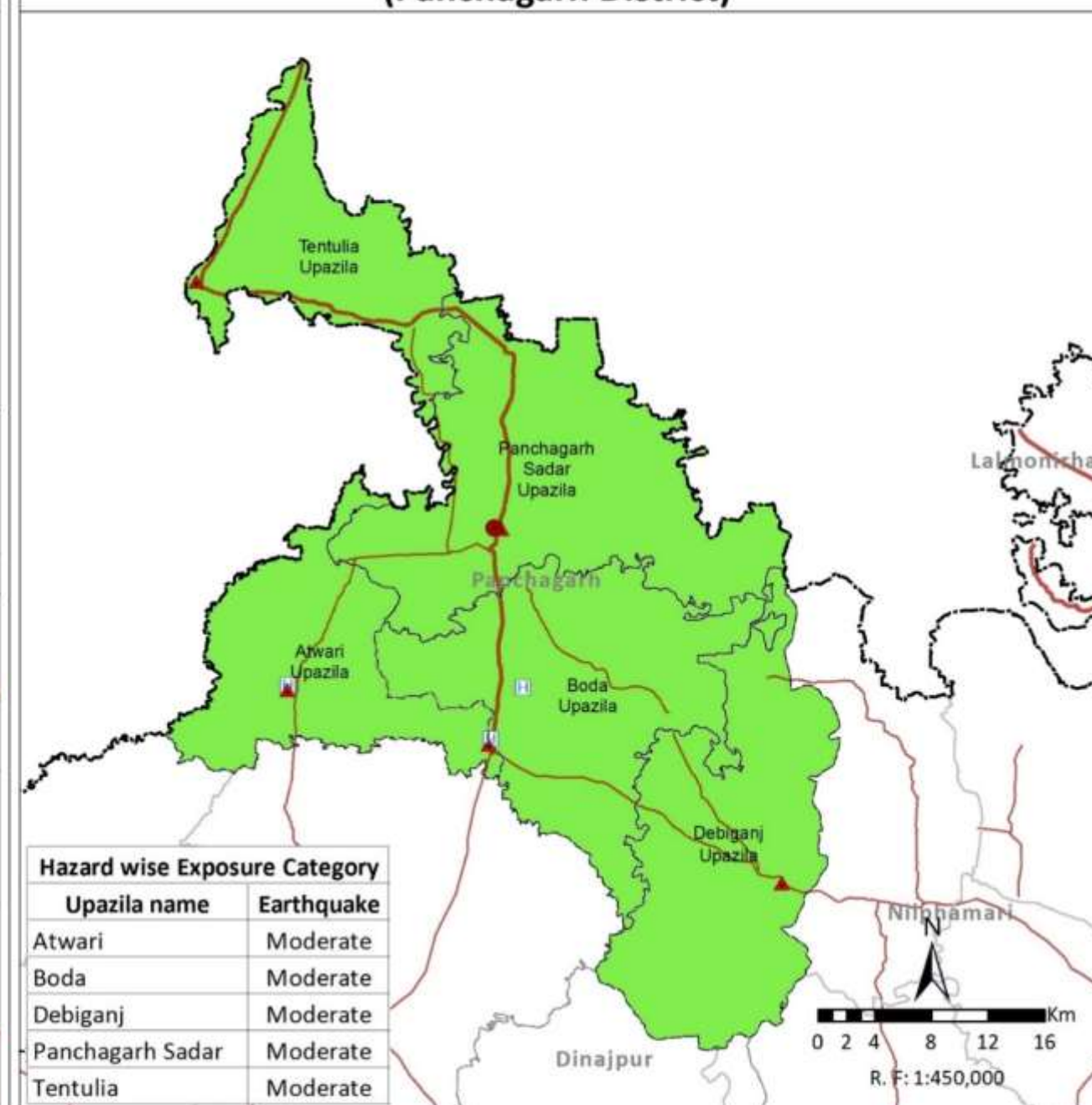
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Population Exposure to Multi-Hazard (Nilphamari District)



Population Exposure to Multi-Hazard (Panchagarh District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Population Exposure for Moderate and above category
- Earthquake

Note

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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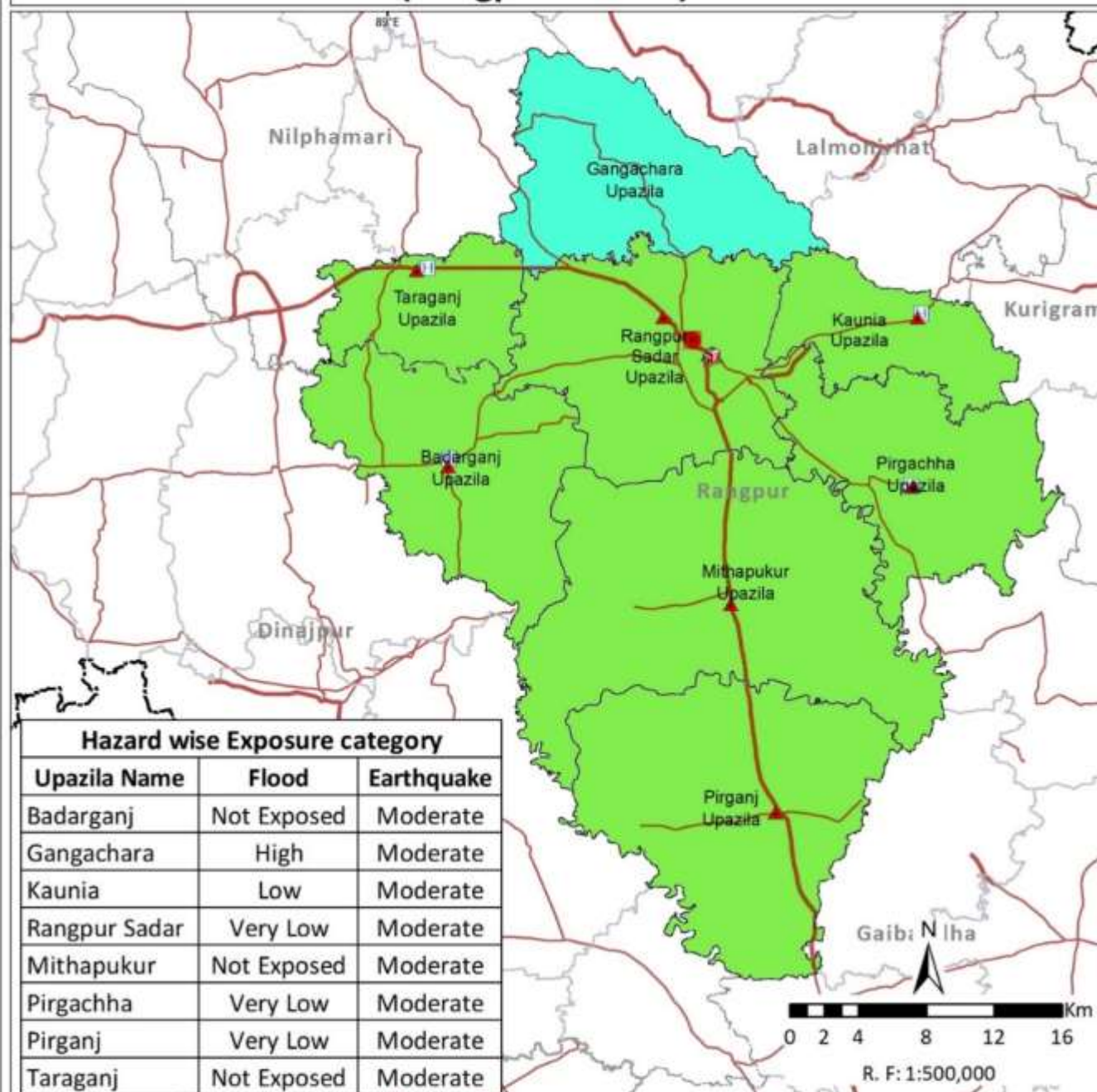
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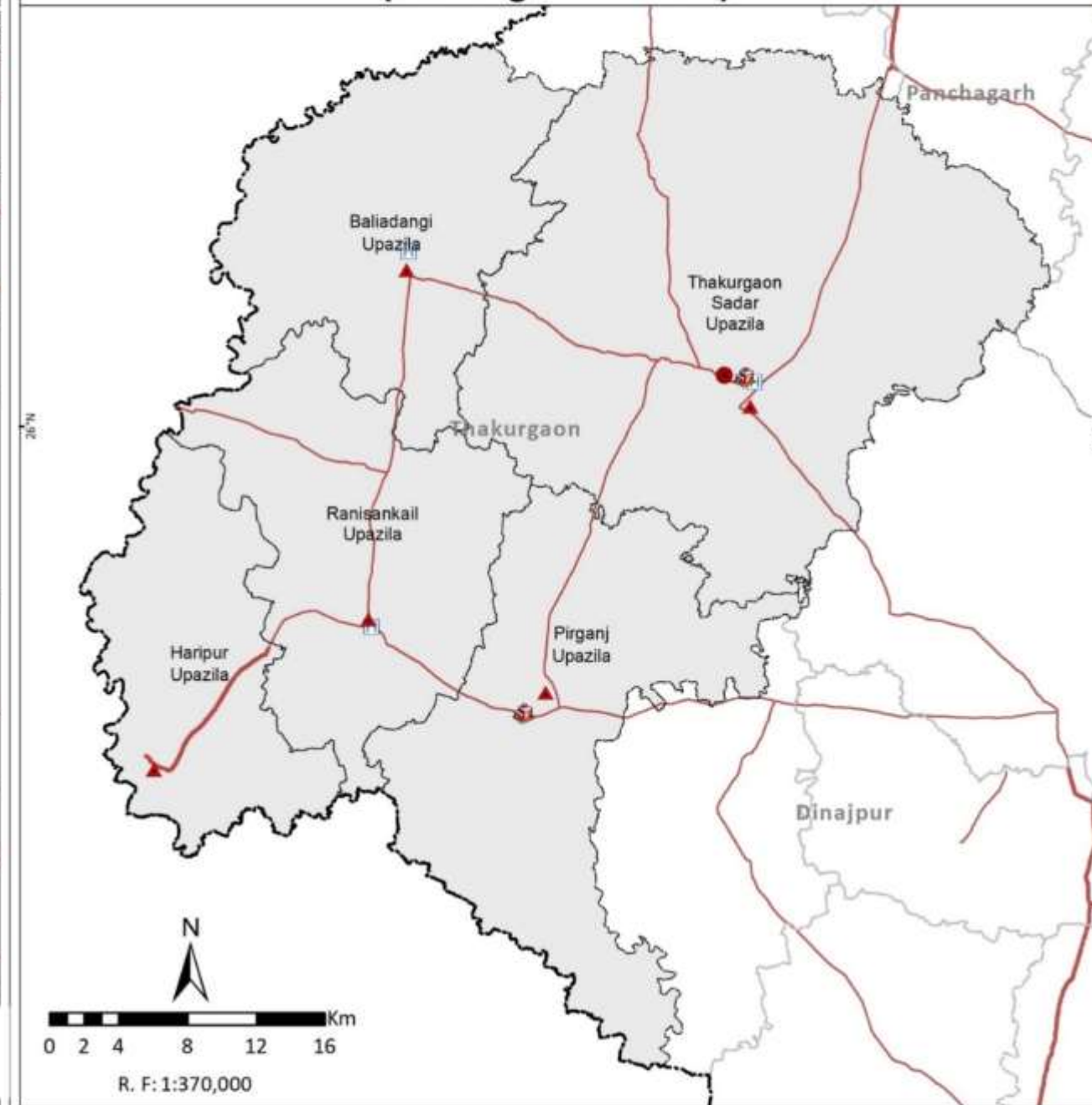
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Population Exposure to Multi-Hazard (Rangpur District)



Population Exposure to Multi-Hazard (Thakurgaon District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- Division Head Quarter
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Population Exposure for Moderate and above category
- Flood, Earthquake
- Earthquake
- Exposure below moderate

Note

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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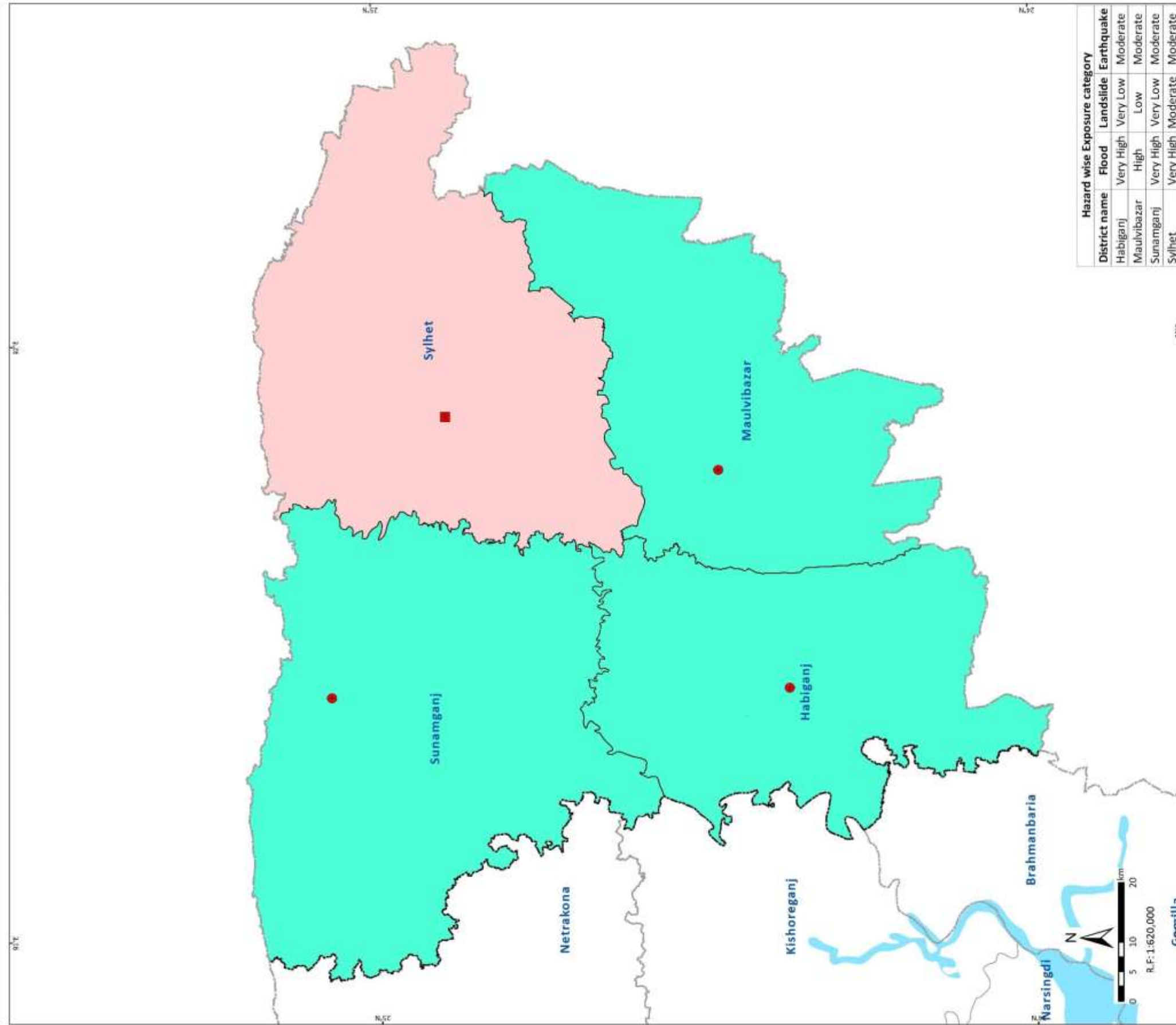


Multi-Hazard Risk and Vulnerability Assessment, Modelling and Mapping in Bangladesh



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Population Exposure to Multi-Hazards (Sylhet Division)



Hazard wise Exposure category				
District name	Flood	Landslide	Earthquake	
Habiganj	Very High	Very Low	Moderate	
Maulvibazar	High	Low	Moderate	
Sunamganj	Very High	Very Low	Moderate	
Sylhet	Very High	Moderate	Moderate	



Note: Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDM-1 & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.



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

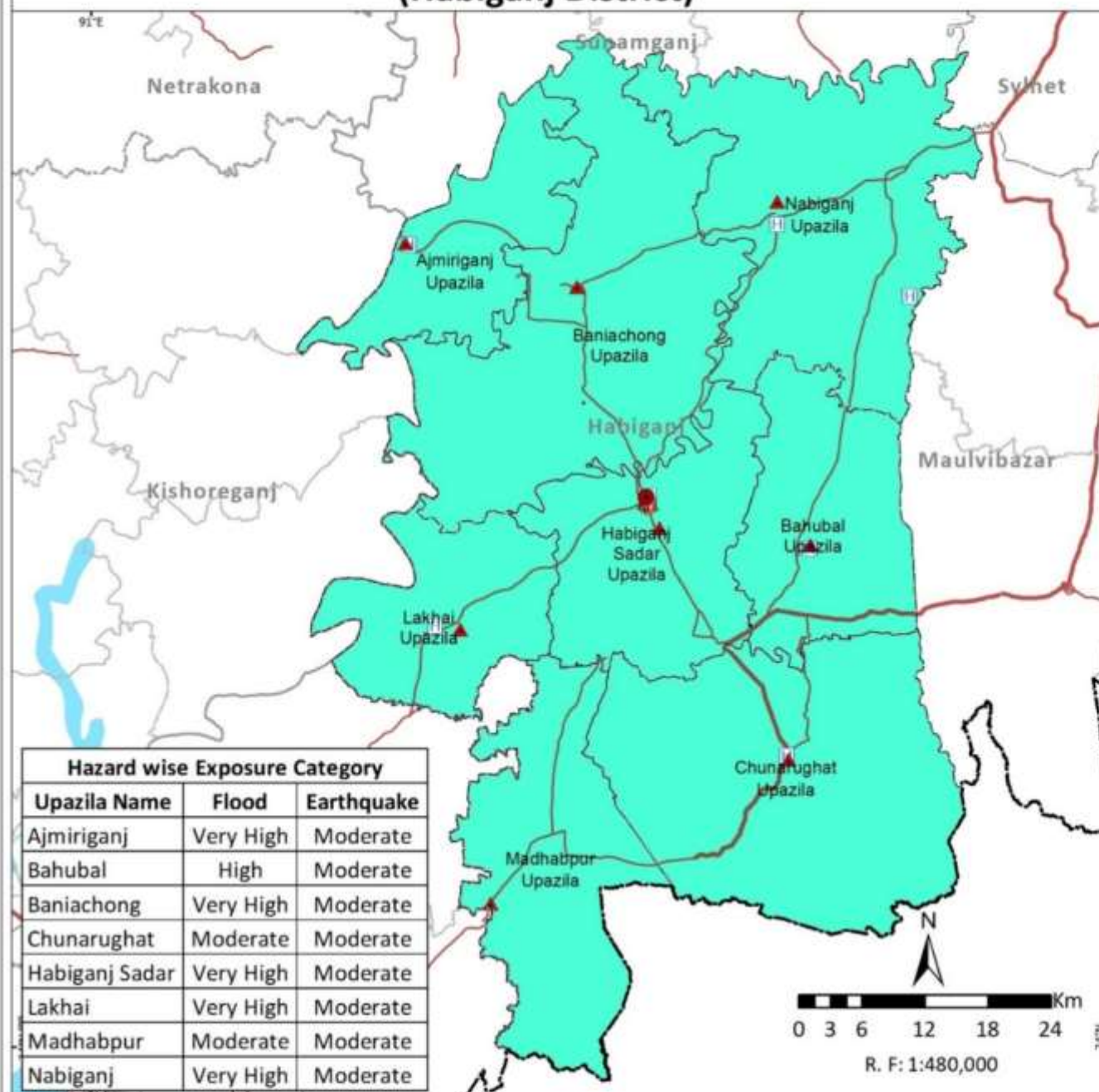


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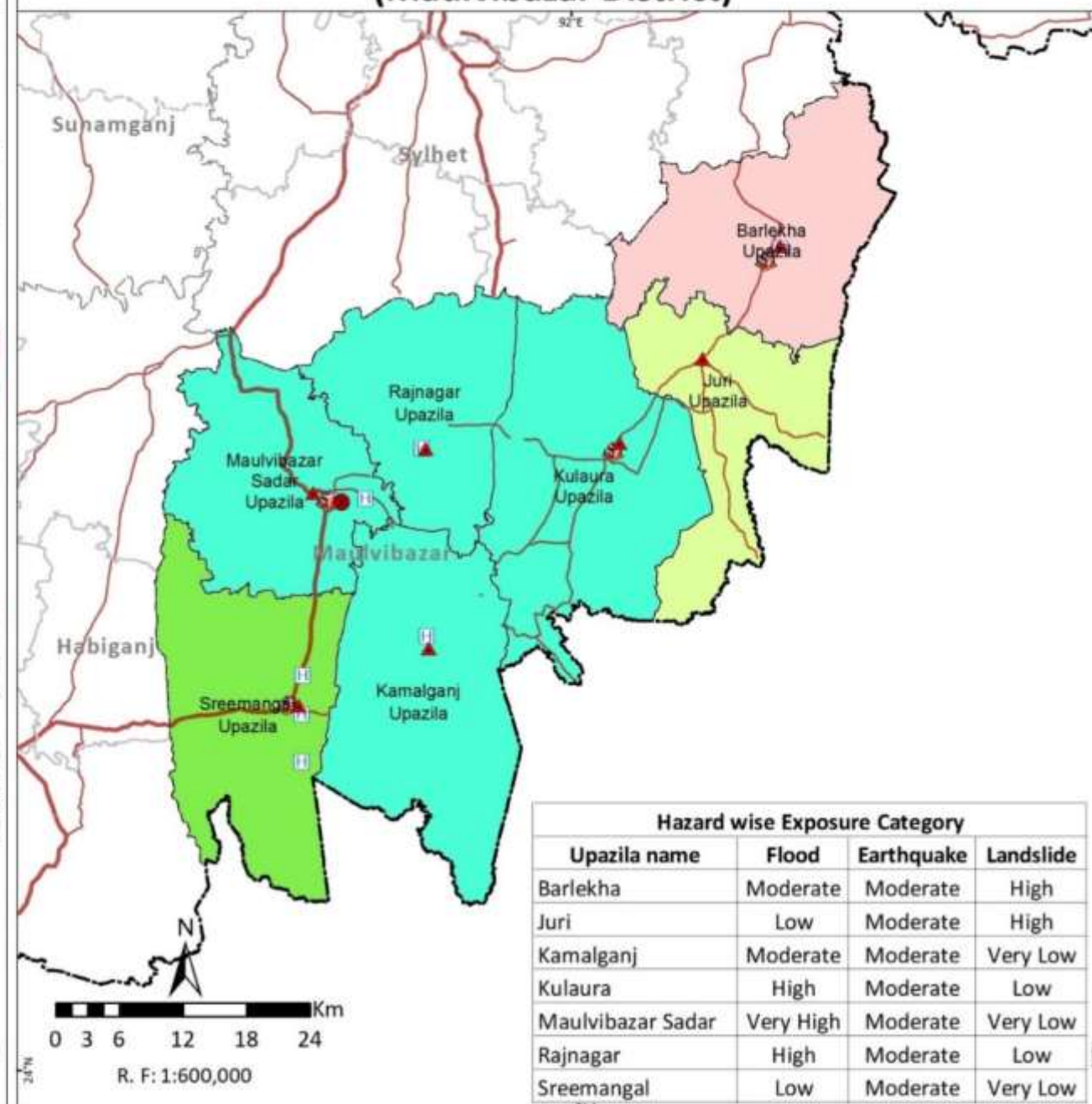




Population Exposure to Multi-Hazard (Habiganj District)



Population Exposure to Multi-Hazard (Maulvibazar District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Population Exposure for Moderate and above category
- Flood, Landslide, Earthquake
- Landslide, Earthquake
- Flood, Earthquake
- Earthquake

Note

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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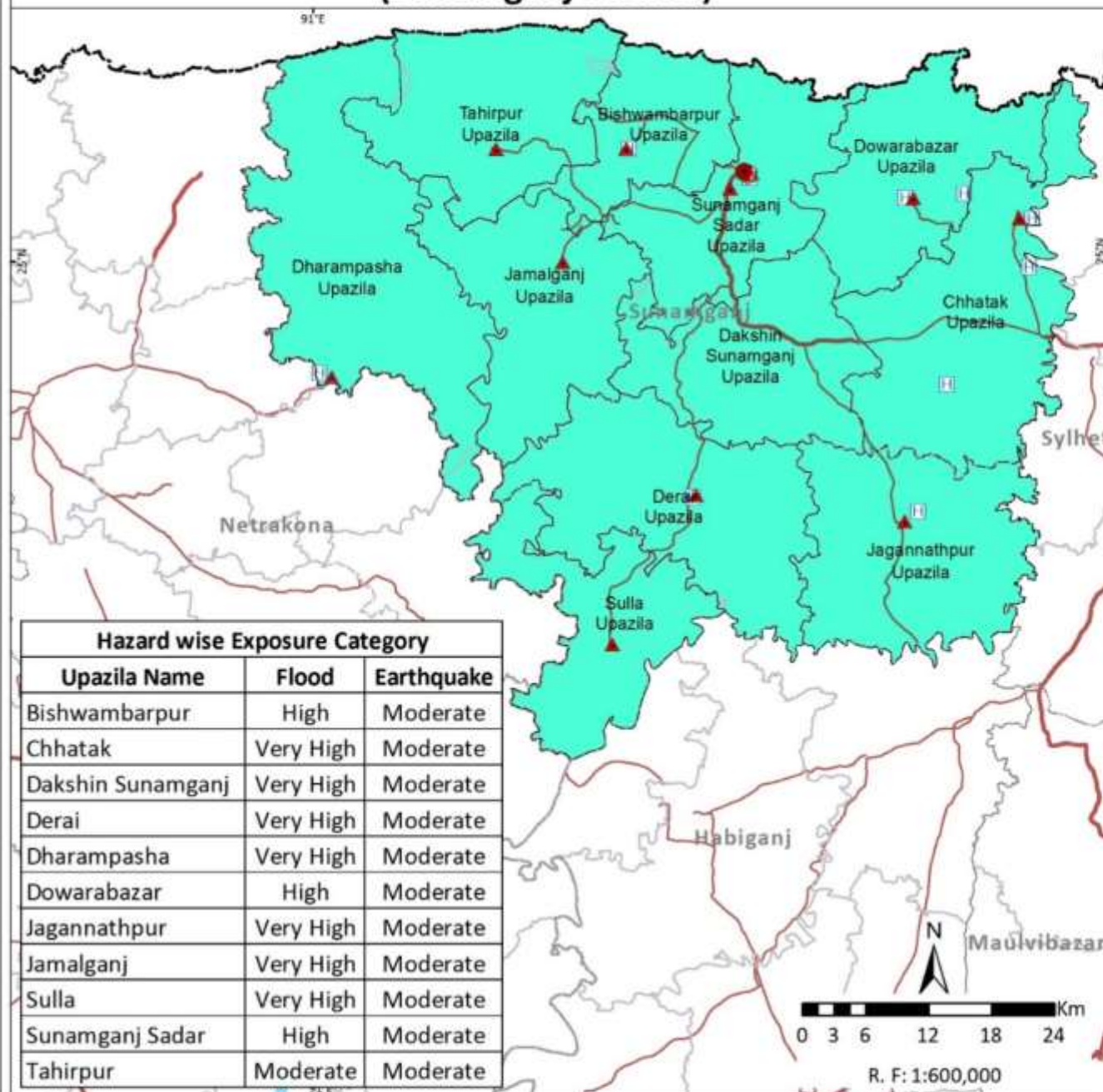
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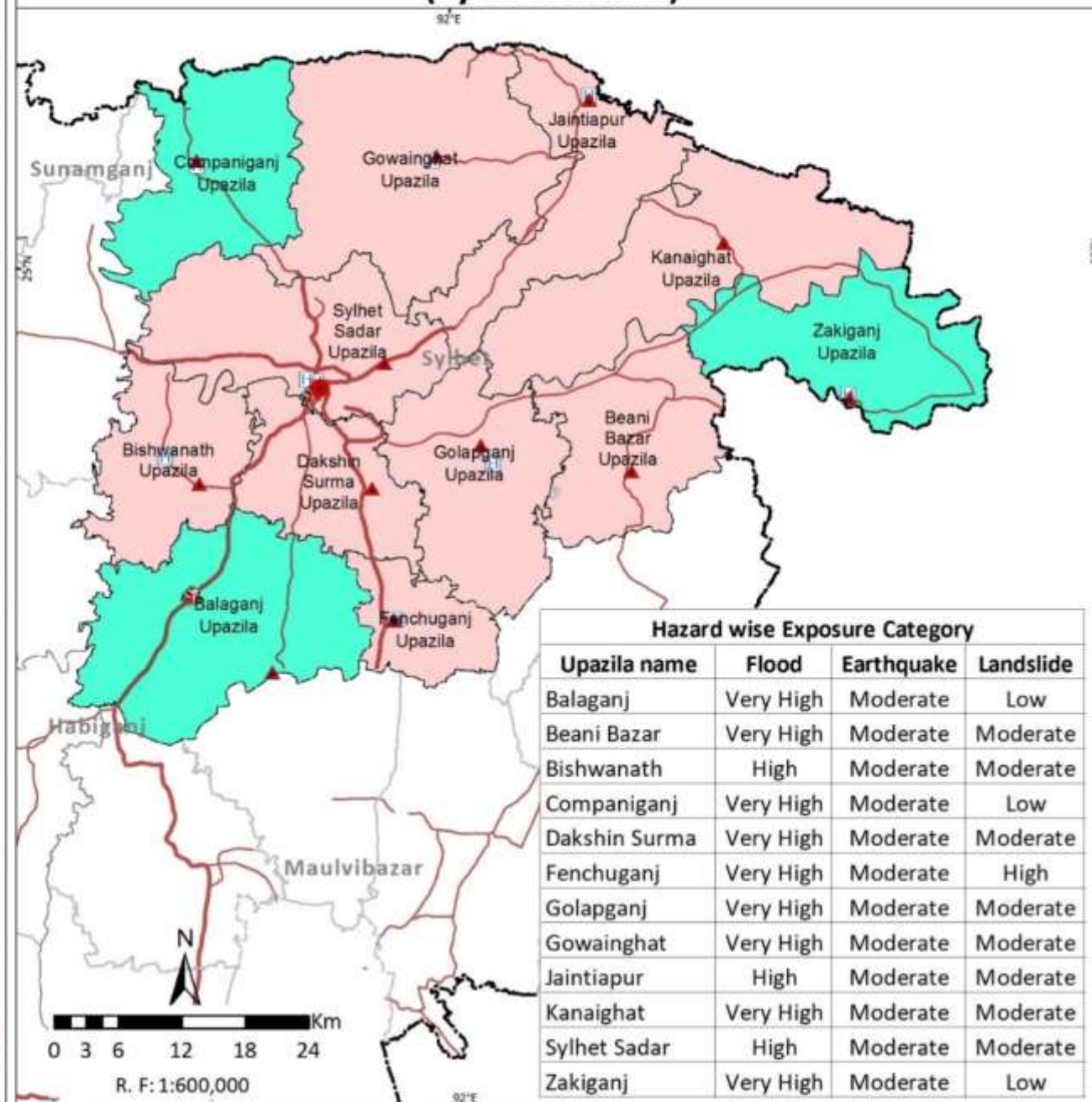
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Population Exposure to Multi-Hazard (Sunamganj District)



Population Exposure to Multi-Hazard (Sylhet District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- Division Head Quarter
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Population Exposure for Moderate and above category
- Flood, Landslide, Earthquake
- Flood, Earthquake

Note

Population existing at upazila level subjected to exposure of moderate and above category hazard intensity of flood, storm surge, drought, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

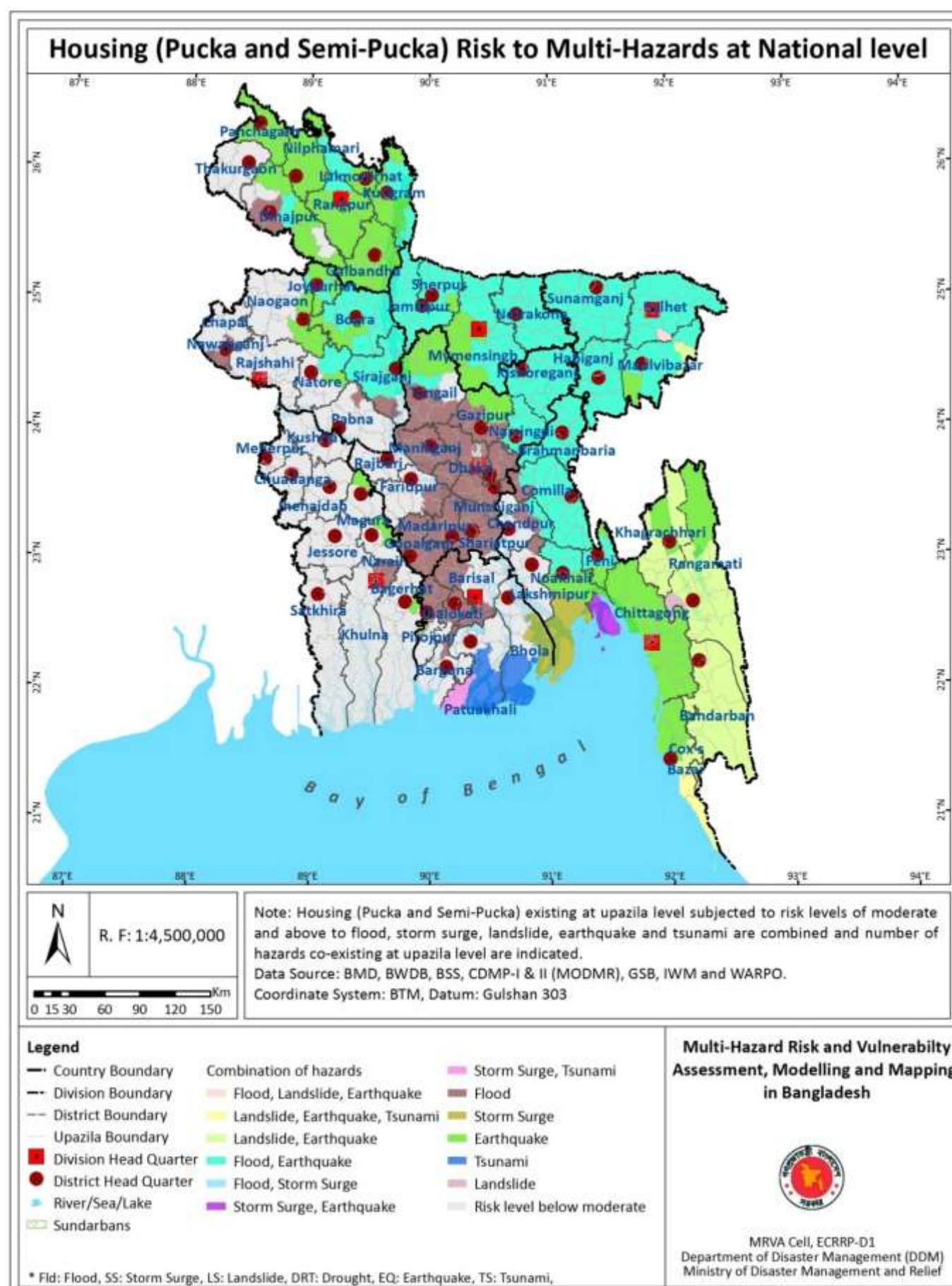
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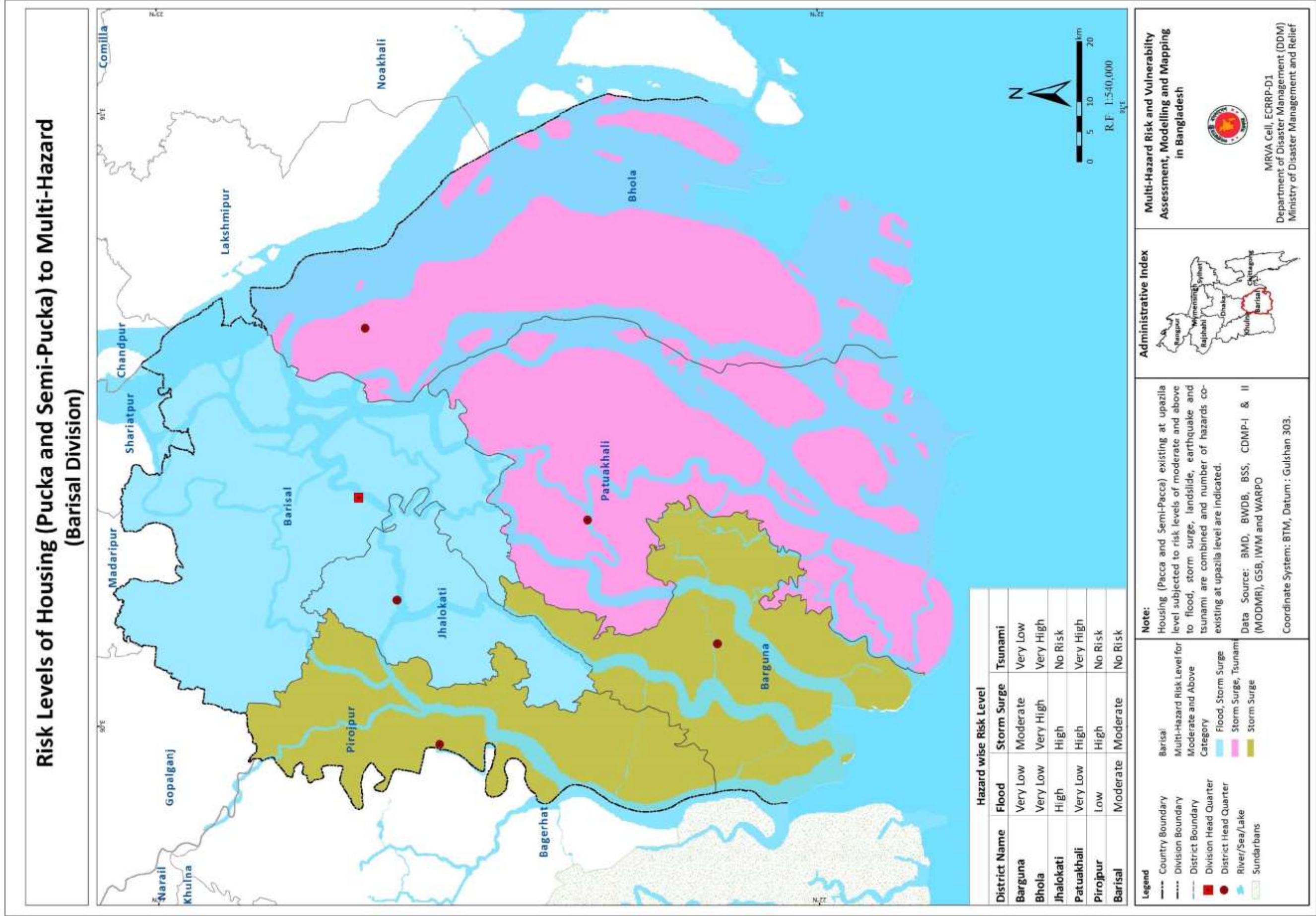


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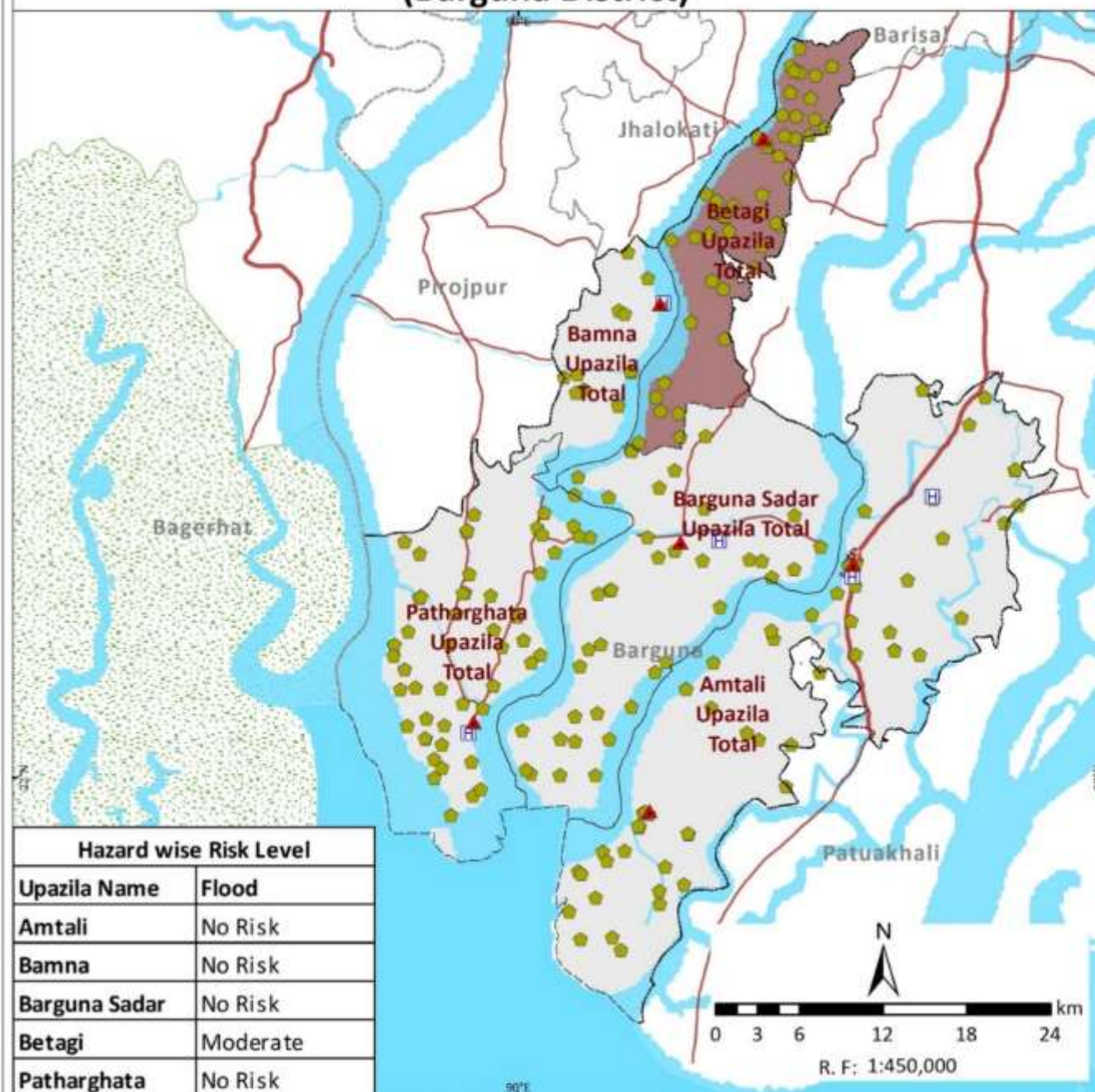
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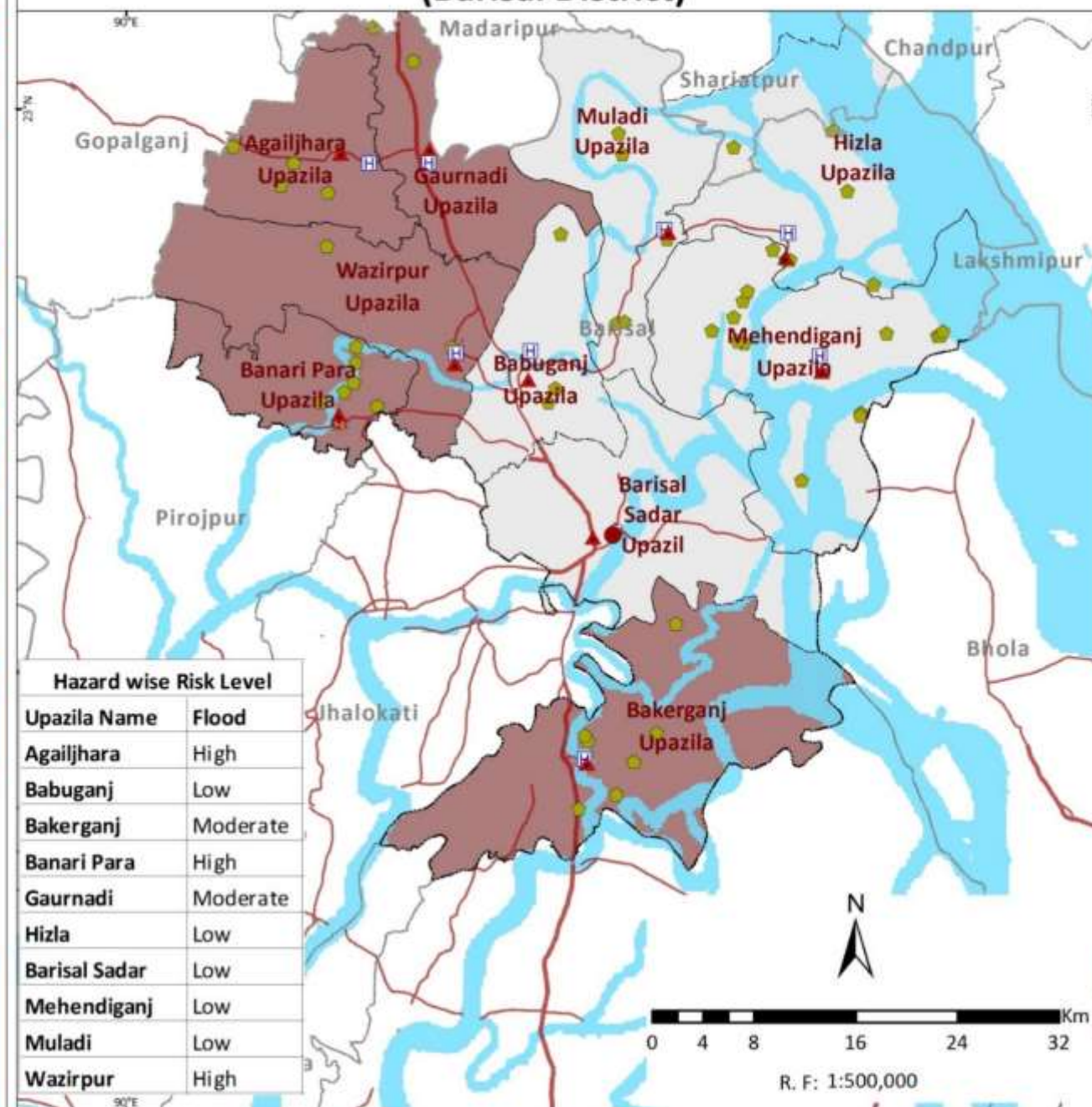




Risk Levels of Housing (Pucka and Semi-Pucka) to Multi hazard (Barguna District)



Risk Levels of Housing (Pucka and Semi-Pucka) to Multi hazard (Barisal District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila_Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
- Flood
- Risk level below moderate

Note

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

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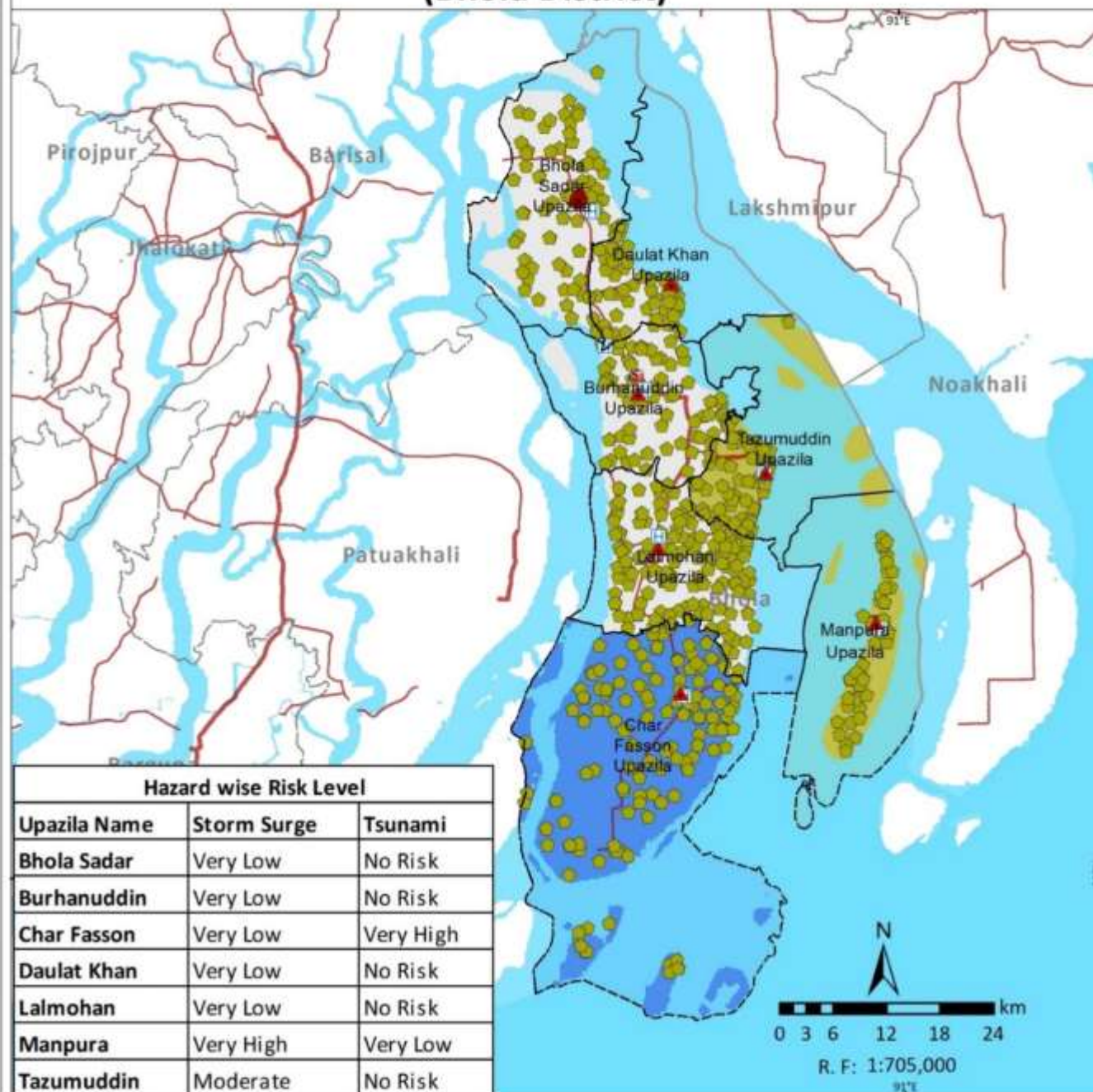
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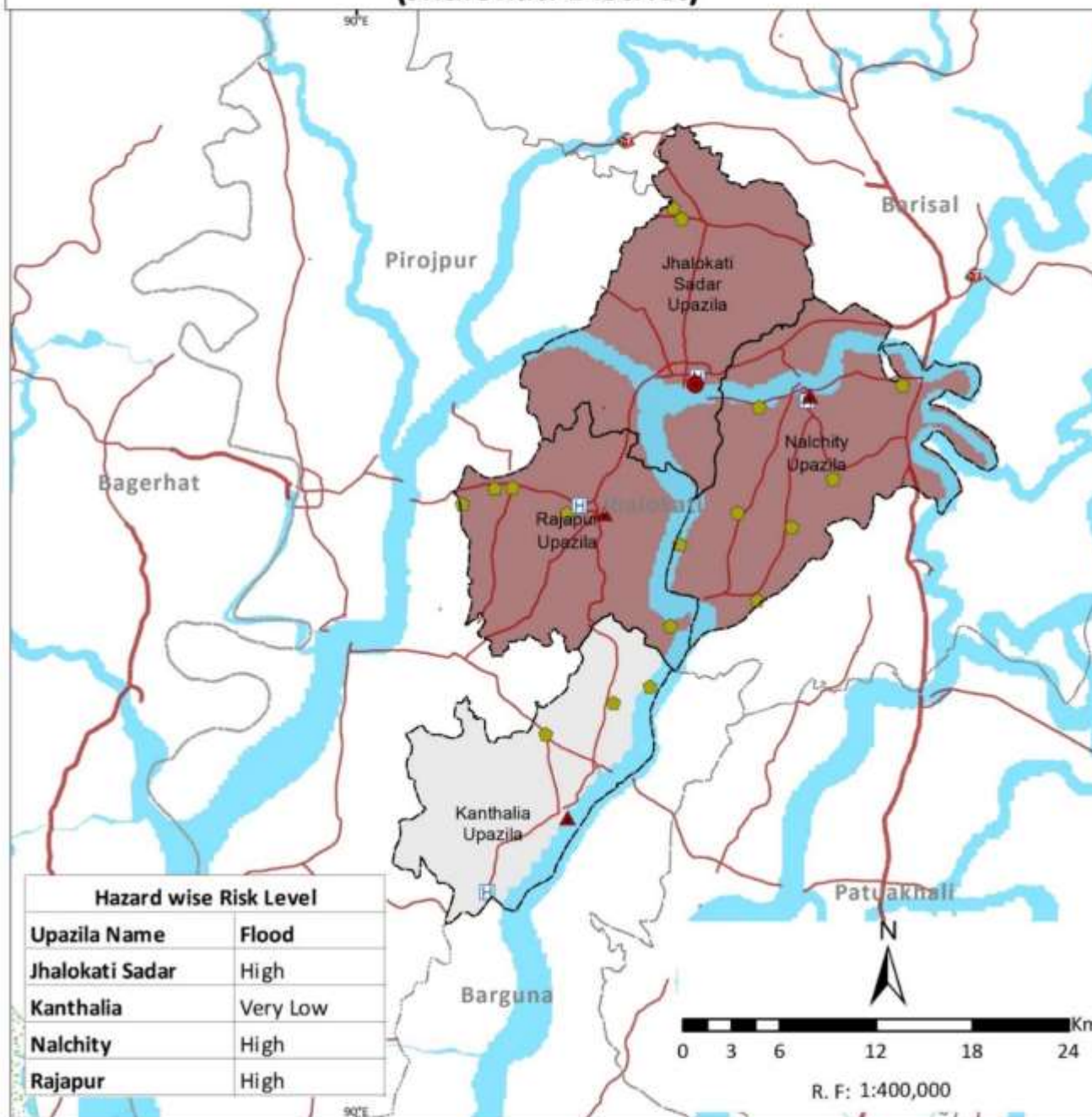
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Risk Levels of Housing (Pucka and Semi-Pucka) to Multi hazard (Bhola District)



Risk Levels of Housing (Pucka and Semi-Pucka) to Multi hazard (Jhalokati District)



- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Center
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate
- Flood, Storm Surge
- Flood
- Storm Surge
- Tsunami
- Risk level below moderate

Note

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

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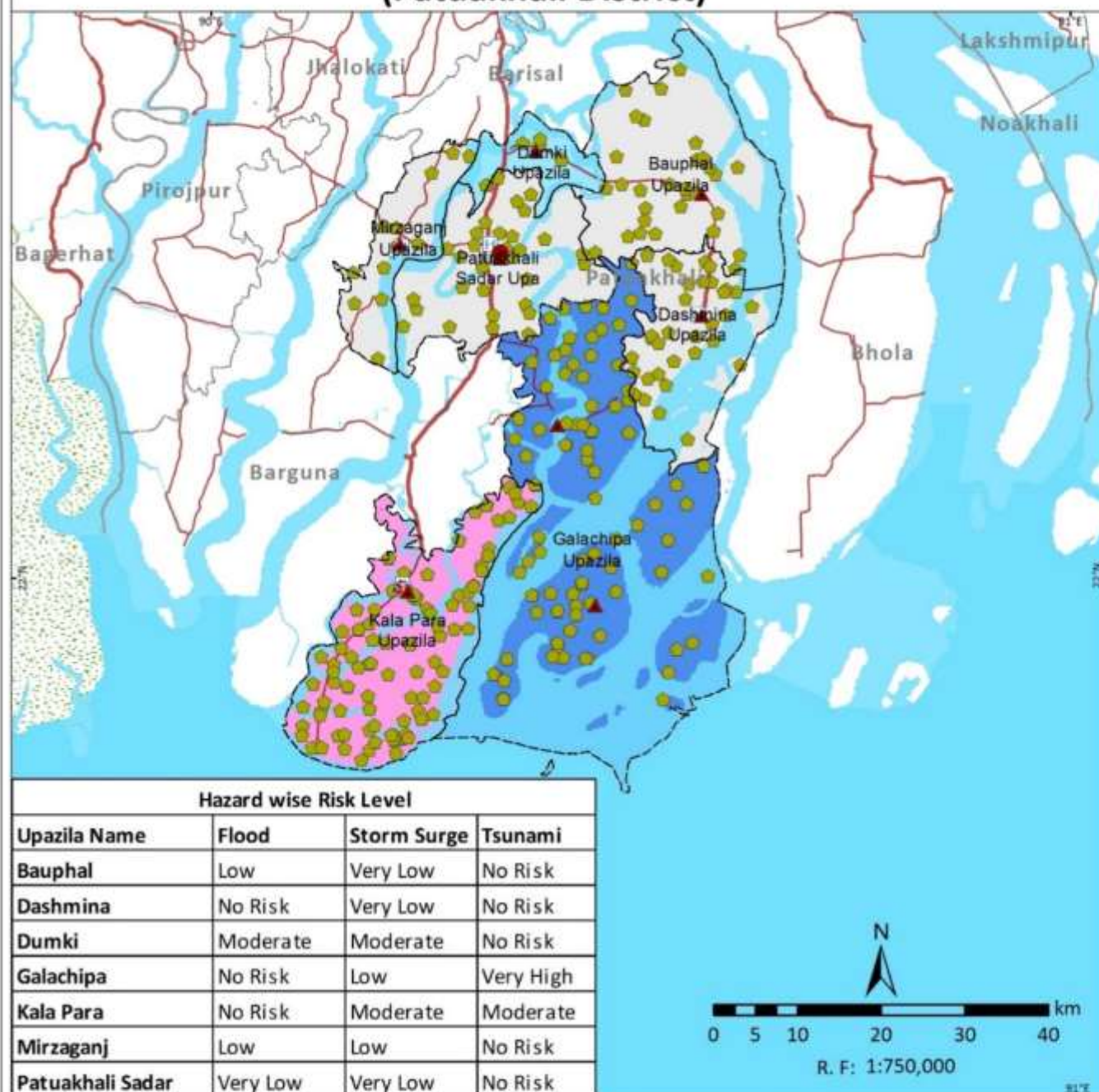
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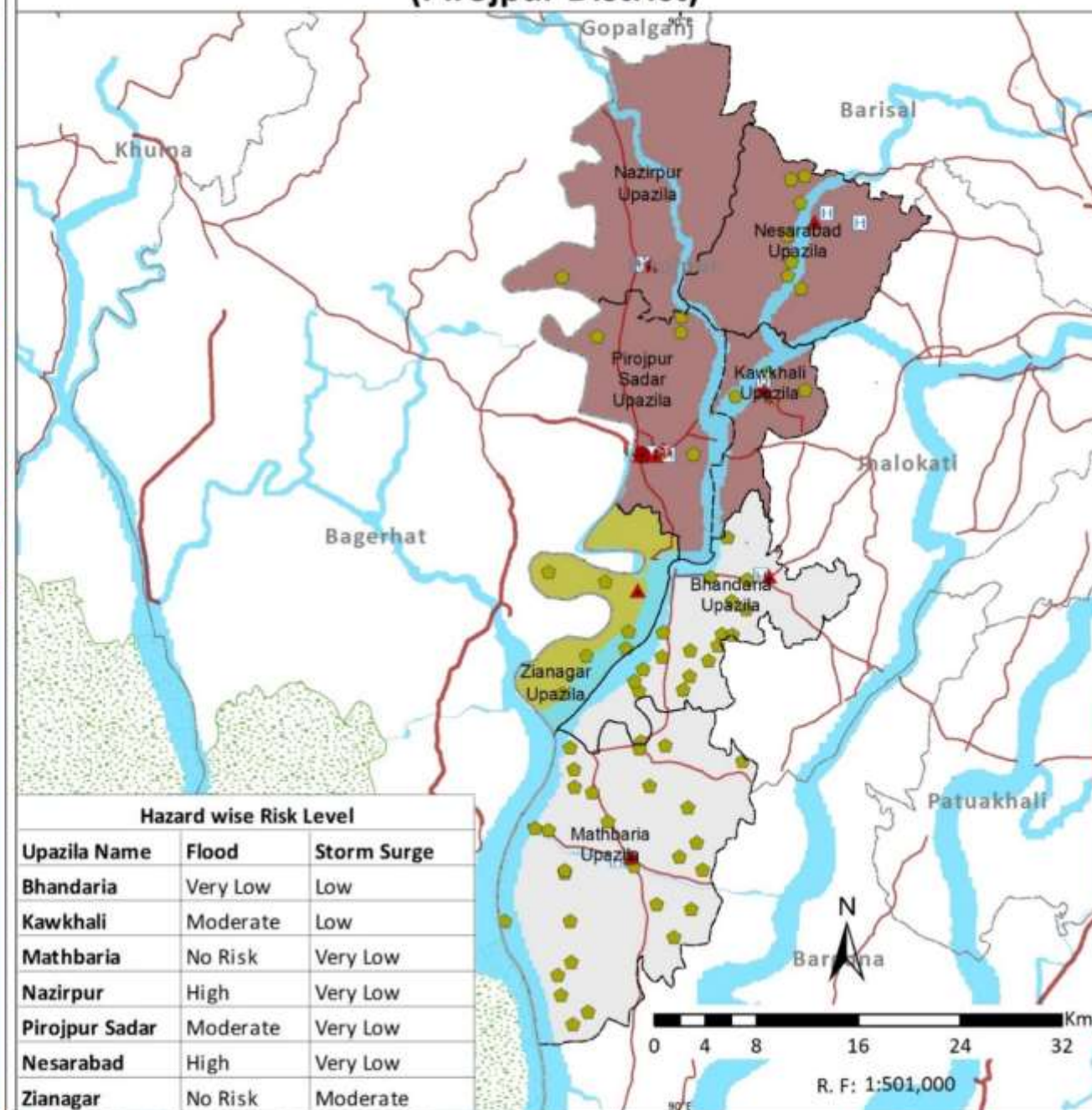
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Risk Levels of Housing (Pucka and Semi-Pucka) to Multi hazard (Patuakhali District)



Risk Levels of Housing (Pucka and Semi-Pucka) to Multi hazard (Pirojpur District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila_Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
- Flood, Storm Surge
- Storm Surge, Tsunami
- Flood
- Storm Surge
- Tsunami
- Risk level below moderate

Note

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

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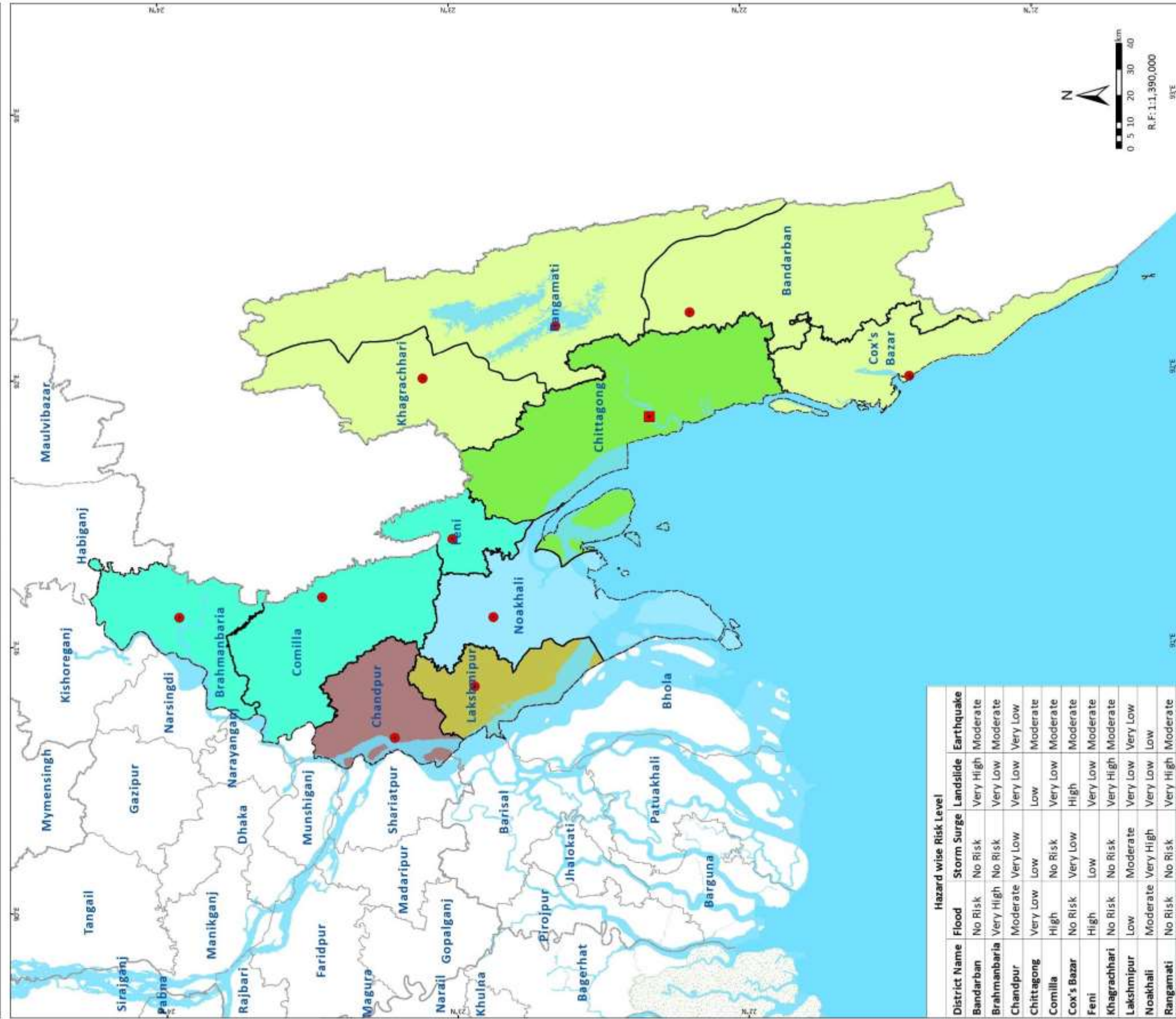


Multi-Hazard Risk and Vulnerability Assessment, Modelling and Mapping in Bangladesh



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Risk Levels of Housing (Pucka and Semi-Pucka) to Multi-Hazard (Chittagong Division)



Hazard wise Risk Level					
District Name	Flood	Storm Surge	Landslide	Earthquake	
Bandarban	No Risk	No Risk	Very High	Moderate	
Brahmanbaria	Very High	No Risk	Very Low	Moderate	
Chandpur	Moderate	Very Low	Very Low	Very Low	
Chittagong	Very Low	Low	Low	Moderate	
Comilla	High	No Risk	Very Low	Moderate	
Cox's Bazar	No Risk	Very Low	High	Moderate	
Feni	High	Low	Very Low	Moderate	
Khagrachhari	No Risk	No Risk	Very High	Moderate	
Lakshimpur	Low	Moderate	Very Low	Very Low	
Noakhali	Moderate	Very High	Very Low	Low	
Rangamati	No Risk	No Risk	Very High	Moderate	

Legend

- Country Boundary
- Division Boundary
- District Boundary
- Division Head Quarter
- District Head Quarter
- River/Sea/Lake
- Sundarbans

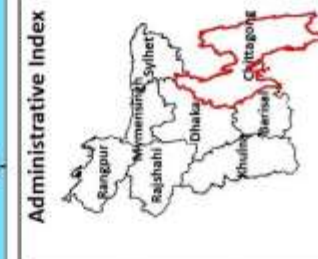
Multi-Hazard Risk Level for Moderate and Above Category

- Landslide, Earthquake
- Flood, Earthquake
- Flood, Storm Surge
- Flood
- Storm Surge
- Earthquake

Note:
Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.



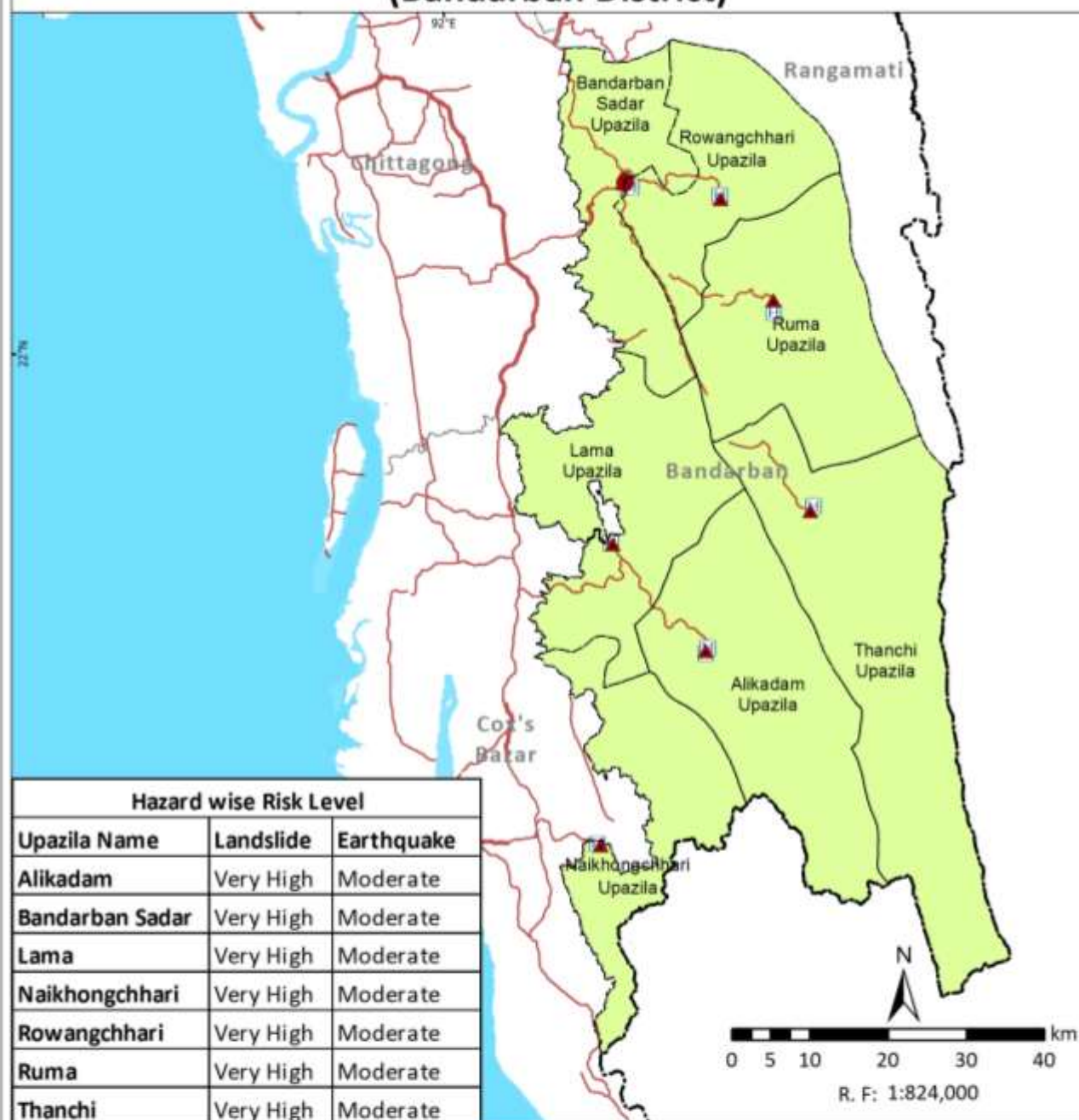
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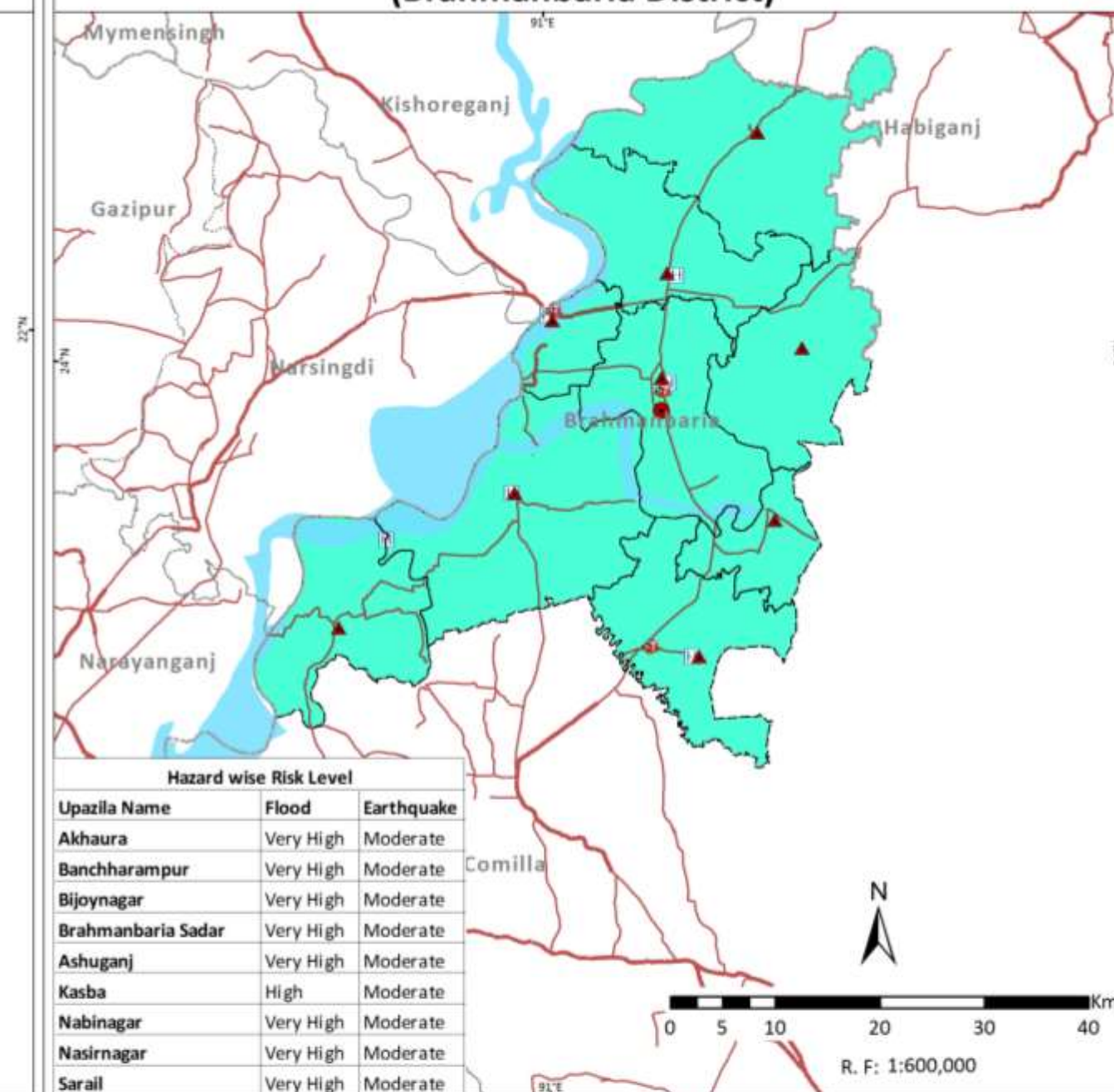




Risk Levels of Housing (Pucka and Semi-Pucka) to Multi hazard (Bandarban District)



Risk Levels of Housing (Pucka and Semi-Pucka) to Multi hazard (Brahmanbaria District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
- Landslide, Earthquake
- Flood, Earthquake

Note

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

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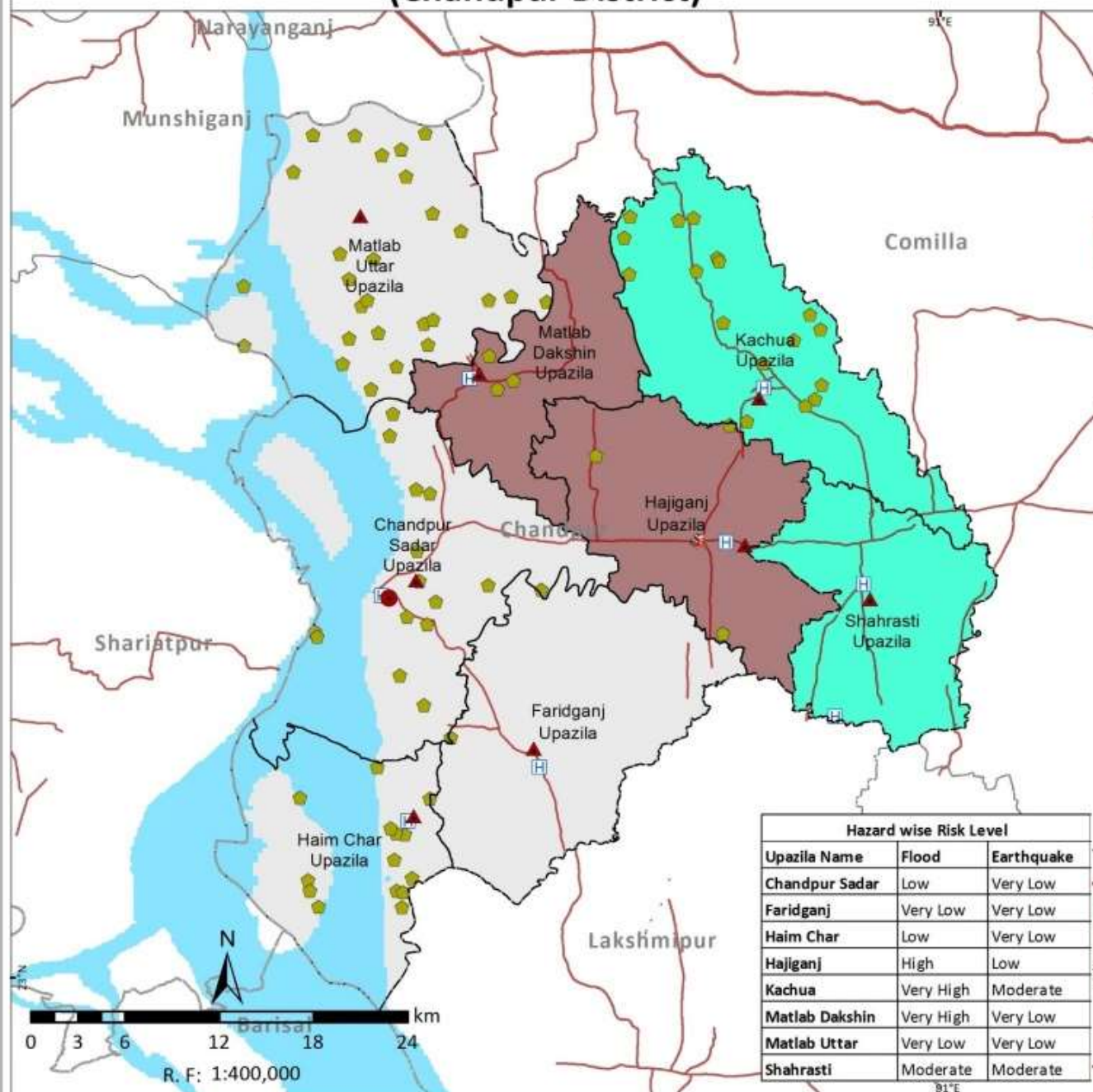
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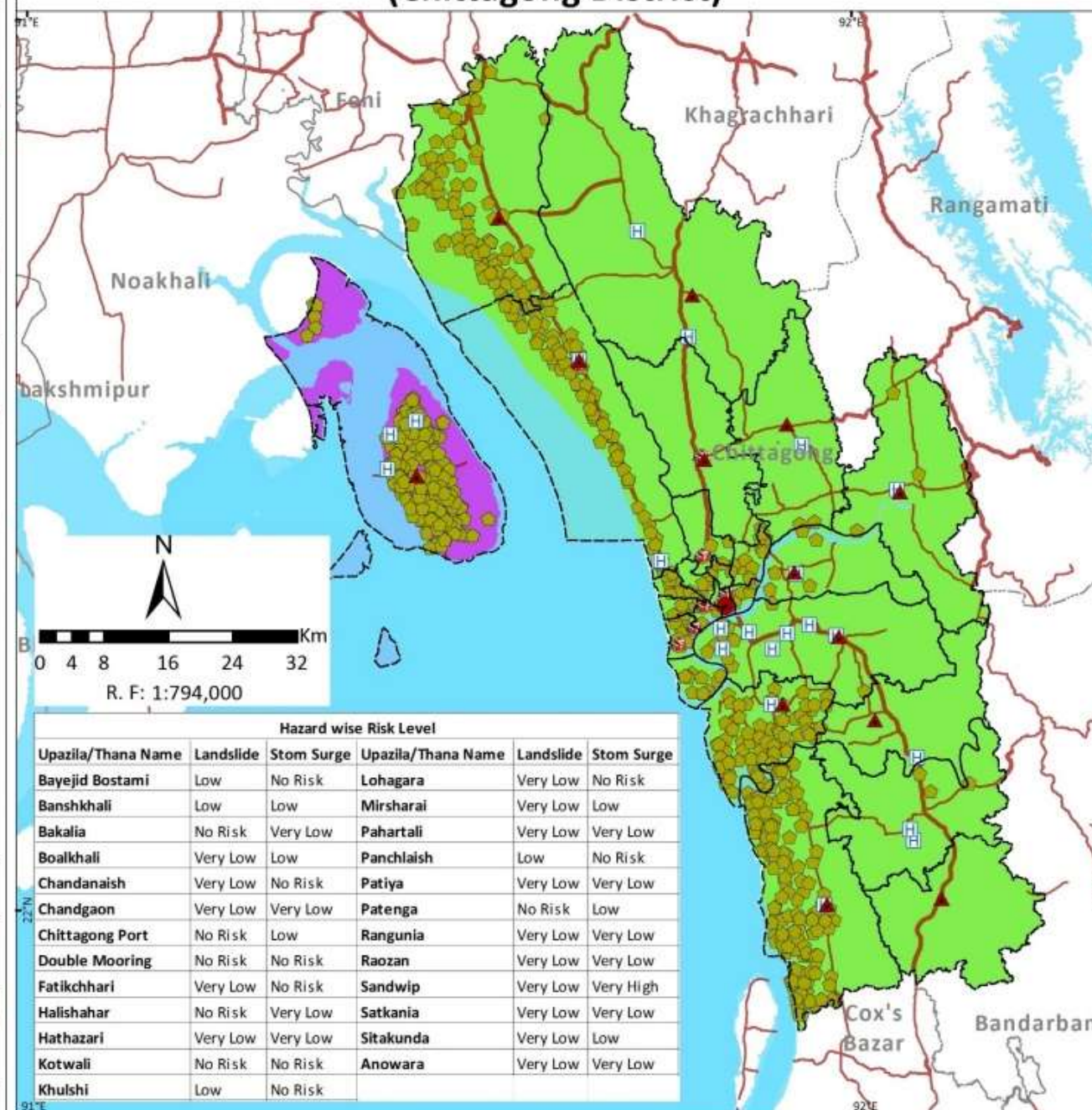
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Risk Levels of Housing (Pucka and Semi-Pucka) to Multi hazard (Chandpur District)



Risk Levels of Housing (Pucka and Semi-Pucka) to Multi hazard (Chittagong District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
- Flood, Earthquake
- Storm Surge, Earthquake
- Flood
- Earthquake
- Risk level below moderate

Note

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

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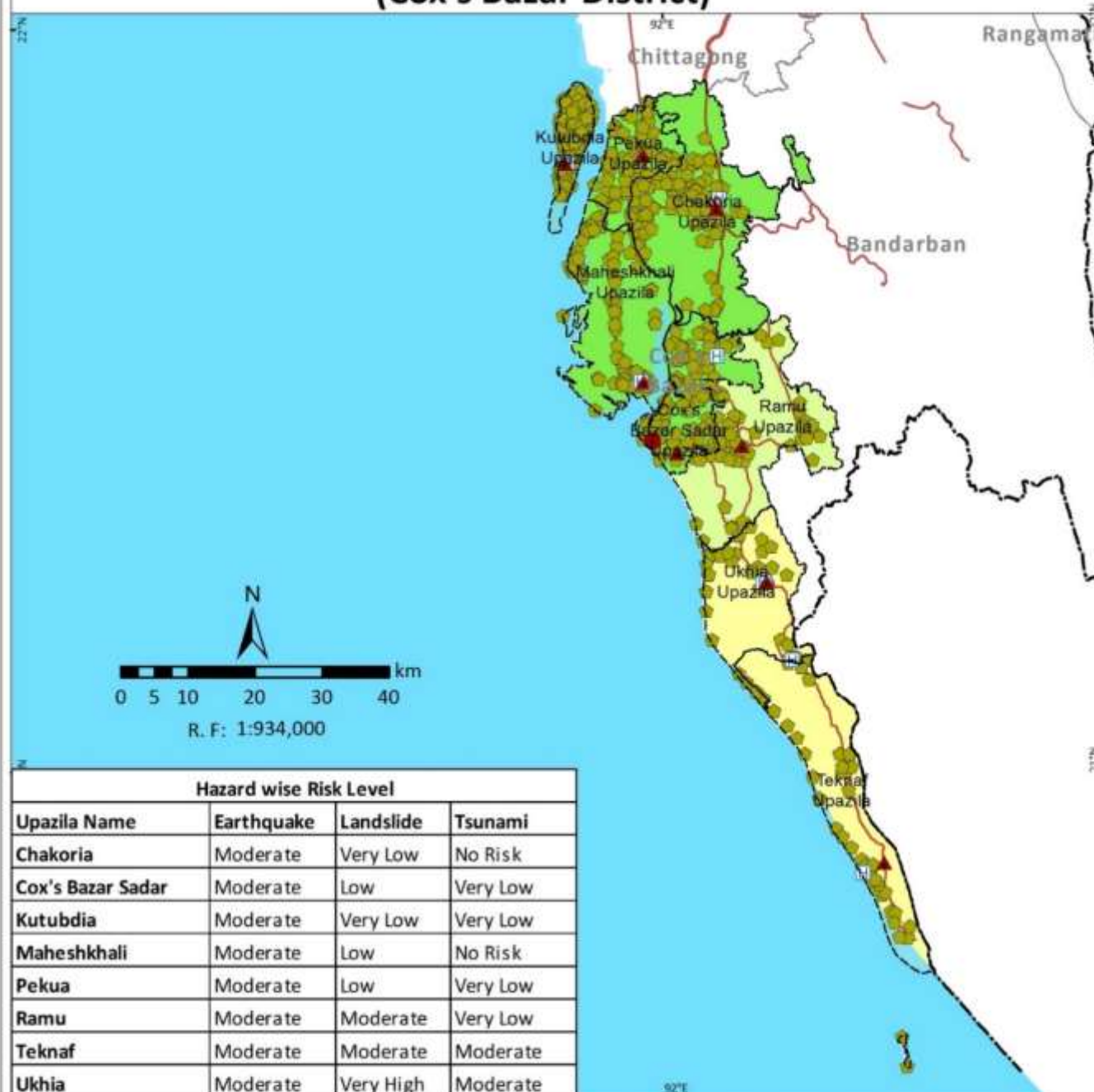
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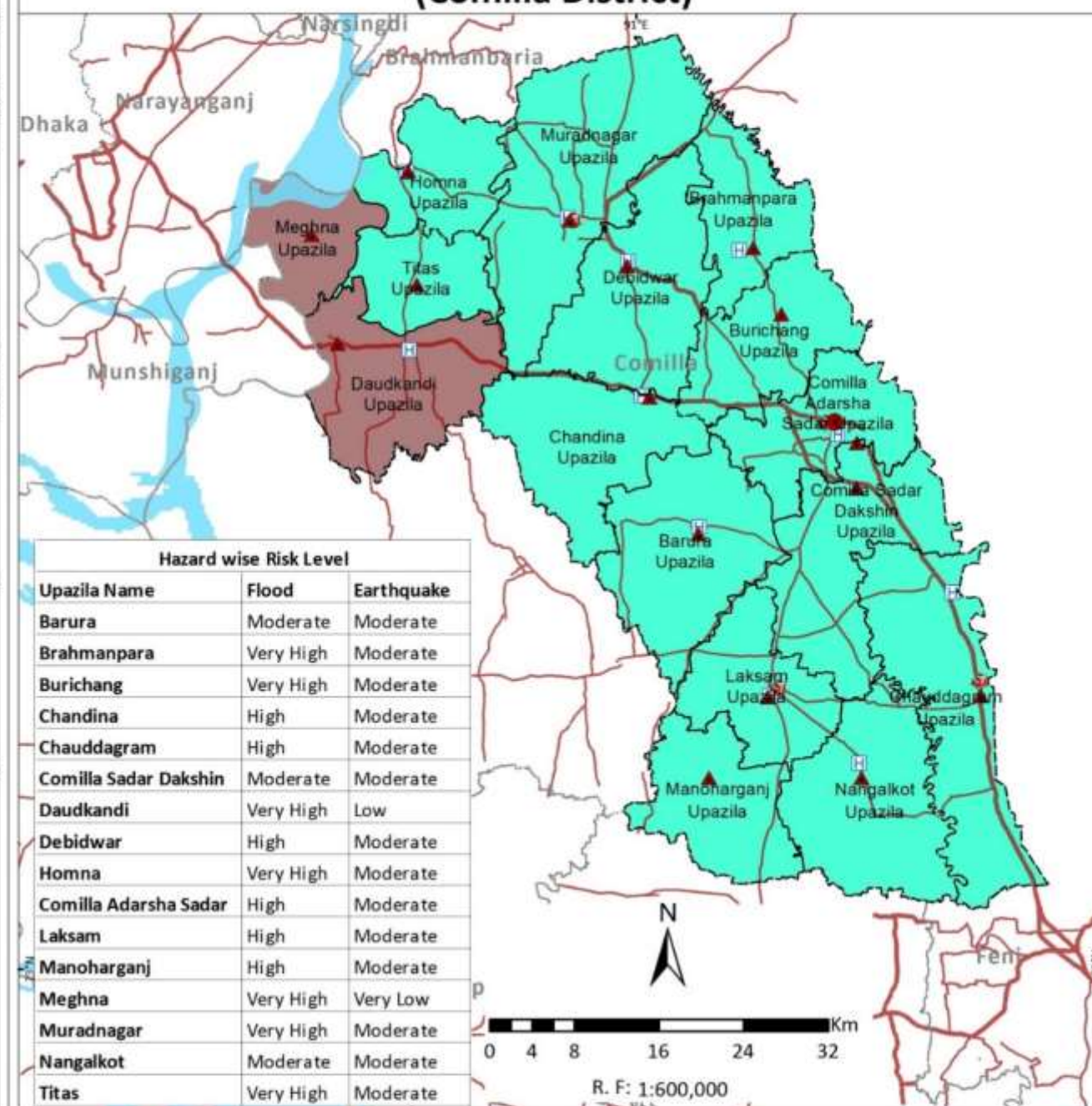
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Risk Levels of Housing (Pucka and Semi-Pucka) to Multi hazard (Cox's Bazar District)



Risk Levels of Housing (Pucka and Semi-Pucka) to Multi hazard (Comilla District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
- Landslide, Earthquake, Tsunami
- Landslide, Earthquake
- Flood, Earthquake
- Flood
- Earthquake

Note

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

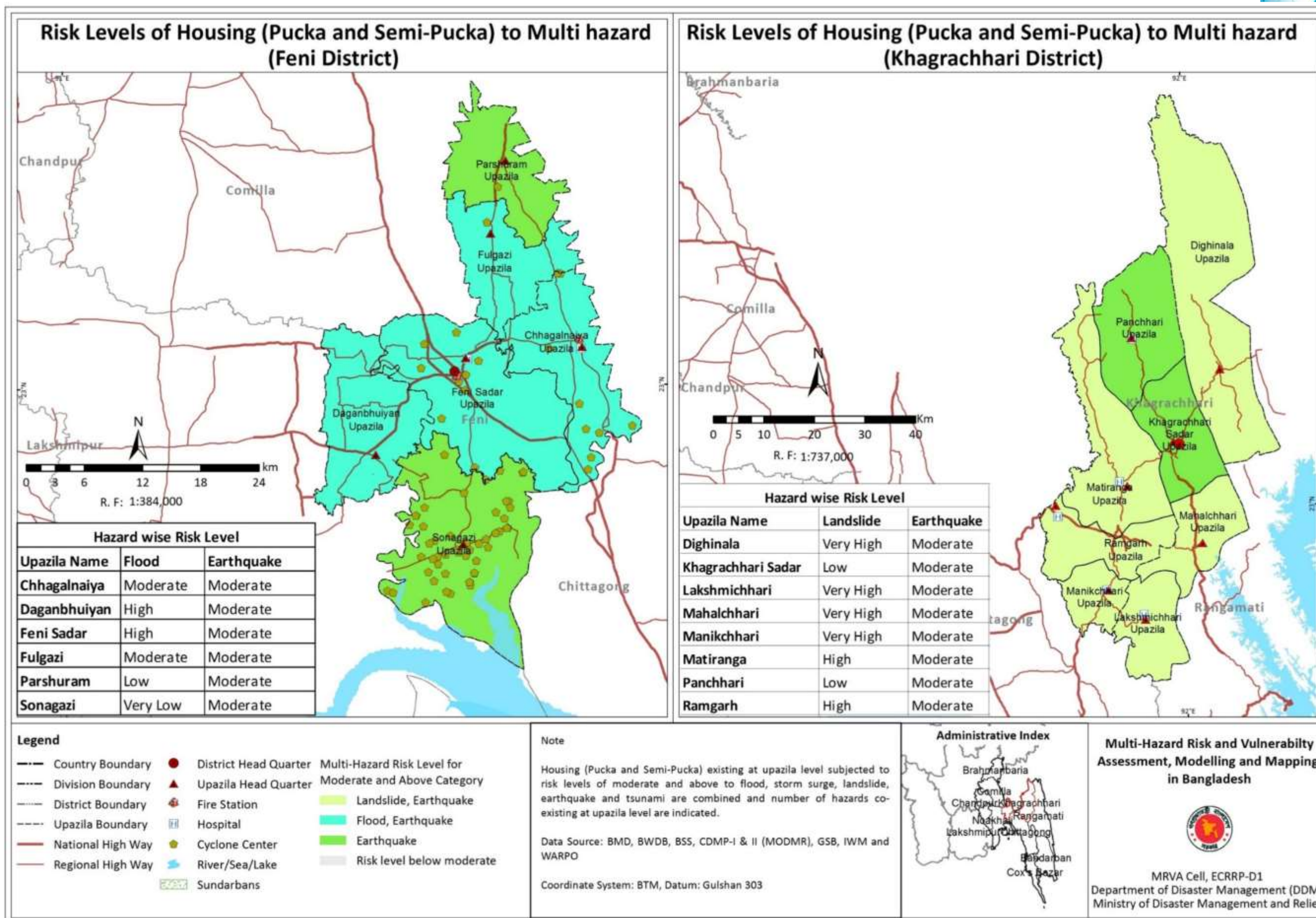
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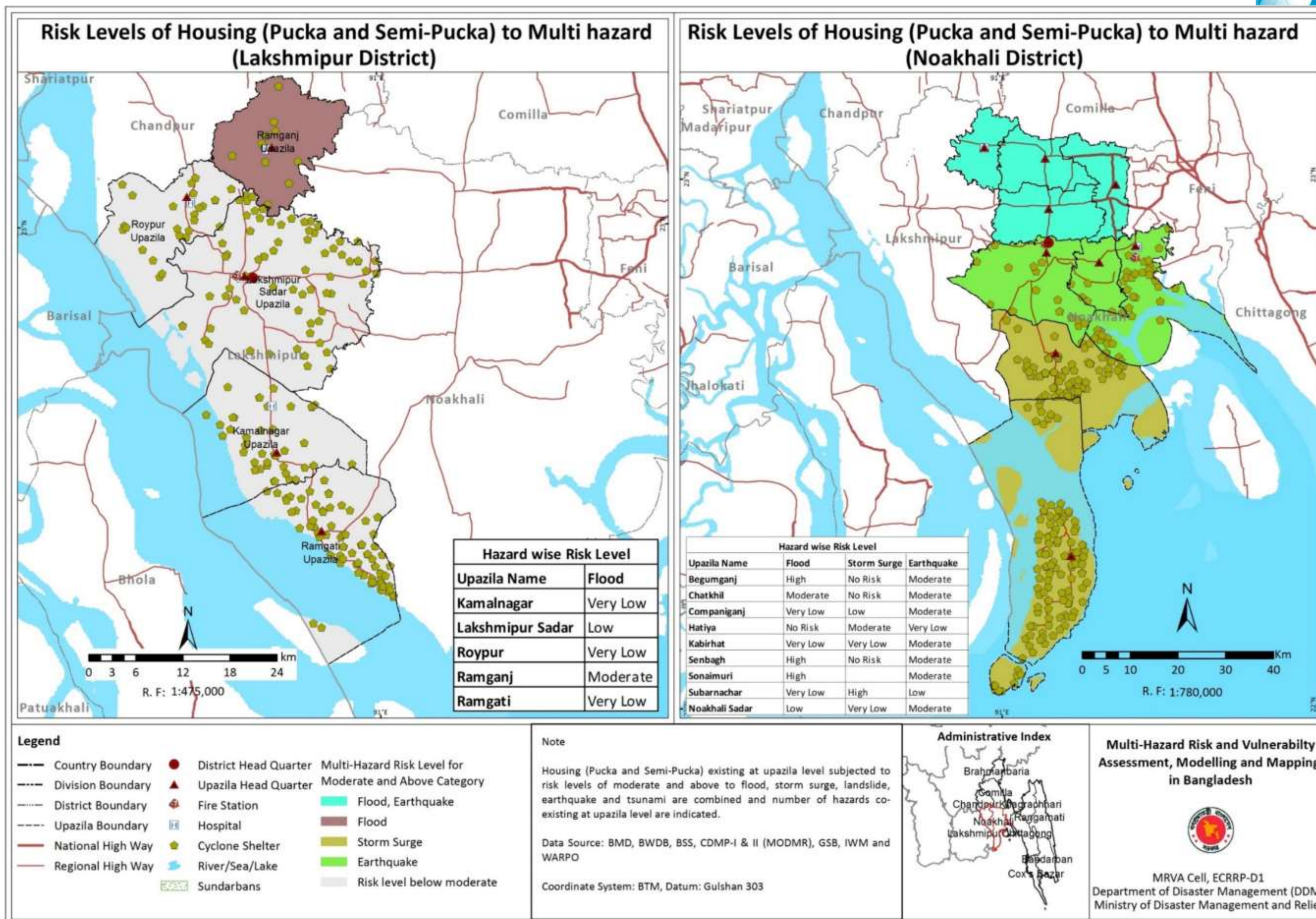


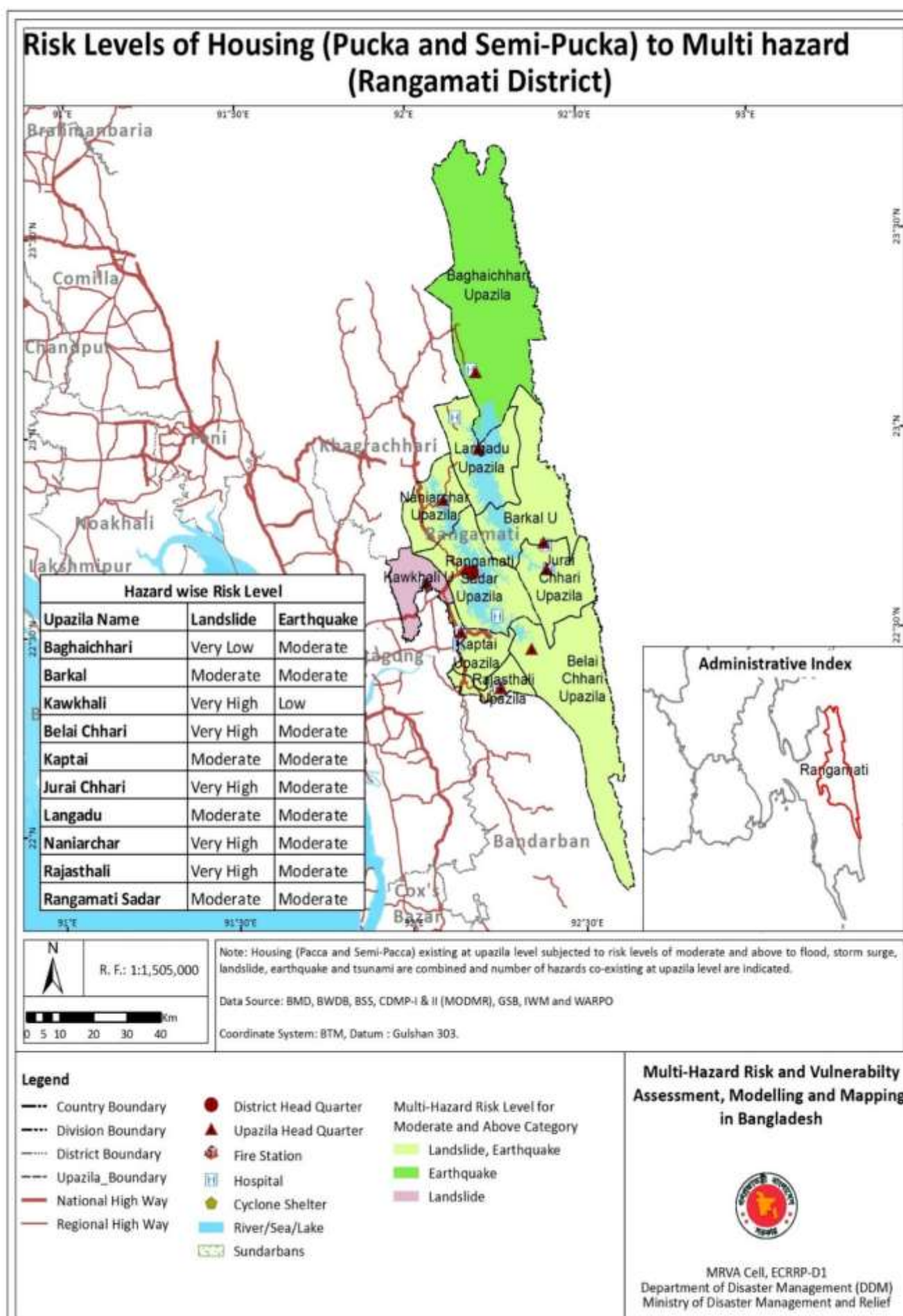
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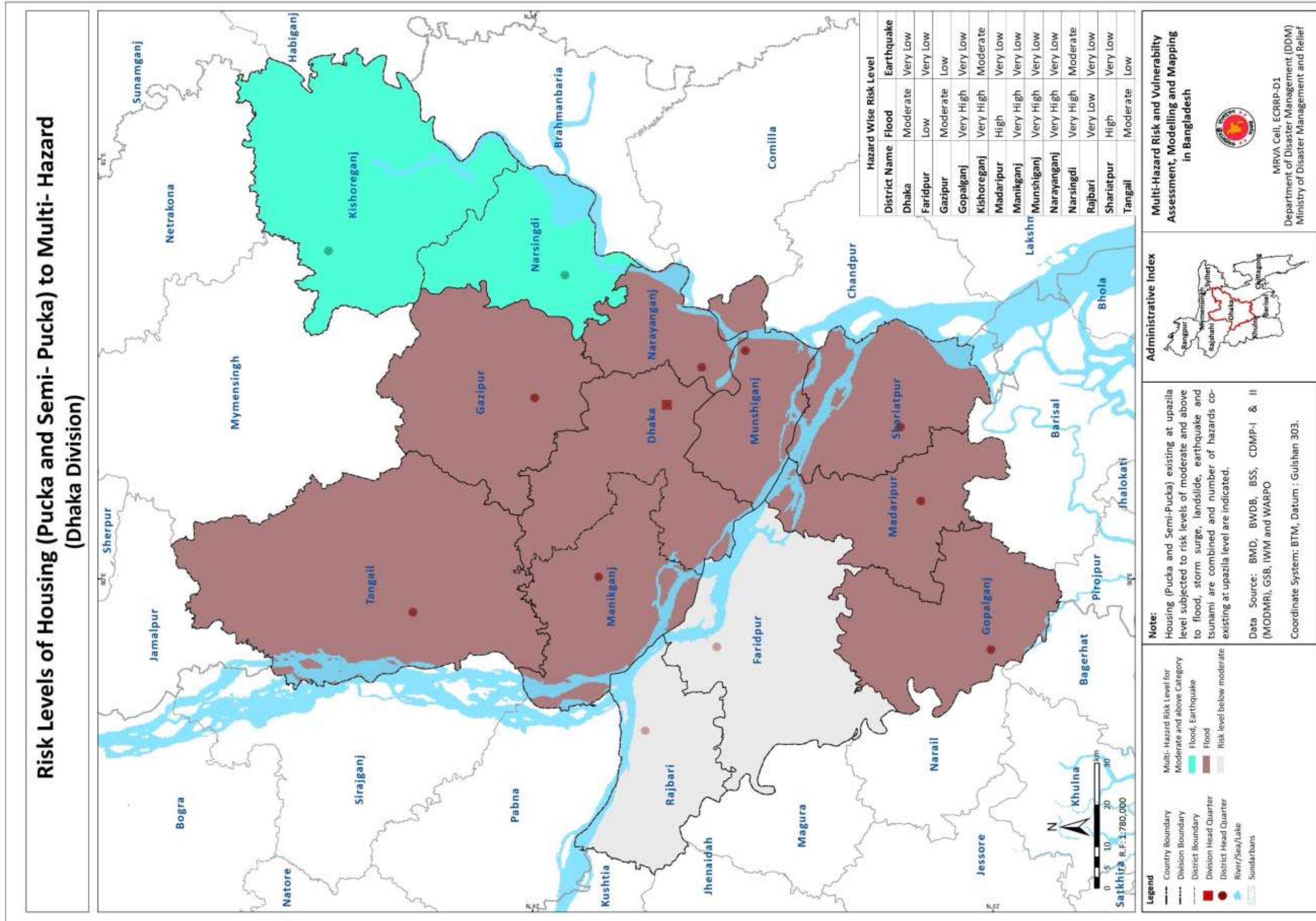


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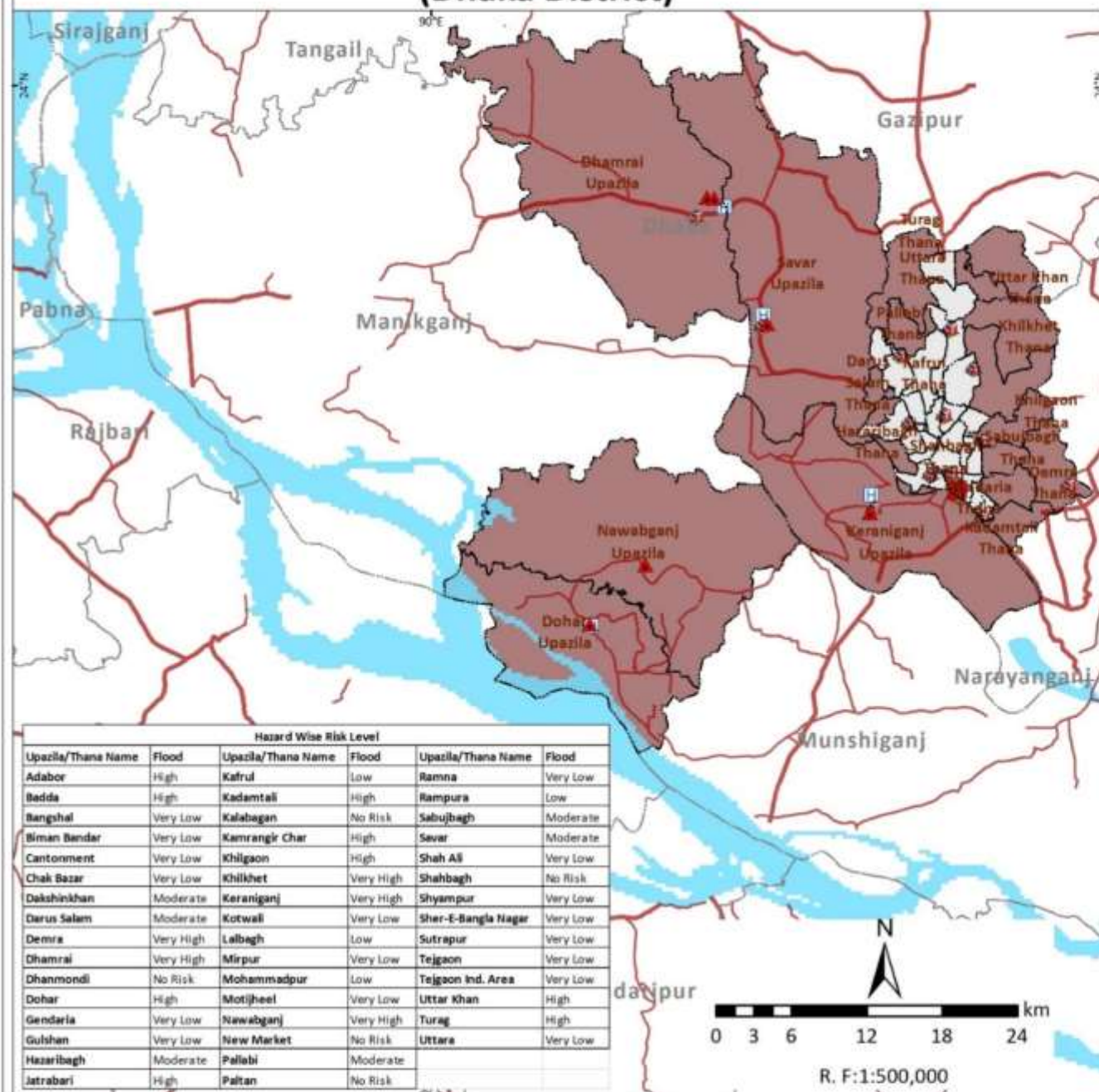








Risk Levels of Housing (Pucka and Semi- Pucka) to Multi- Hazard (Dhaka District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila_Boundary
- National High Way
- Regional High Way
- Division Head Quarter
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level of Housing for Moderate and above Category
- Flood
- Risk level below moderate

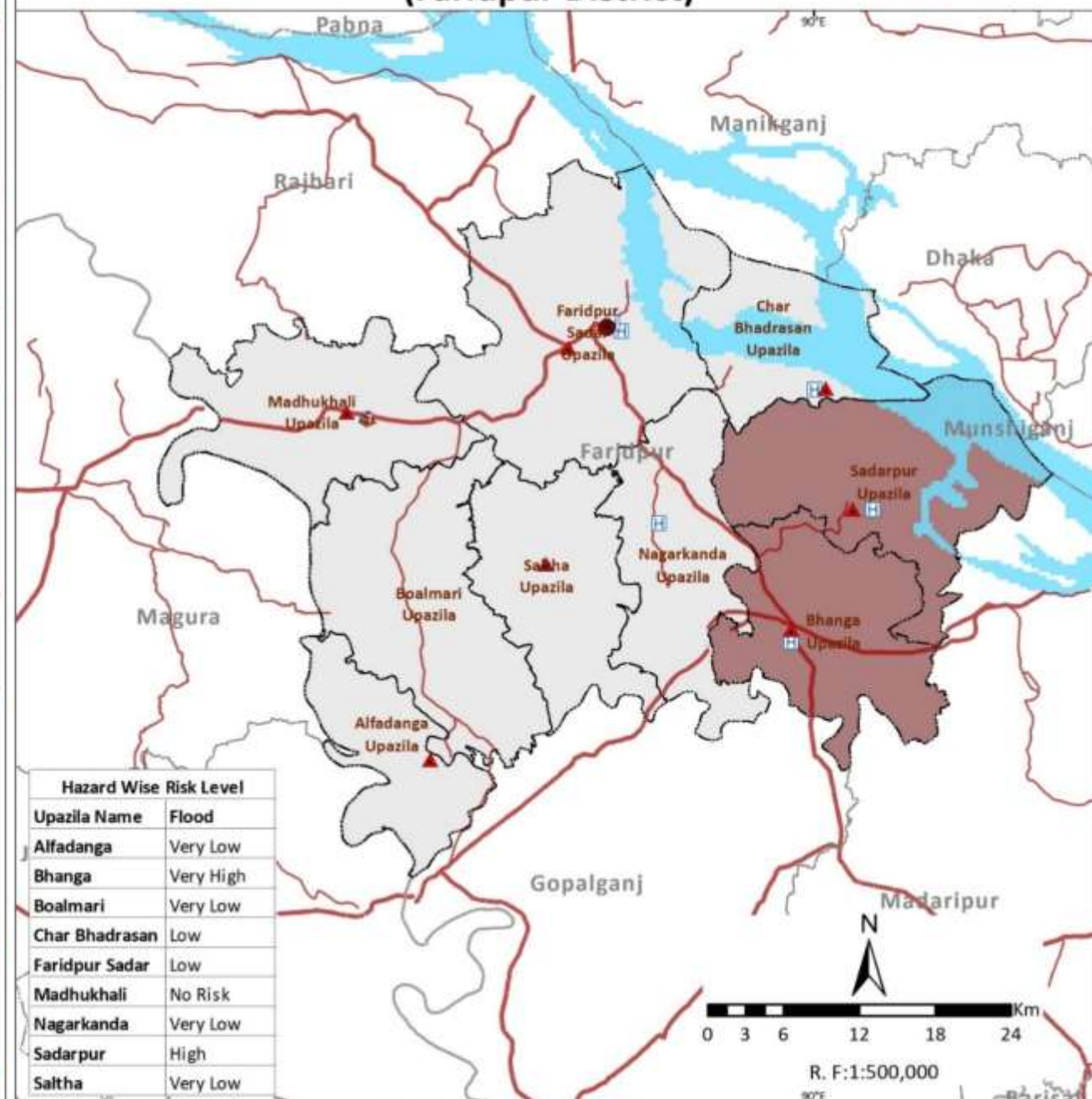
Note:

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

Risk Levels of Housing (Pucka and Semi- Pucka) to Multi- Hazard (Faridpur District)



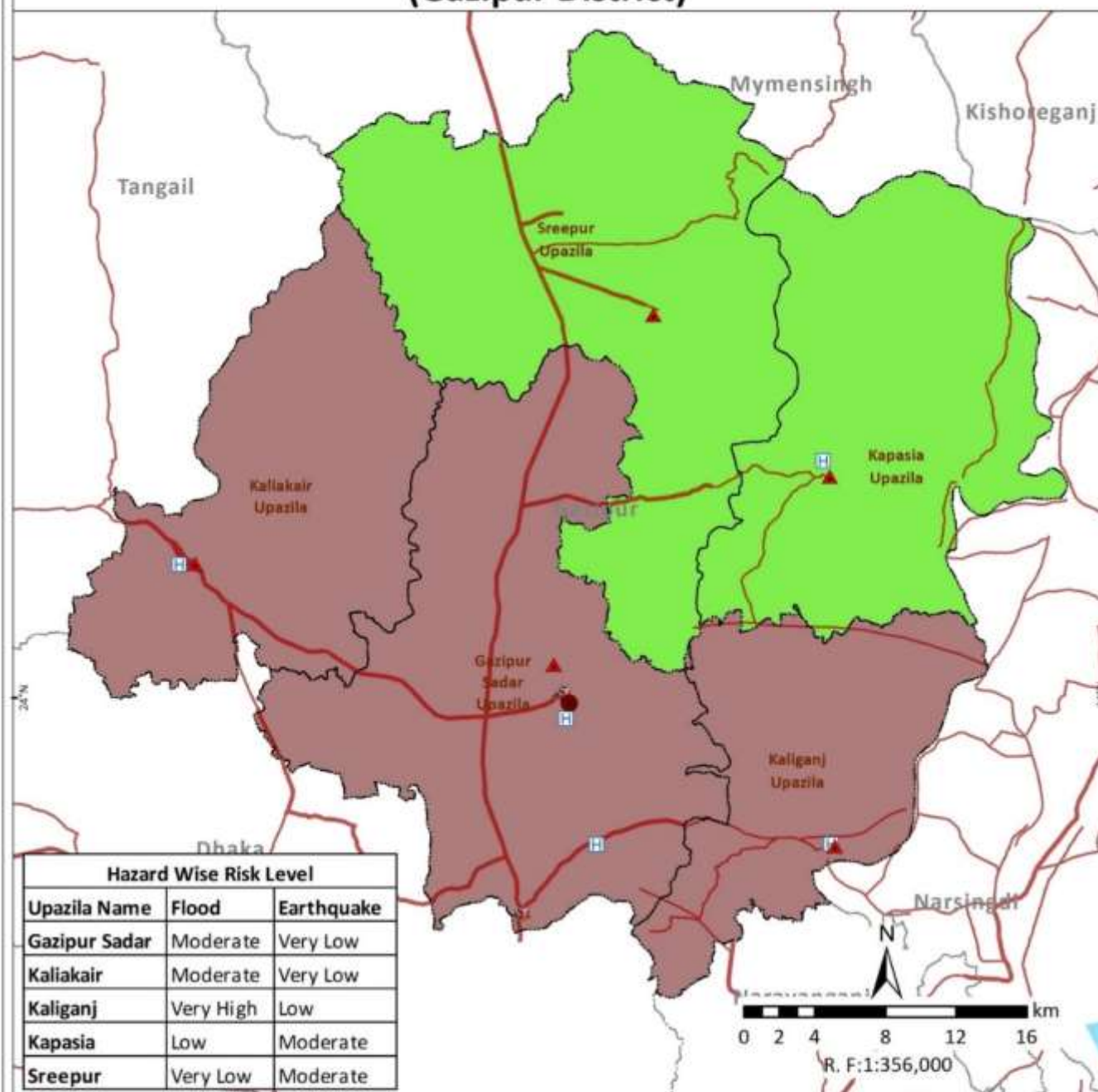
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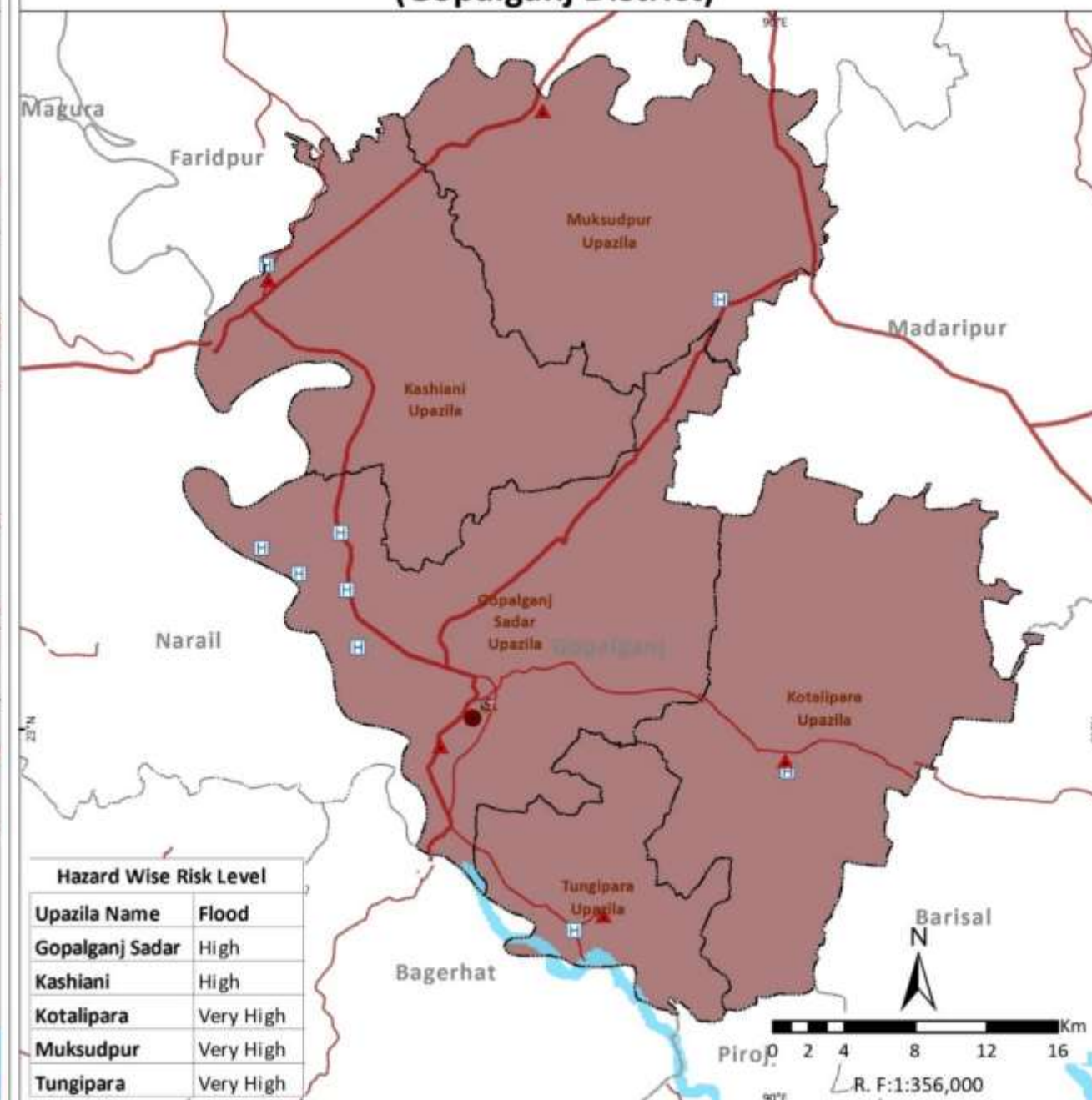
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Risk Levels of Housing (Pucka and Semi- Pucka) to Multi- Hazard (Gazipur District)



Risk Levels of Housing (Pucka and Semi- Pucka) to Multi- Hazard (Gopalganj District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level of Housing for Moderate and above Category
- Flood
- Earthquake

Note:

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.



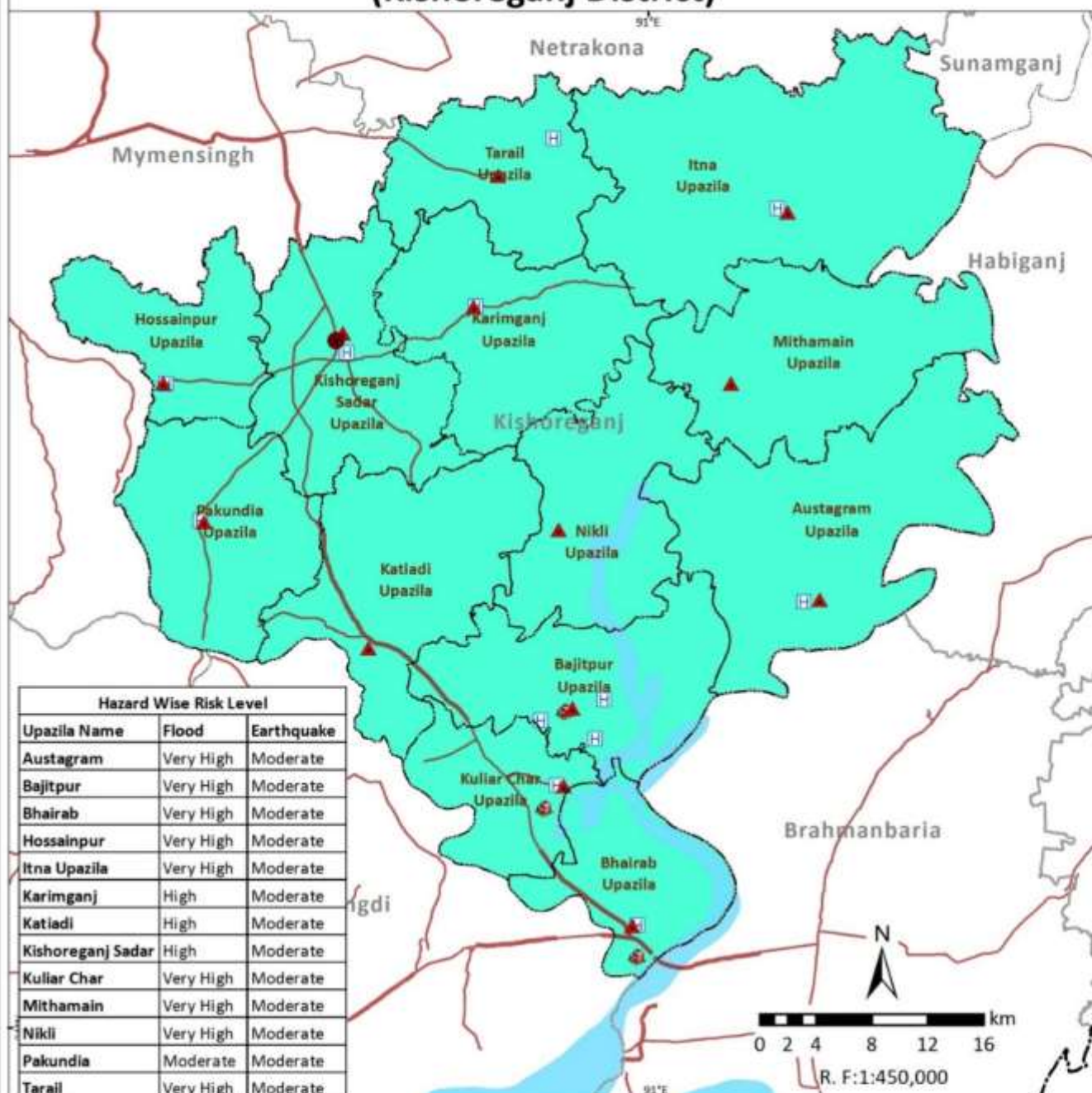
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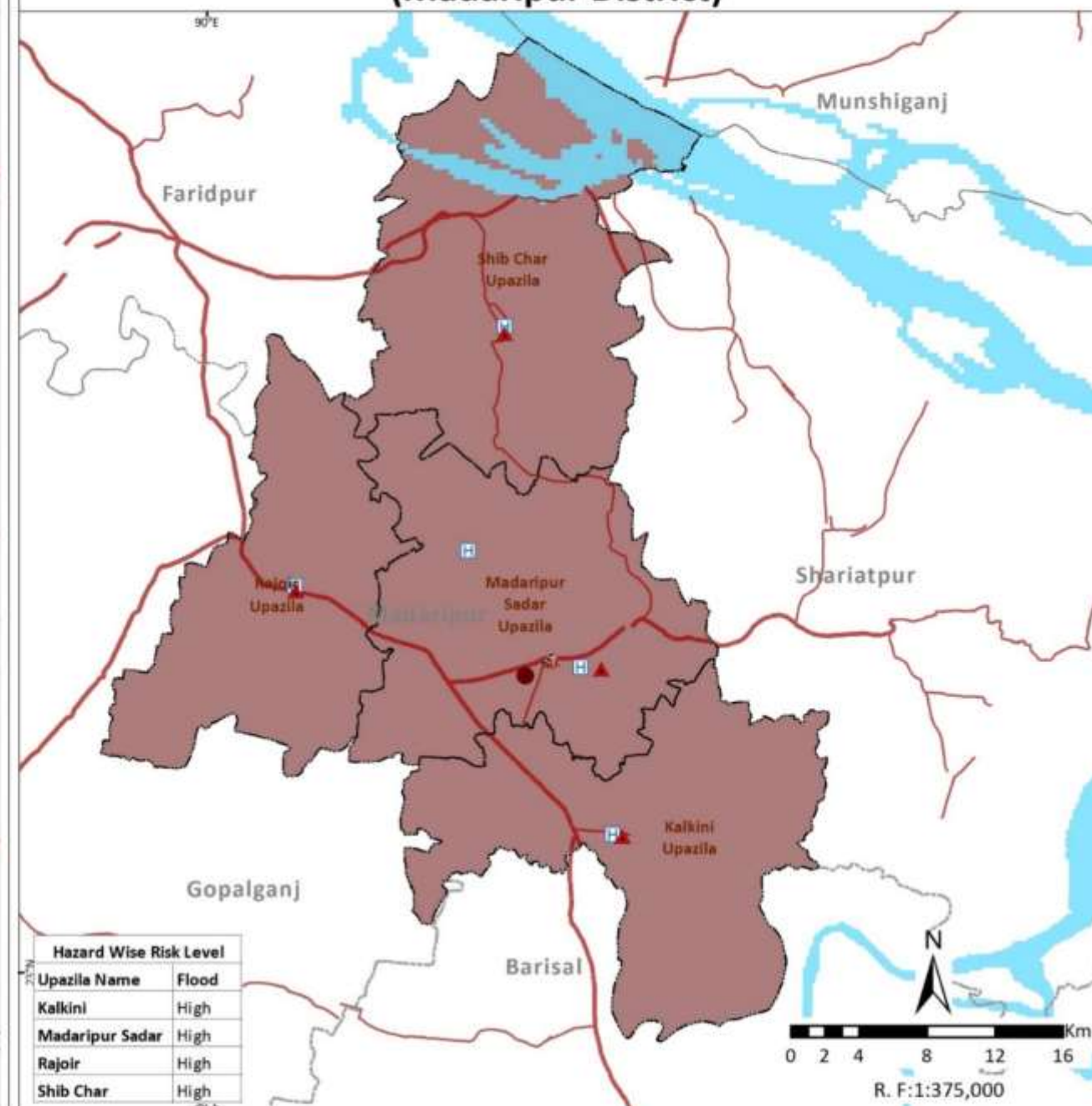
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Risk Levels of Housing (Pucka and Semi- Pucka) to Multi- Hazard (Kishoreganj District)



Risk Levels of Housing (Pucka and Semi- Pucka) to Multi- Hazard (Madaripur District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level of Housing for Moderate and above Category
- Flood, Earthquake
- Flood

Note:

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.



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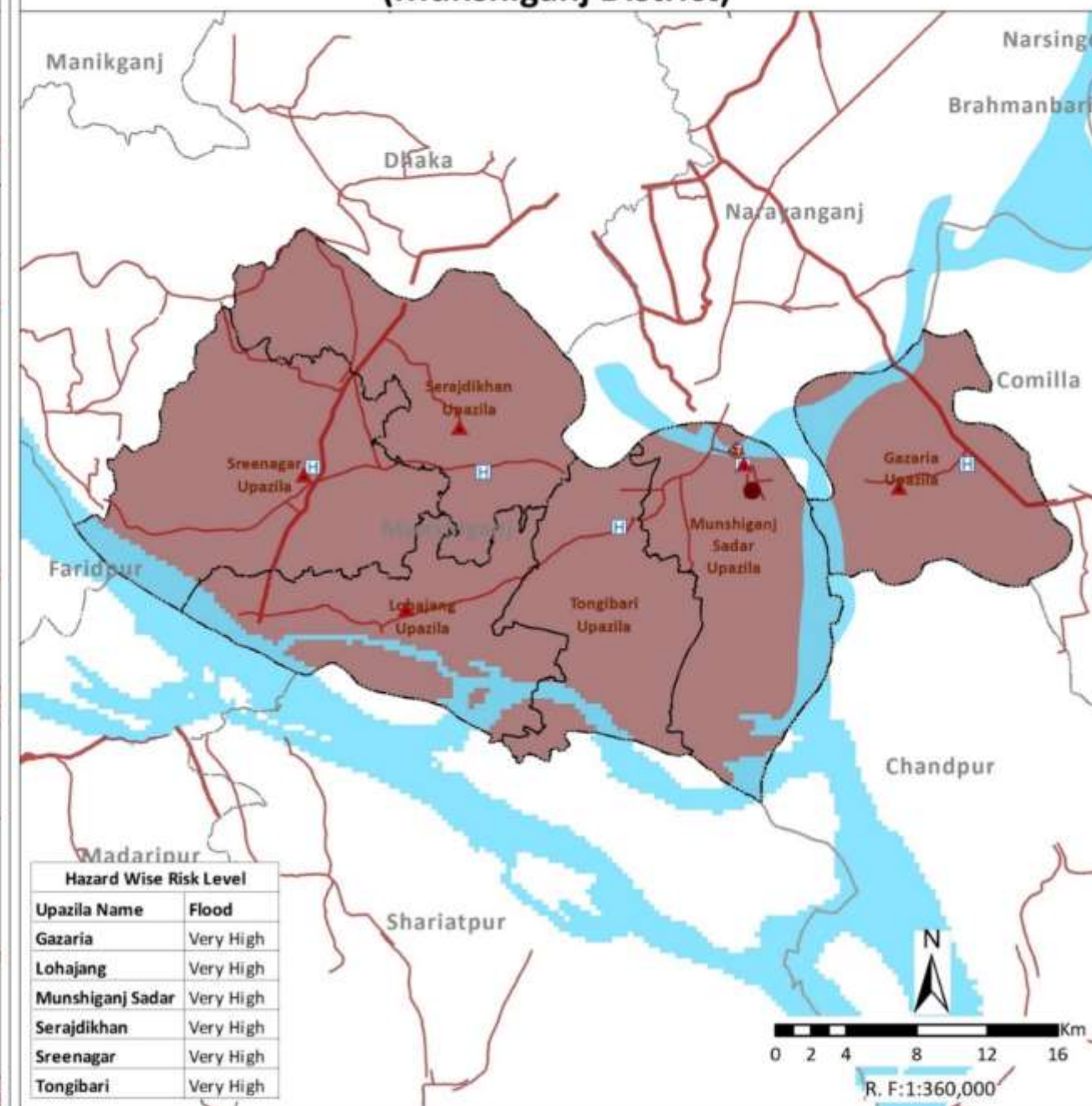
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Risk Levels of Housing (Pucka and Semi- Pucka) to Multi- Hazard (Manikganj District)



Risk Levels of Housing (Pucka and Semi- Pucka) to Multi- Hazard (Munshiganj District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level of Housing for Moderate and above Category
- Flood

Note:

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.



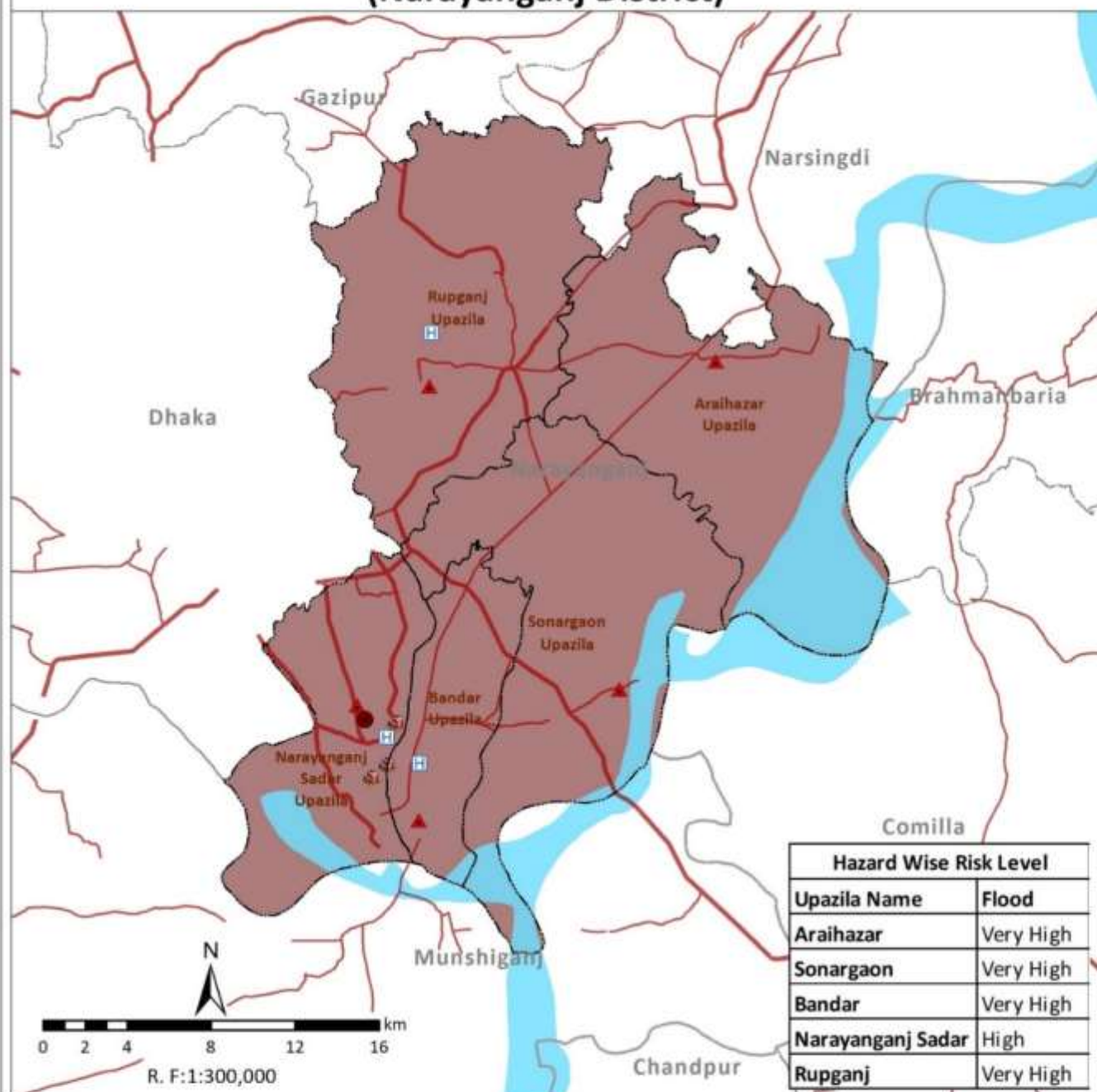
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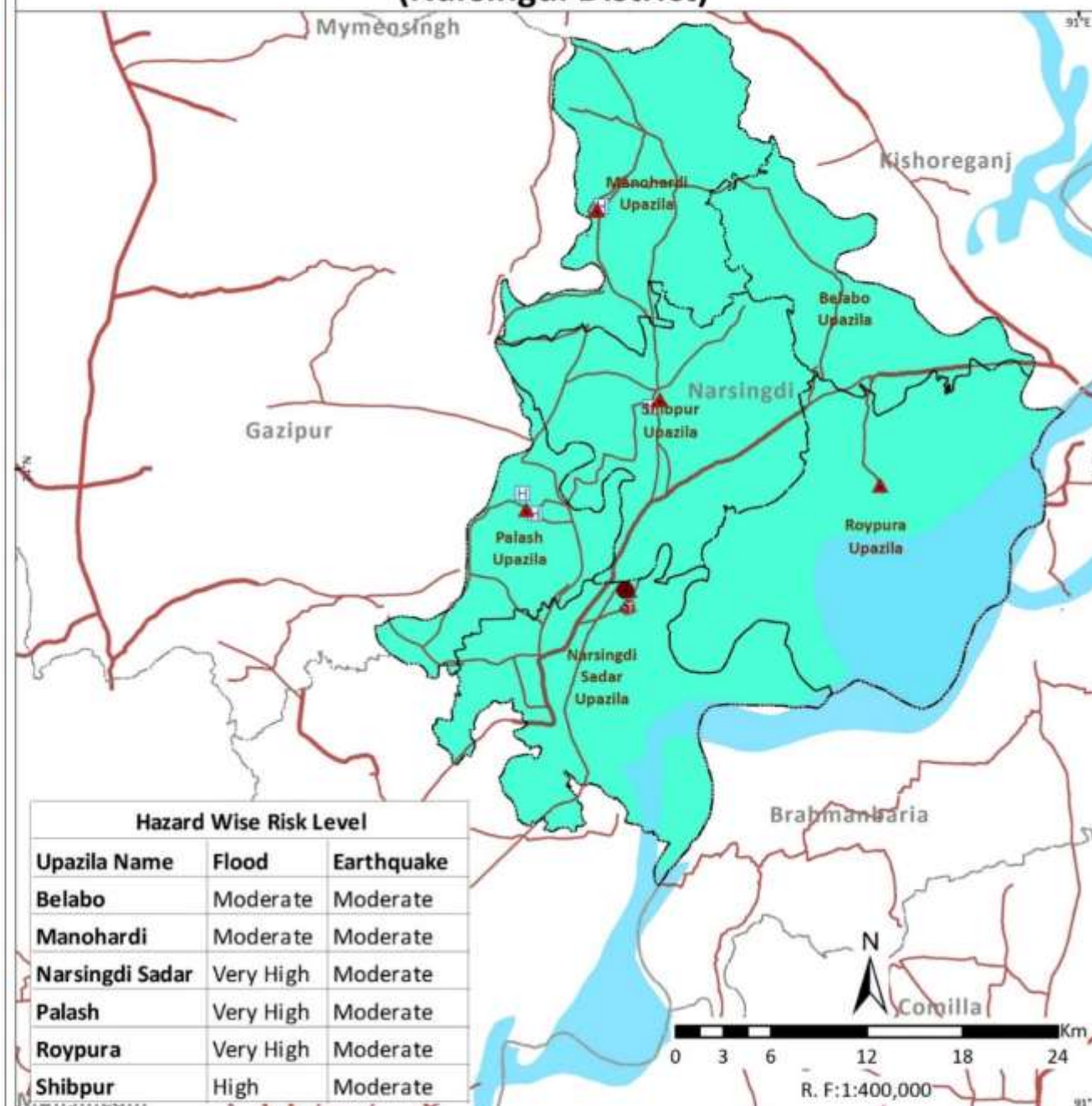
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Risk Levels of Housing (Pucka and Semi- Pucka) to Multi- Hazard (Narayanganj District)



Risk Levels of Housing (Pucka and Semi- Pucka) to Multi- Hazard (Narsingdi District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level of Housing for Moderate and above Category
- Flood, Earthquake
- Flood

Note:

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.



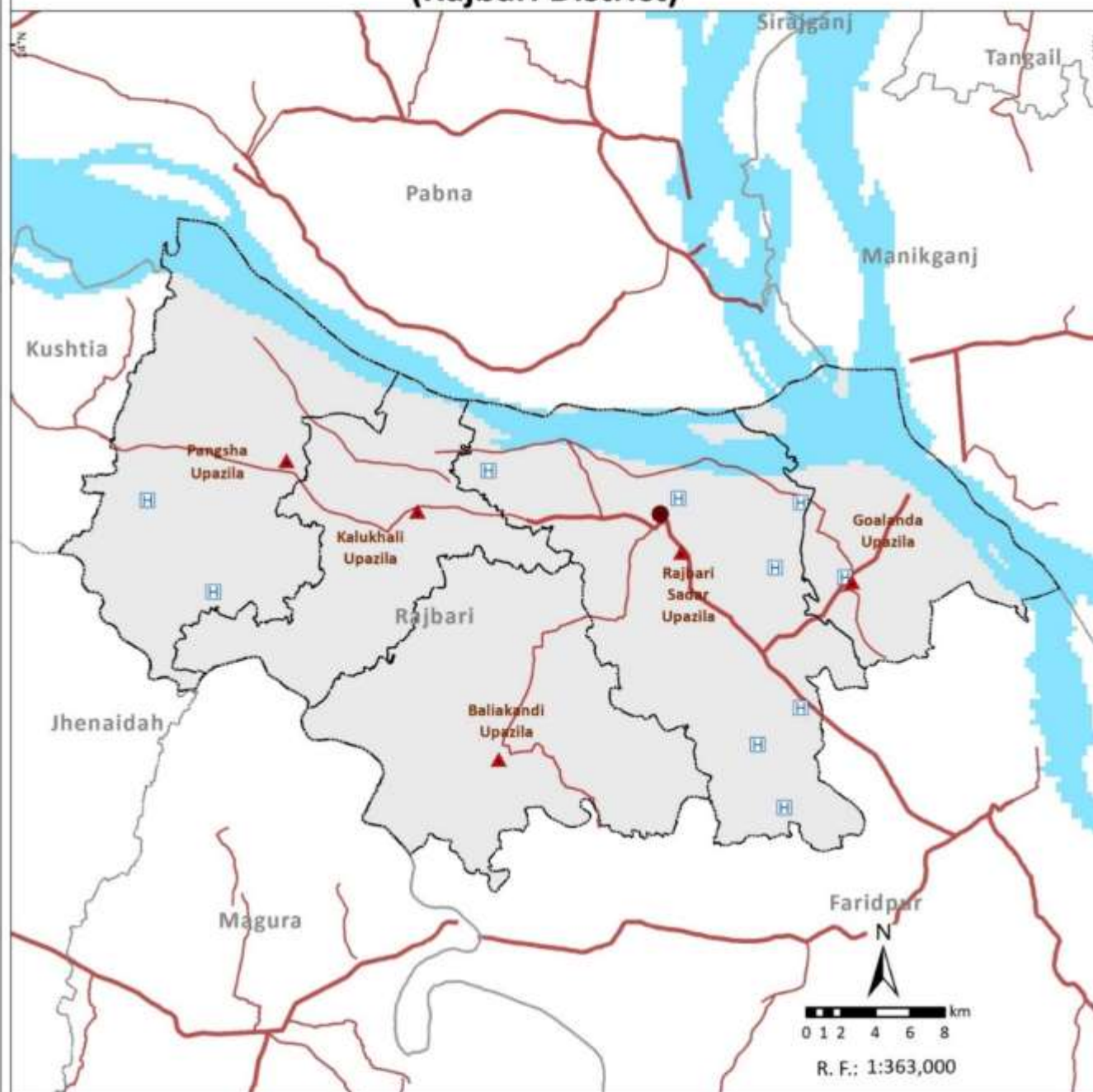
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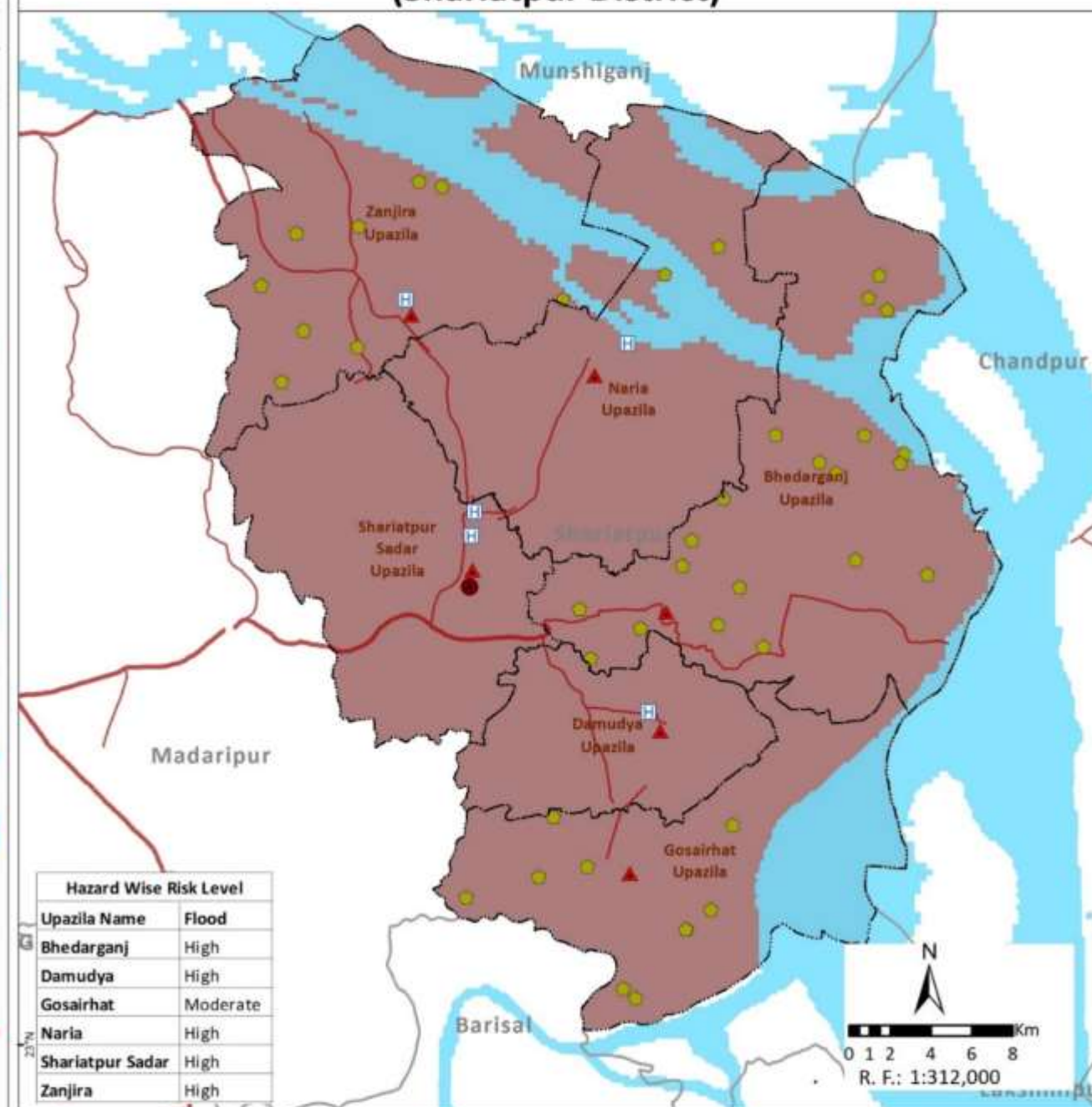
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Risk Levels of Housing (Pucka and Semi- Pucka) to Multi- Hazard (Rajbari District)



Risk Levels of Housing (Pucka and Semi- Pucka) to Multi- Hazard (Shariatpur District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level of Housing for Moderate and above Category
- Flood
- Risk level below moderate

Note:

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.



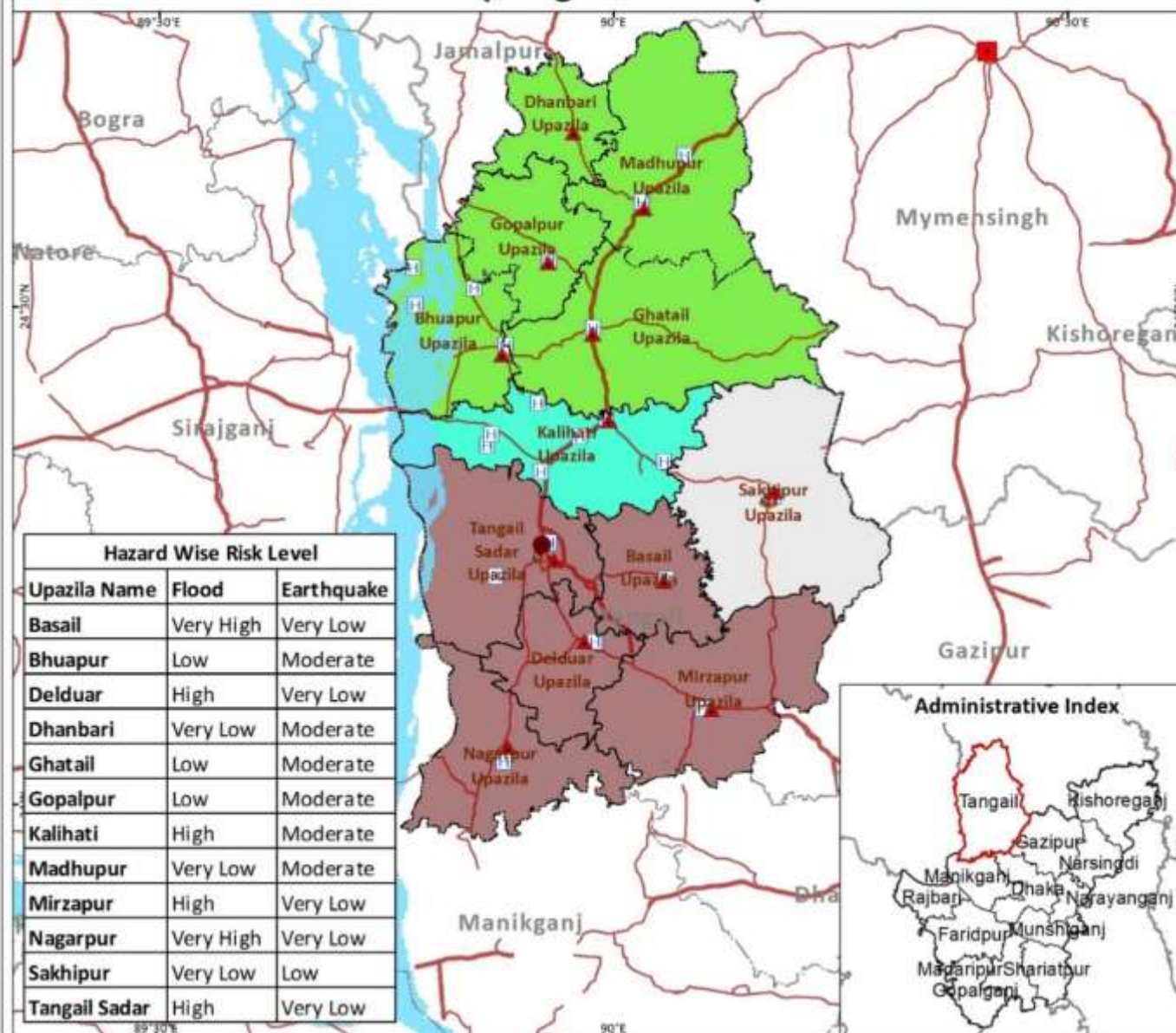
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Risk Levels of Housing (Pucka and Semi- Pucka) to Multi- Hazard (Tangail District)



Note: Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

Legend

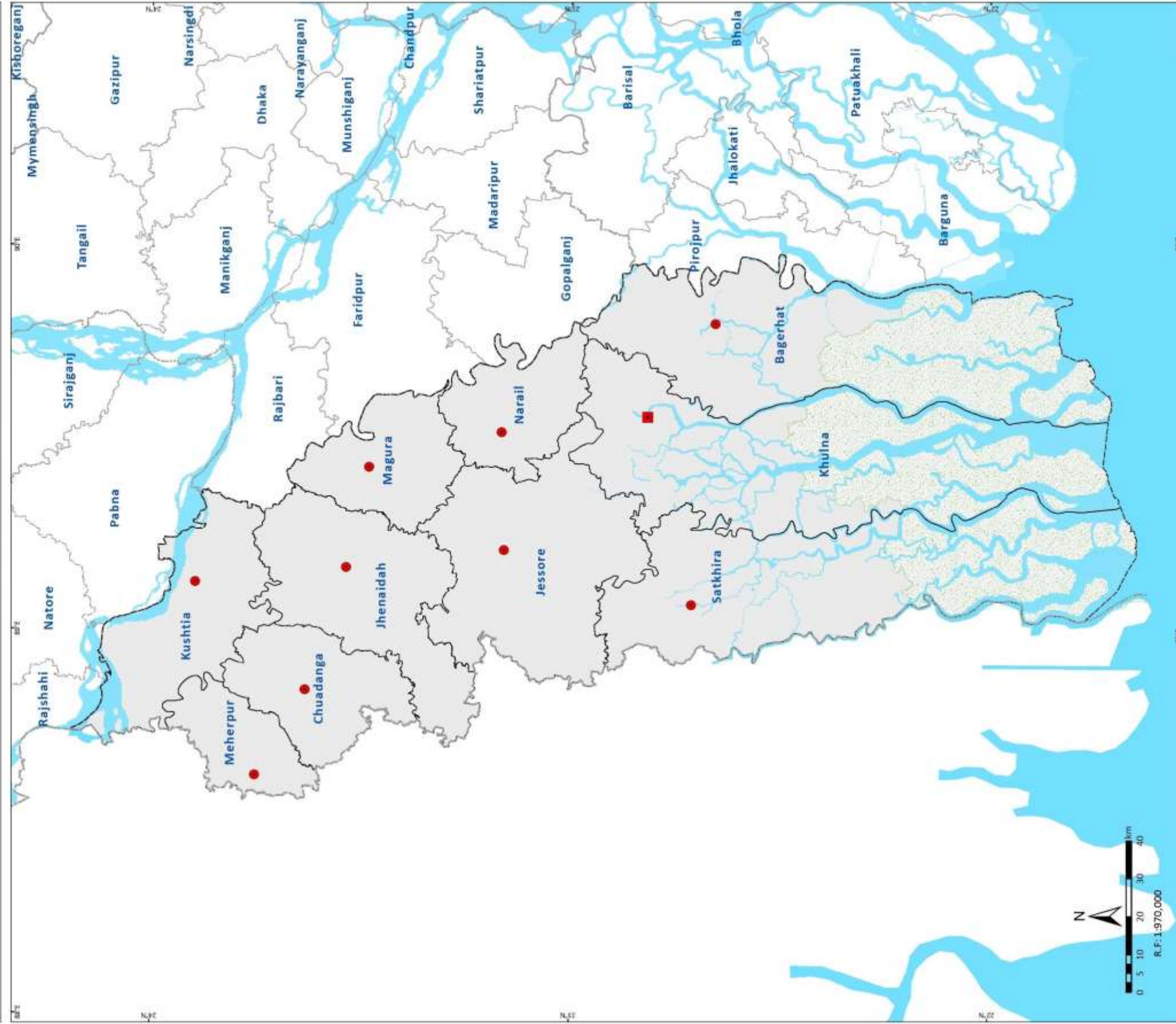
- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level for Moderate and above Category
- Flood, Earthquake
- Flood
- Earthquake
- Risk level below moderate

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Risk Levels of Housing (Pucka and Semi- Pucka) to Multi- Hazard (Khulna Division)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Division Head Quarter
- District Head Quarter
- River/Sea/Lake
- Sundarbans

Multi- Hazard Risk Level for Moderate and above Category

Risk level below moderate

Note:

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDM-1 & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

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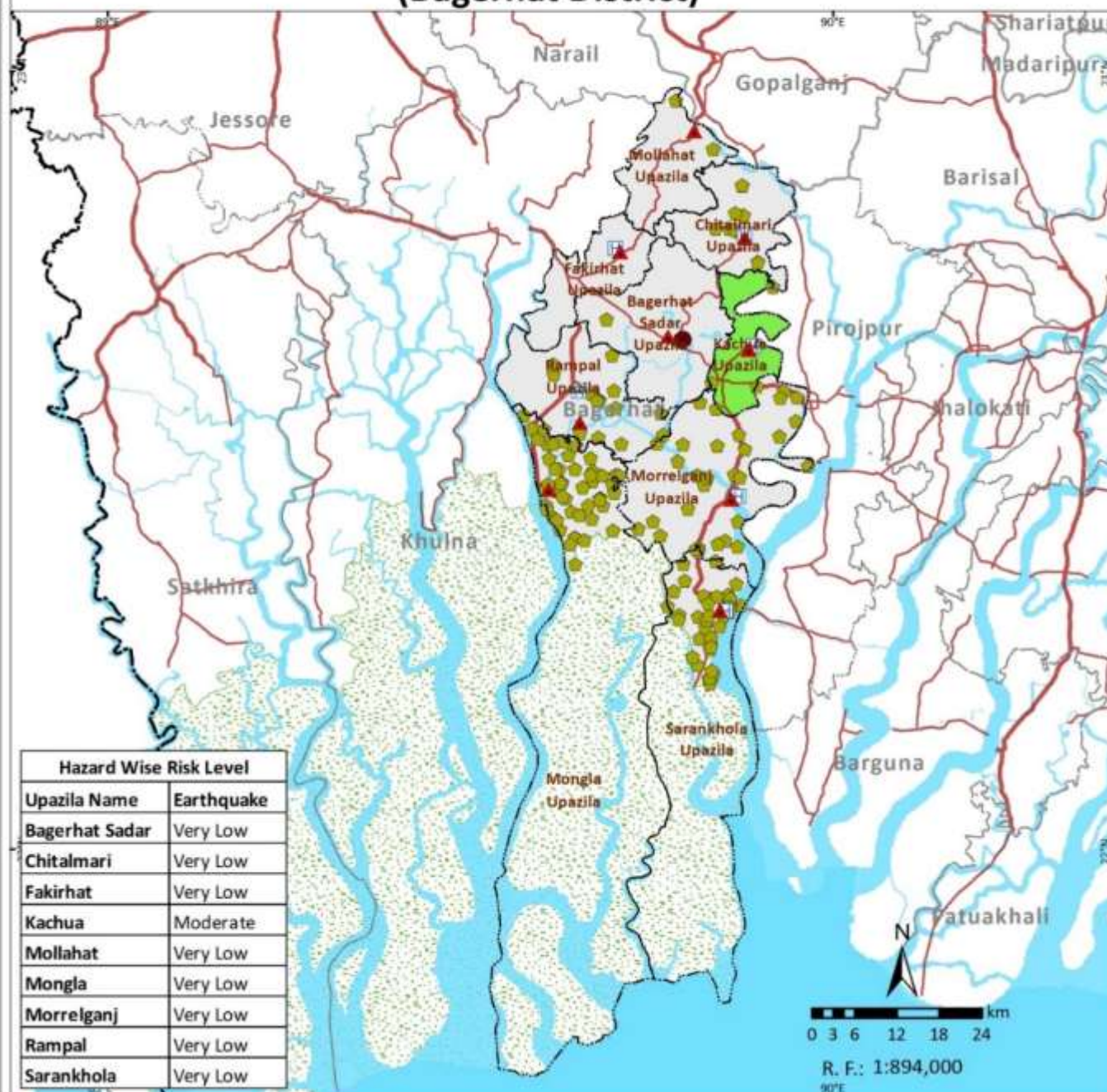
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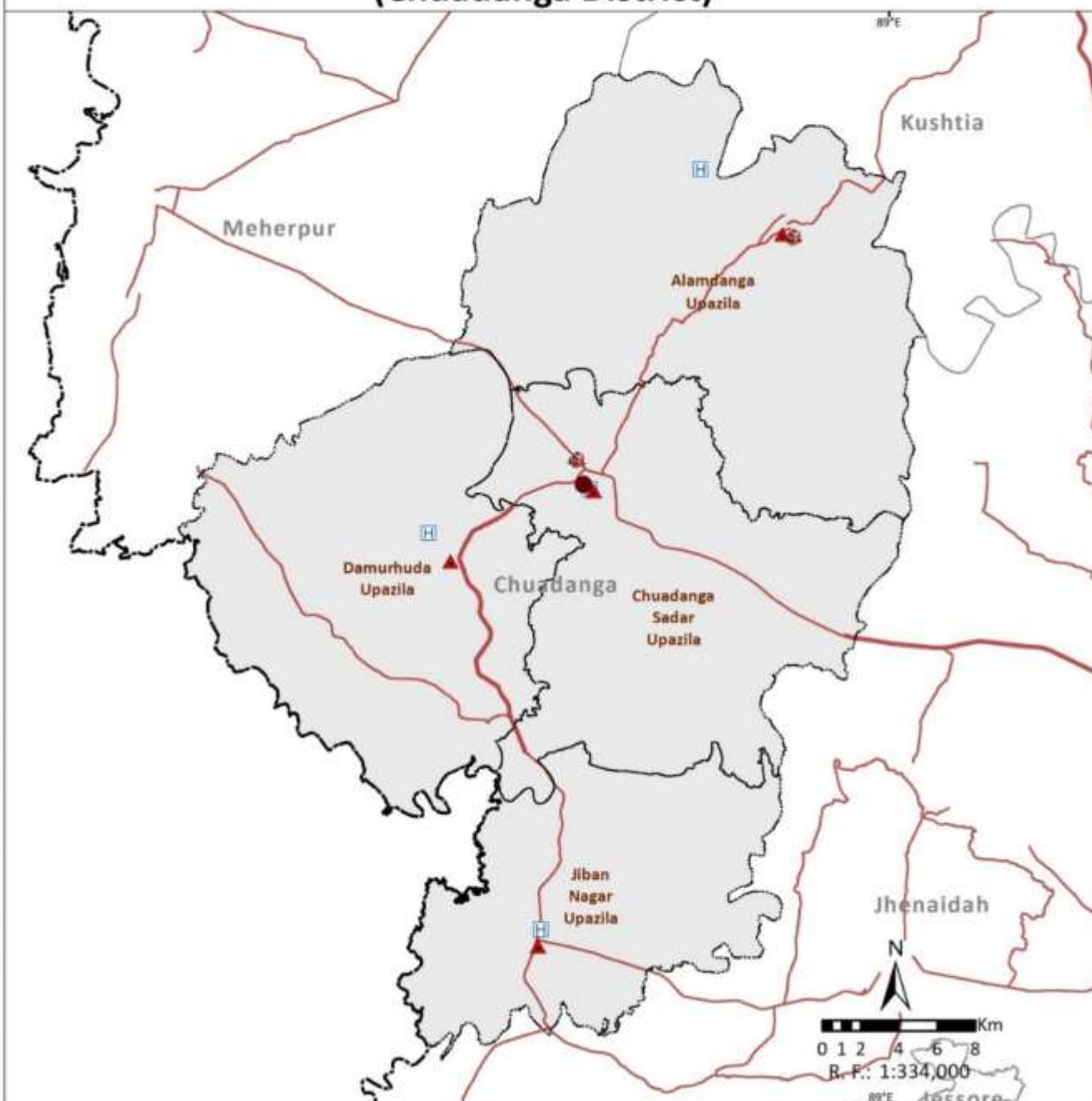
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Risk Levels of Housing (Pucka and Semi- Pucka) to Multi- Hazard (Bagerhat District)



Risk Levels of Housing (Pucka and Semi- Pucka) to Multi- Hazard (Chuadanga District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level of Housing for Moderate and above Category
- Earthquake
- Risk level below moderate

Note:

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

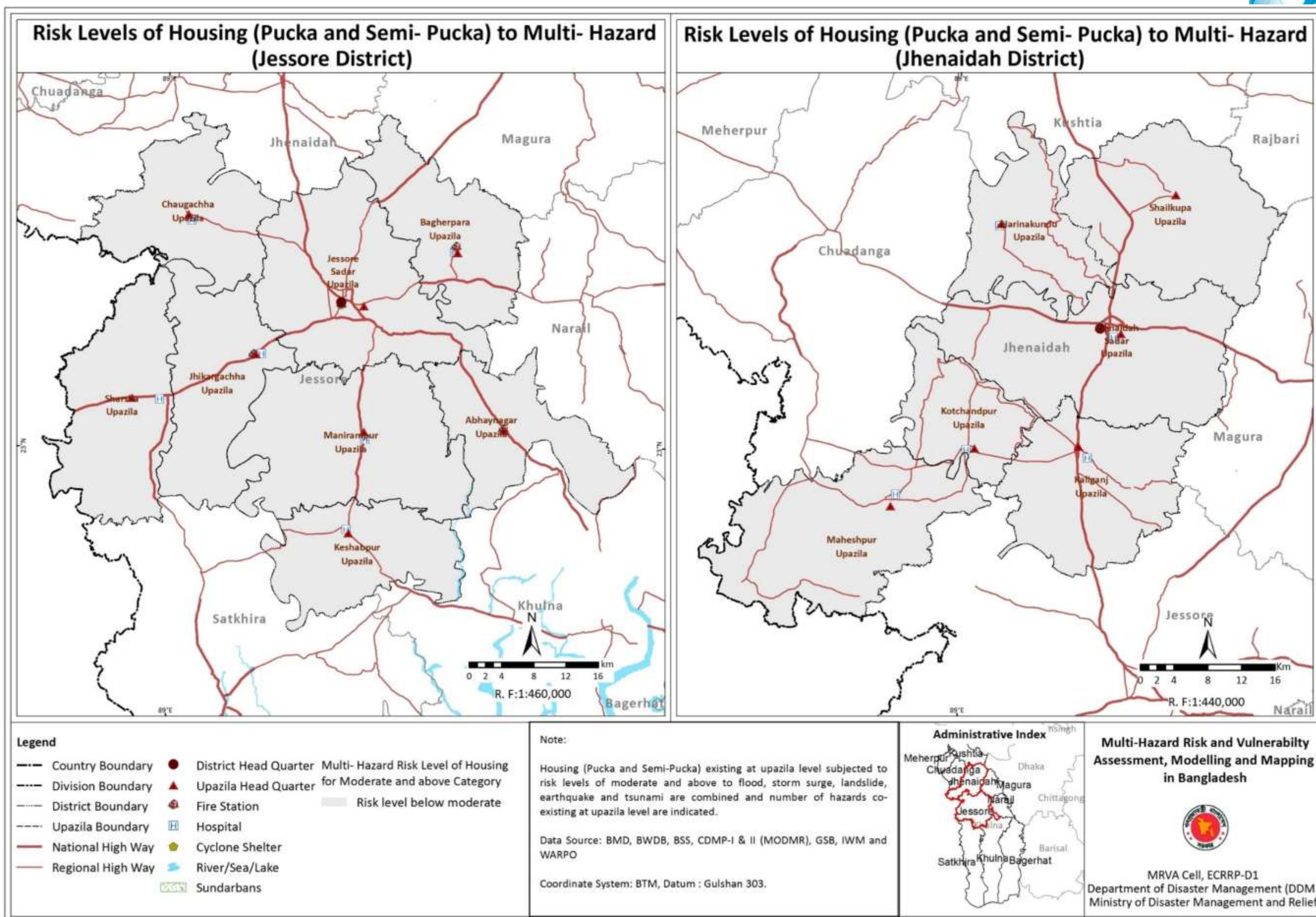
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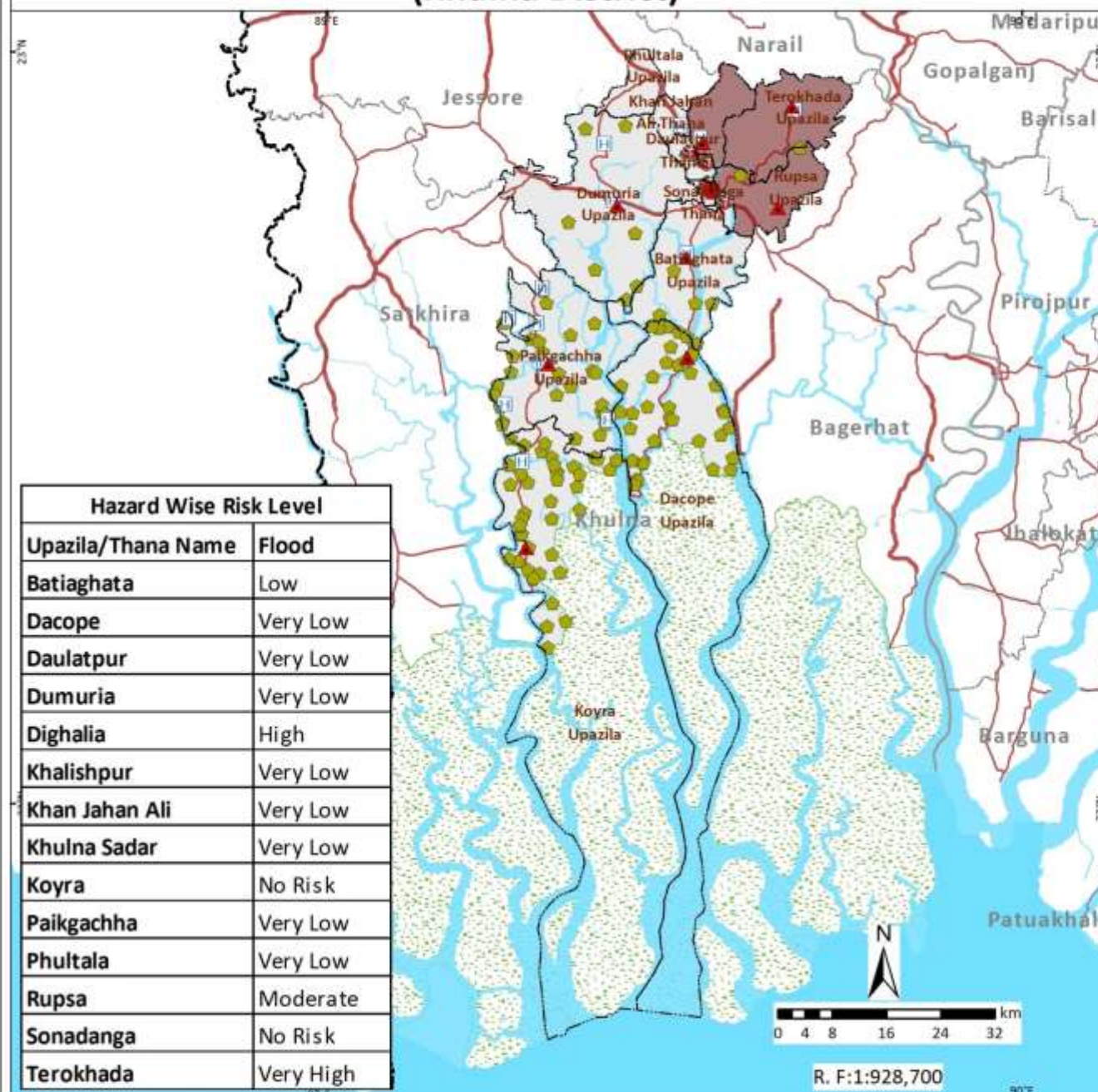


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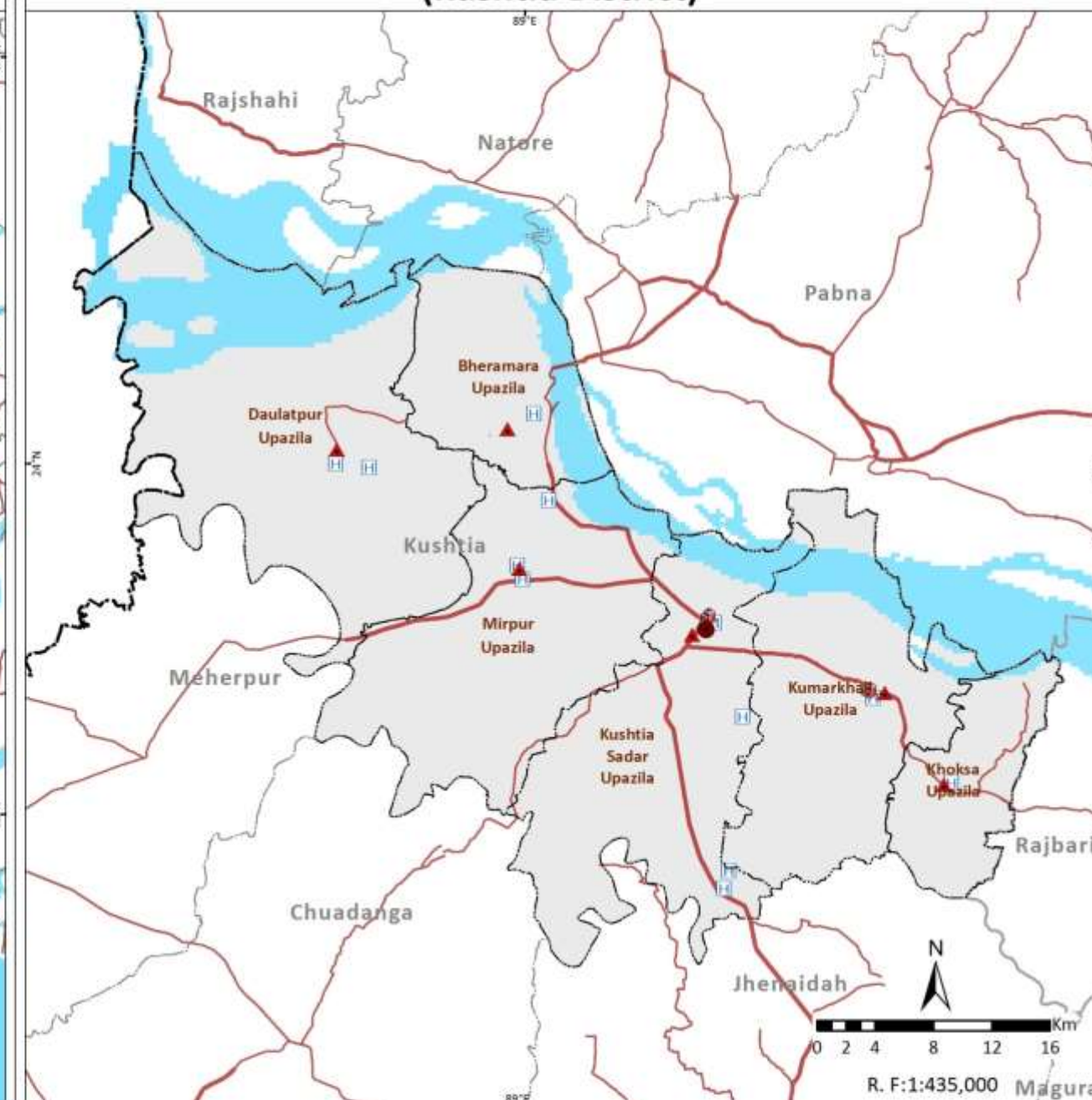




Risk Levels of Housing (Pucka and Semi- Pucka) to Multi- Hazard (Khulna District)



Risk Levels of Housing (Pucka and Semi- Pucka) to Multi- Hazard (Kushtia District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila_Boundary
- National High Way
- Regional High Way
- Division Head Quarter
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level of Housing for Moderate and above Category
- Flood
- Risk level below moderate

Note:

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

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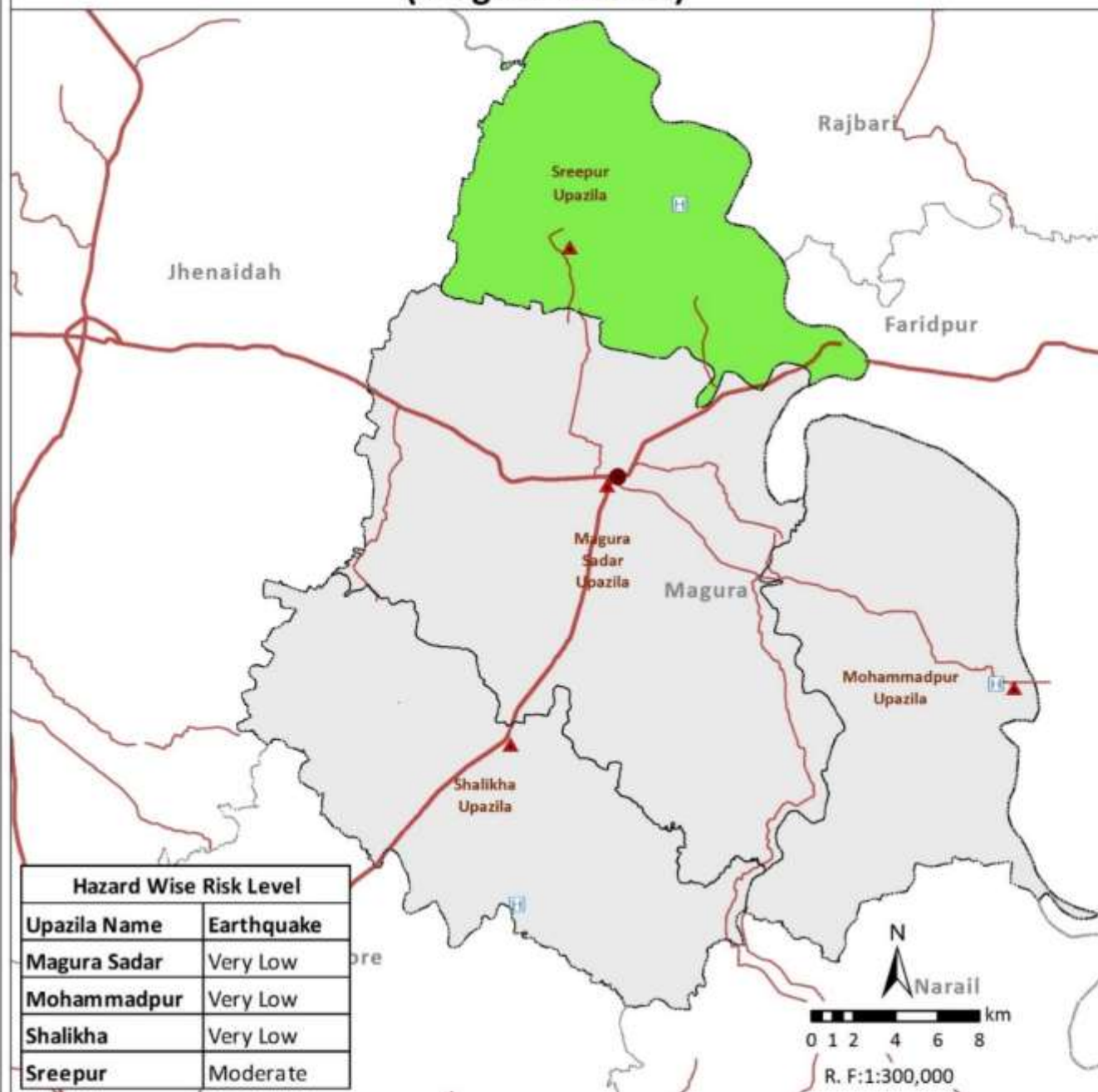
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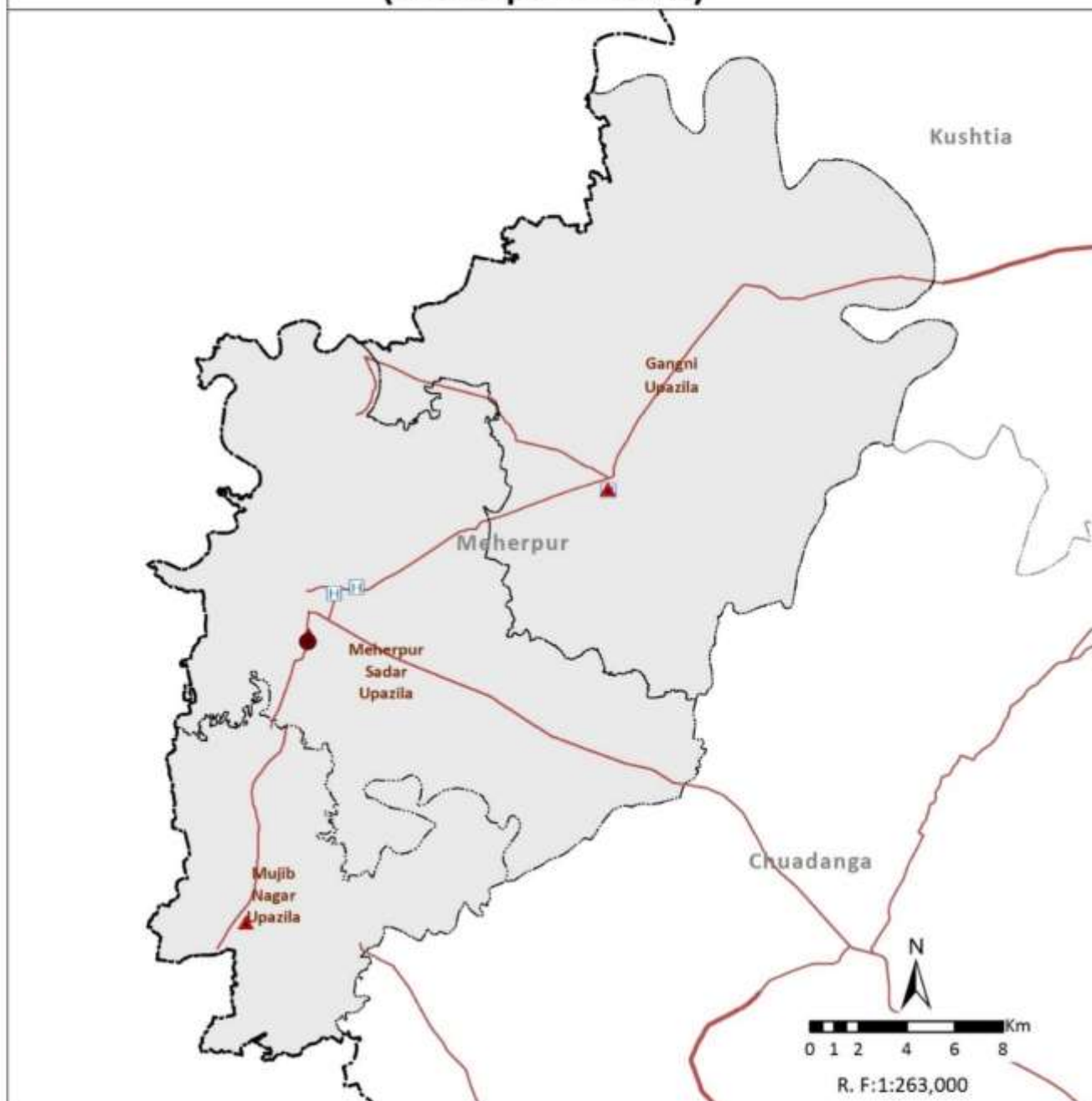
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Risk Levels of Housing (Pucka and Semi- Pucka) to Multi- Hazard (Magura District)



Risk Levels of Housing (Pucka and Semi- Pucka) to Multi- Hazard (Meherpur District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level of Housing for Moderate and above Category
- Earthquake
- Risk level below moderate

Note:

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

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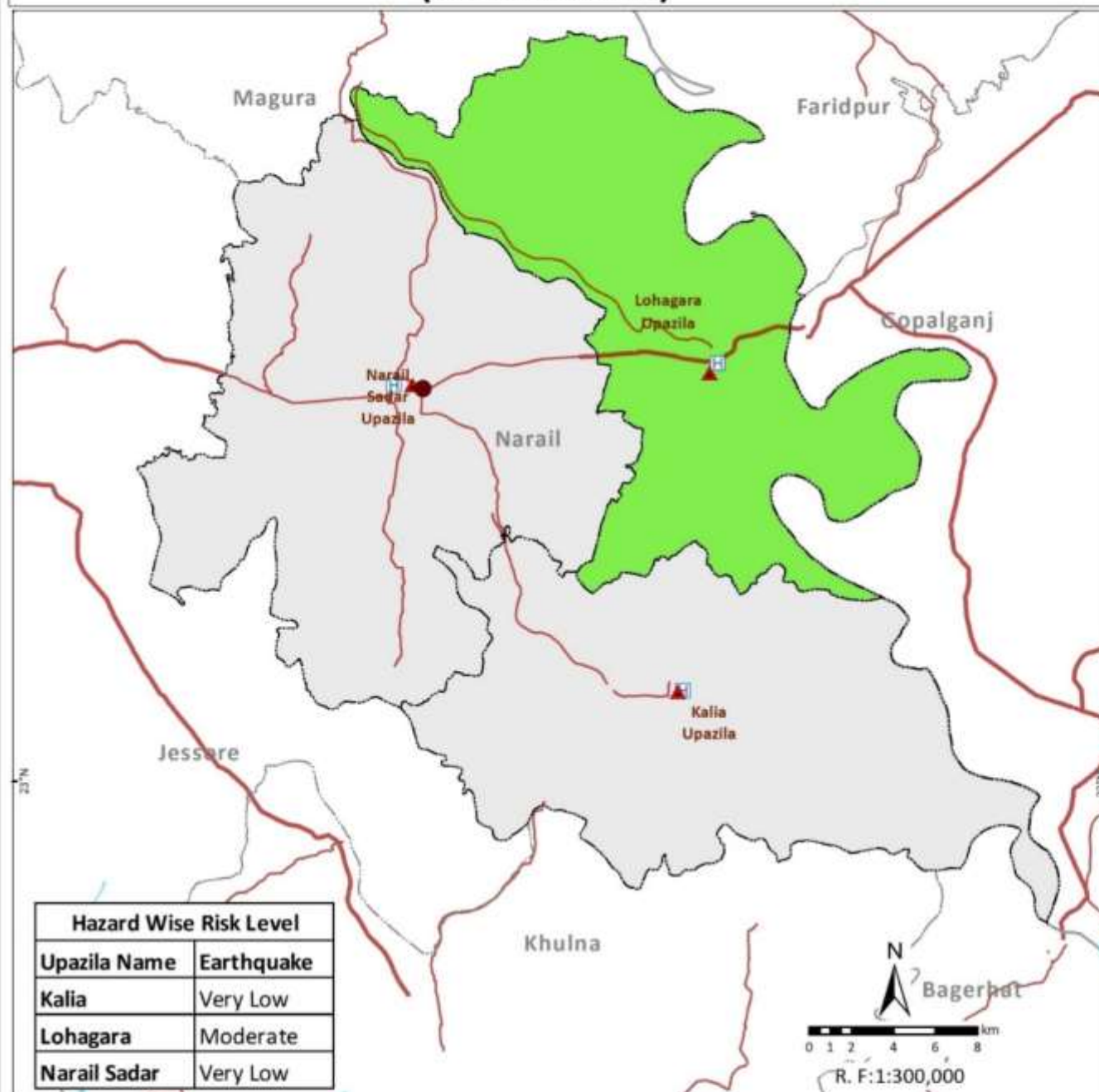
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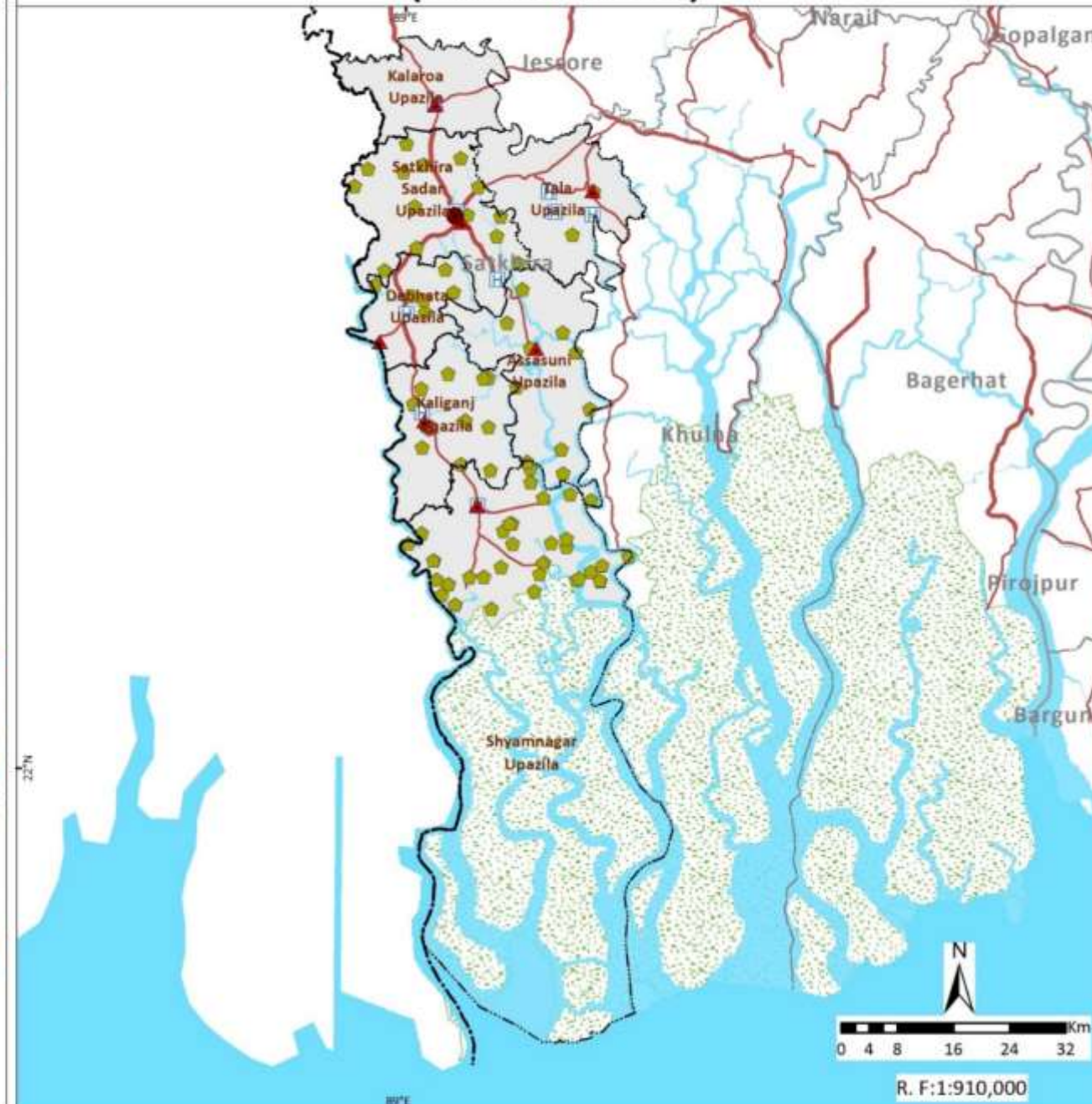
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Risk Levels of Housing (Pucka and Semi- Pucka) to Multi- Hazard (Narail District)



Risk Levels of Housing (Pucka and Semi- Pucka) to Multi- Hazard (Satkhira District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level of Housing for Moderate and above Category
- Earthquake
- Risk level below moderate

Note:

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

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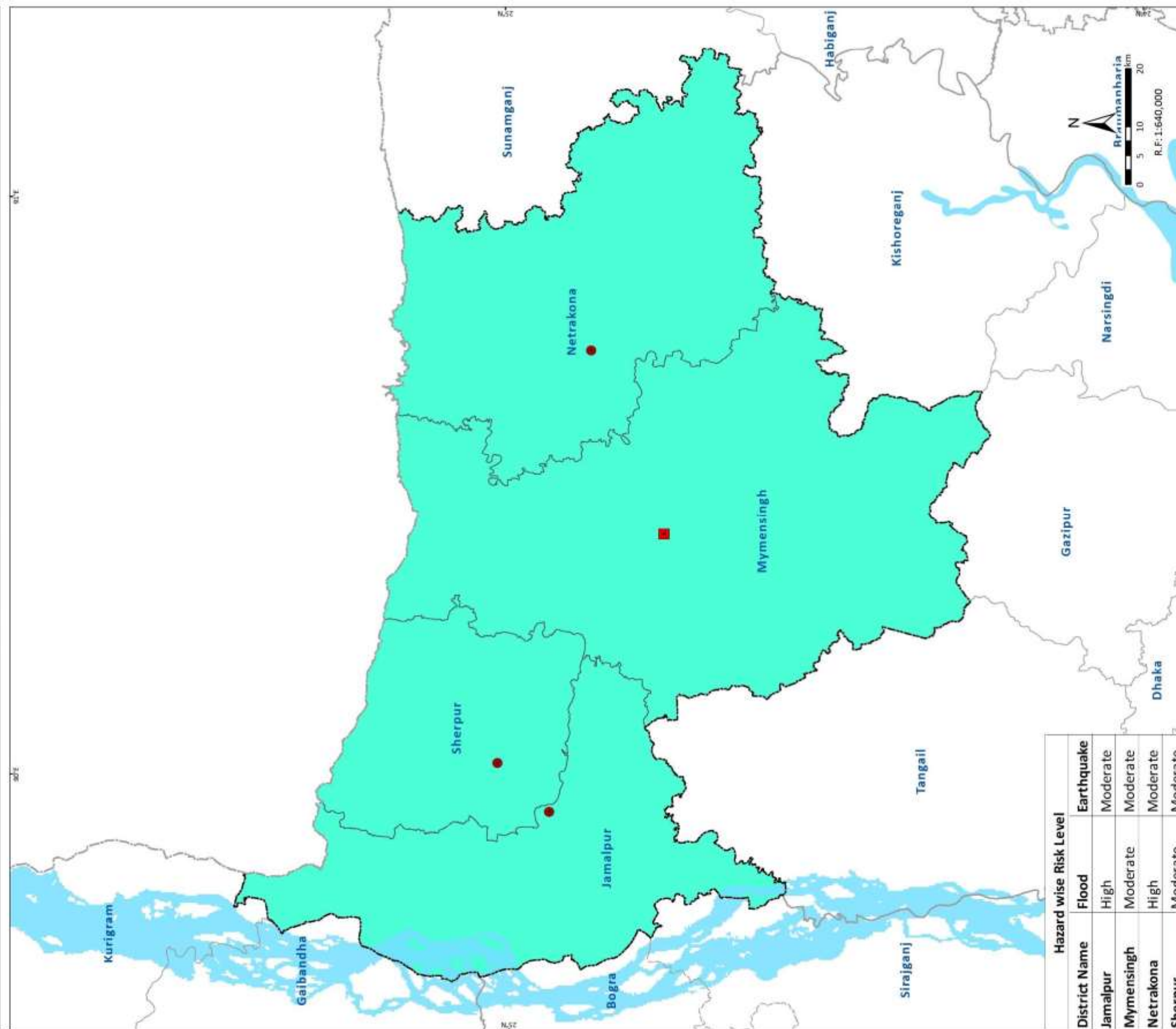


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Risk Levels of Housing (Pucka and Semi-Pucka) to Multi-Hazard (Mymensingh Division)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- District Head Quarter
- River/Sea/Lake
- Sundarbans

Multi-Hazard Risk Level for Moderate and Above Category

Flood, Earthquake

Note:
Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

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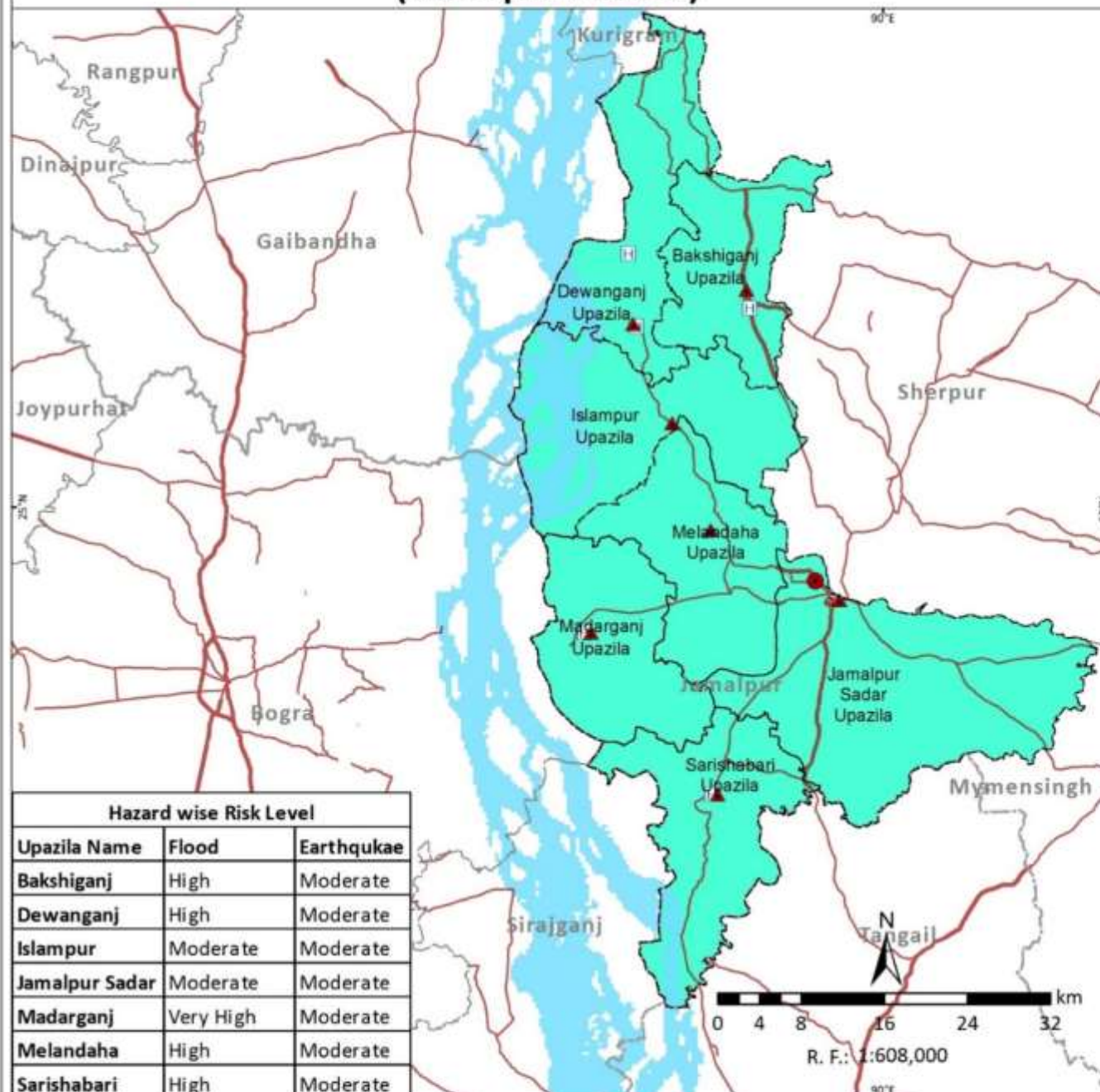


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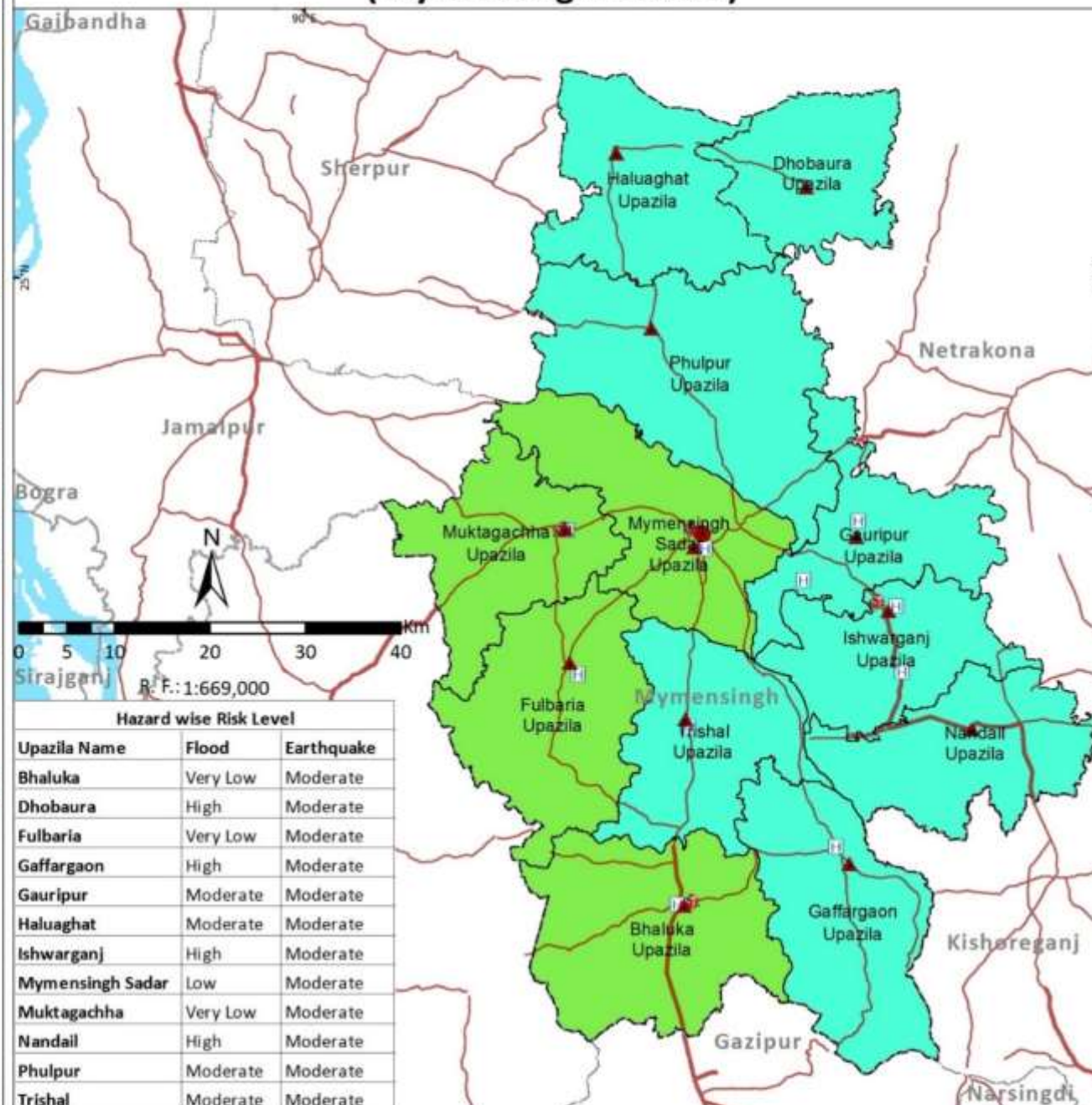




Risk Levels of Housing (Pucka and Semi-Pucka) to Multi hazard (Jamalpur District)



Risk Levels of Housing (Pucka and Semi-Pucka) to Multi hazard (Mymensingh District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
- Flood, Earthquake
- Earthquake

Note

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

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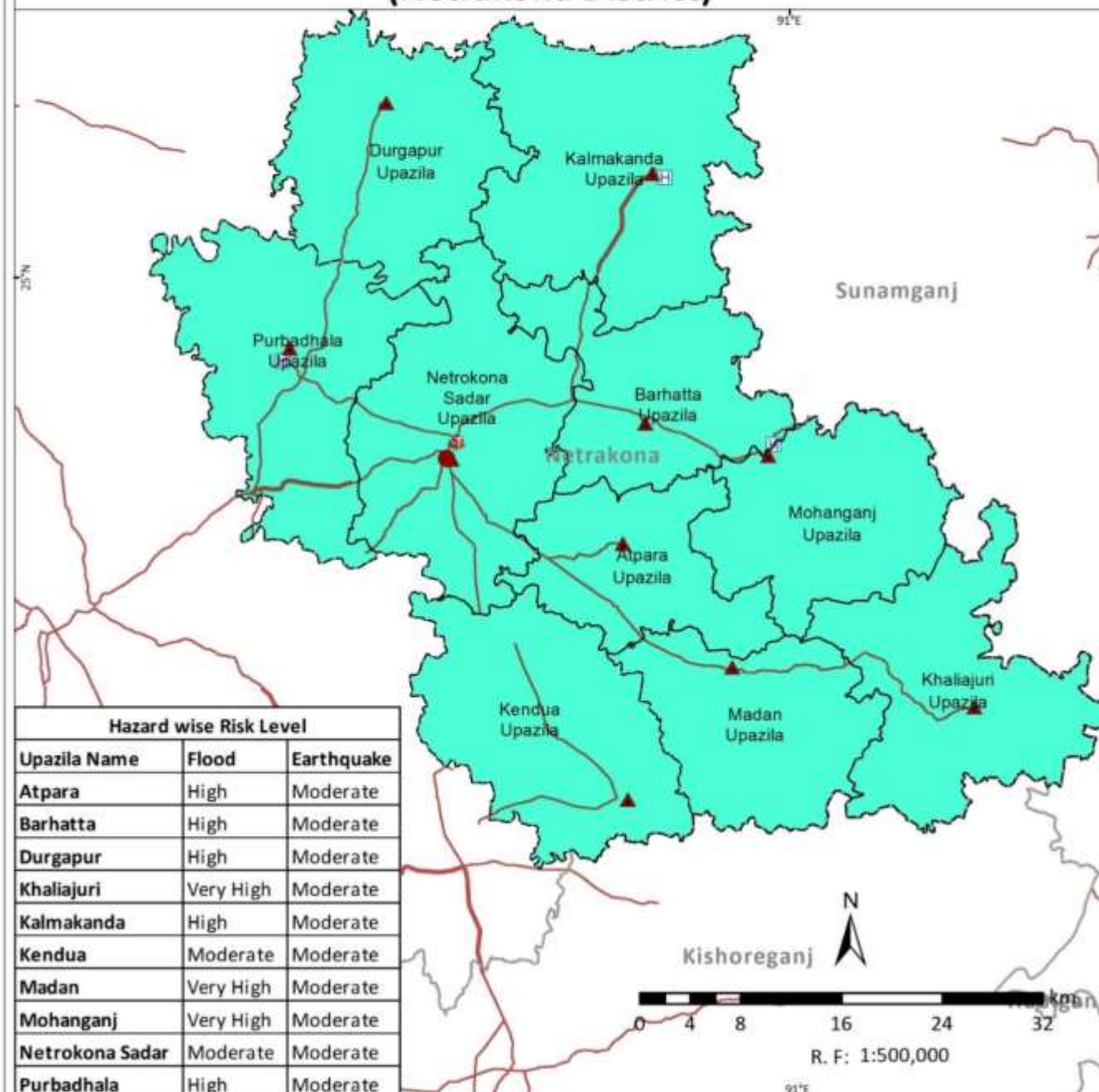
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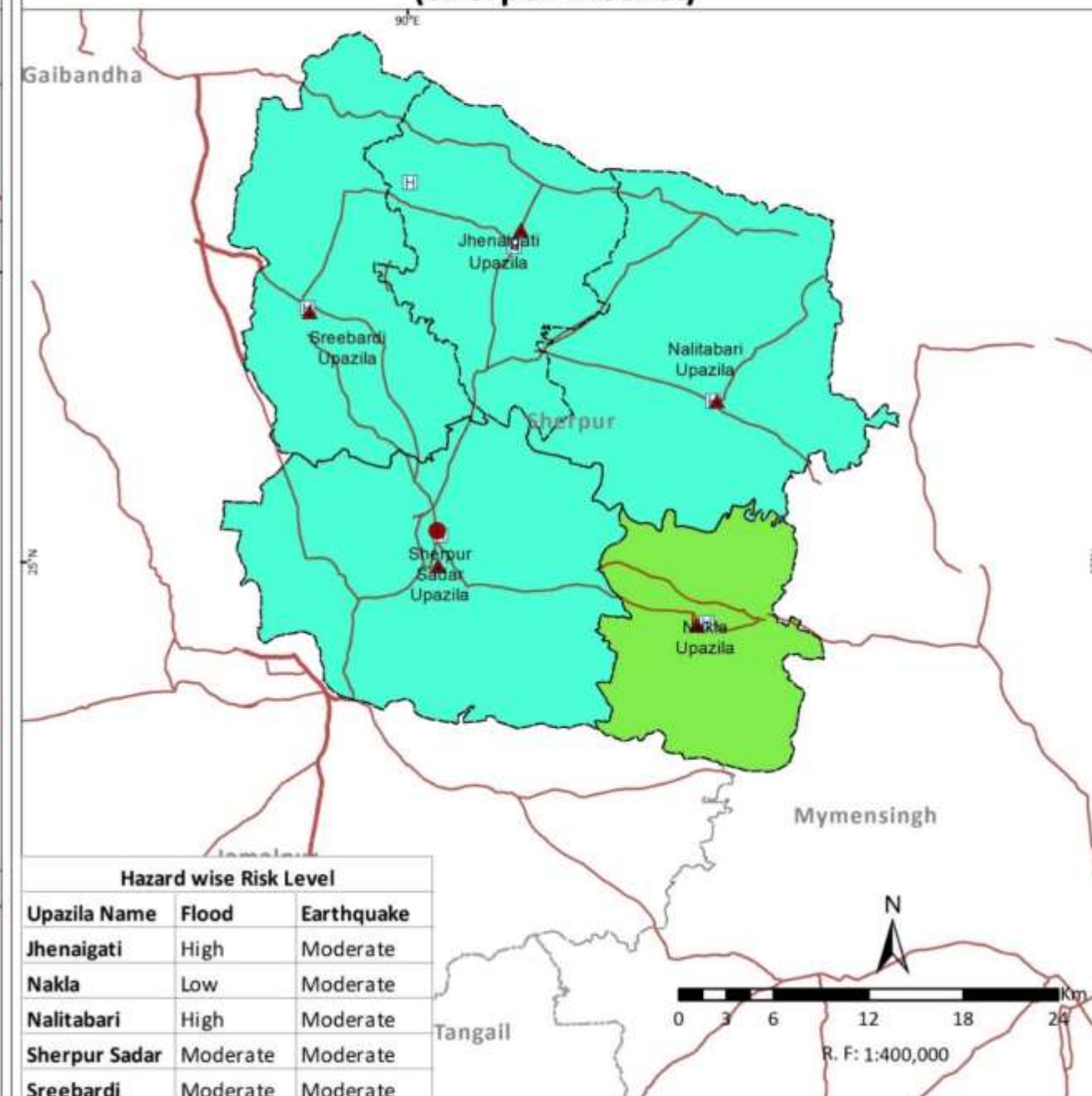
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Risk Levels of Housing (Pucka and Semi-Pucka) to Multi hazard (Netrakona District)



Risk Levels of Housing (Pucka and Semi-Pucka) to Multi hazard (Sherpur District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
- Flood, Earthquake
- Earthquake

Note

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDM-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

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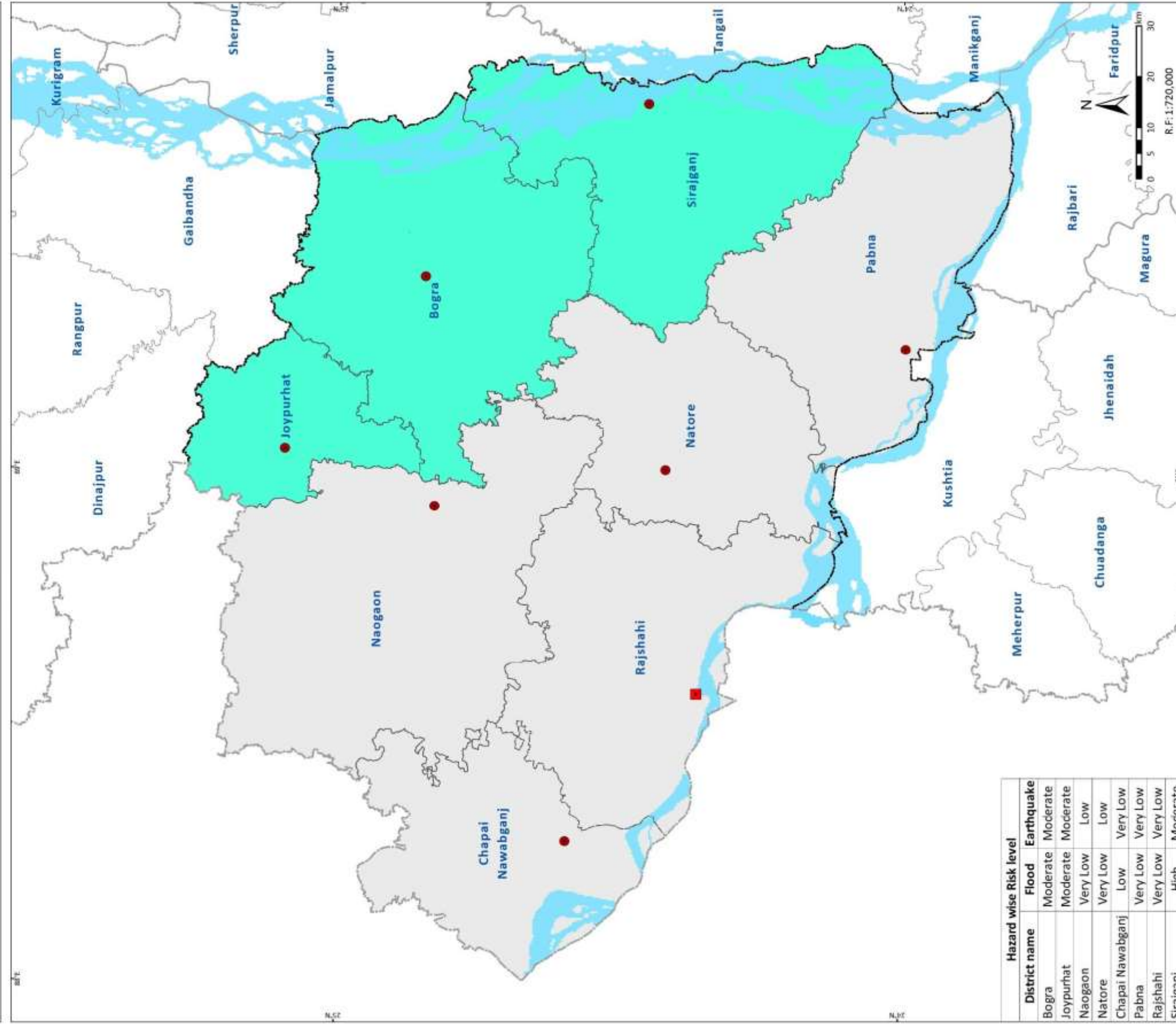


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Risk Levels of Housing (Pucka and Semi-Pucka) to Multi-Hazard (Rajshahi Division)



District name	Hazard wise Risk level	
	Flood	Earthquake
Bogra	Moderate	Moderate
Joypurhat	Moderate	Moderate
Naogaon	Very Low	Low
Natore	Very Low	Low
Chapai Nawabganj	Low	Very Low
Pabna	Very Low	Very Low
Rajshahi	Very Low	Very Low
Sirajganj	High	Moderate

District name	Hazard wise Risk level	
	Flood	Earthquake
Bogra	Moderate	Moderate
Joypurhat	Moderate	Moderate
Naogaon	Very Low	Low
Natore	Very Low	Low
Chapai Nawabganj	Low	Very Low
Pabna	Very Low	Very Low
Rajshahi	Very Low	Very Low
Sirajganj	High	Moderate

Note: Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

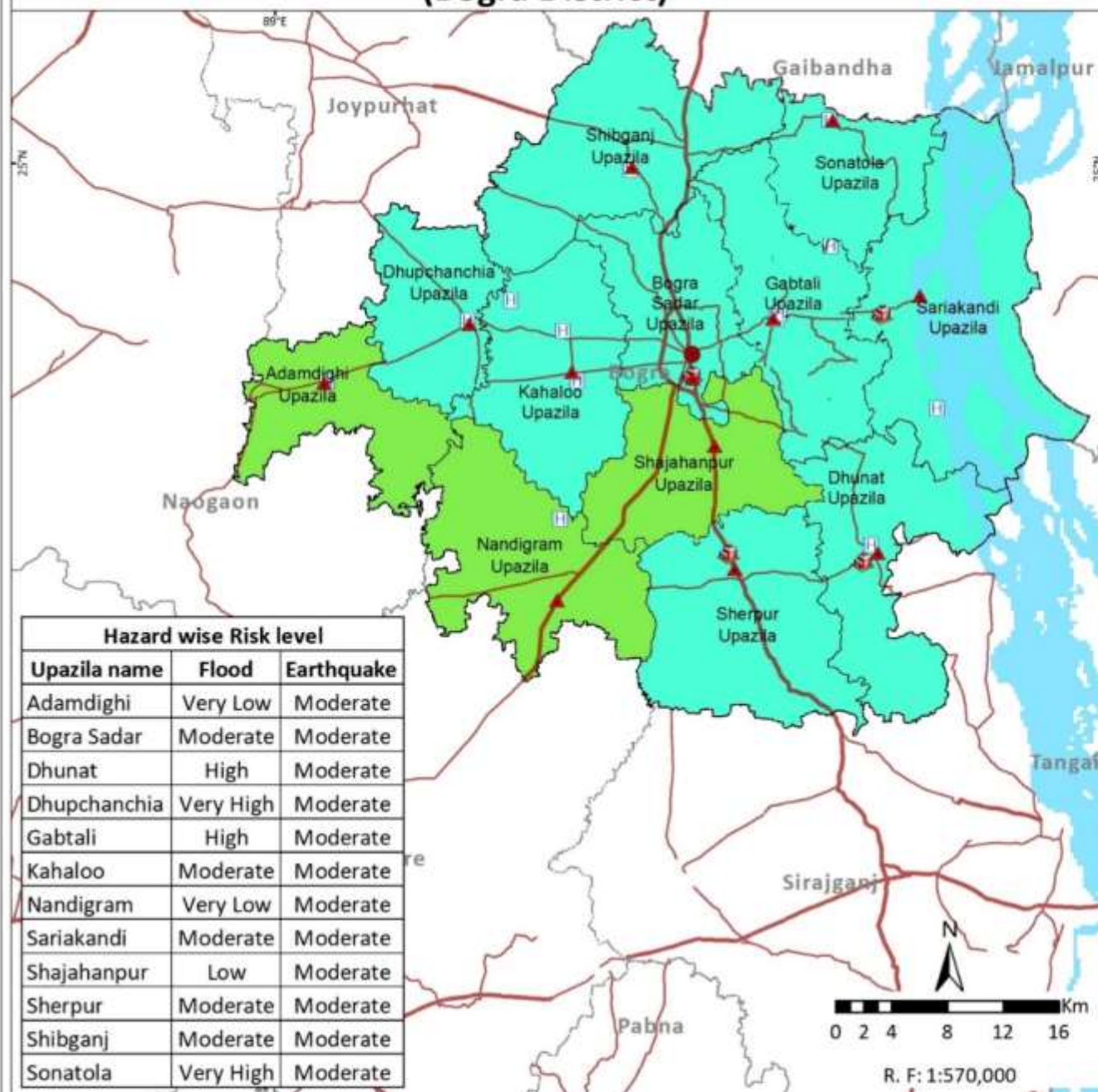


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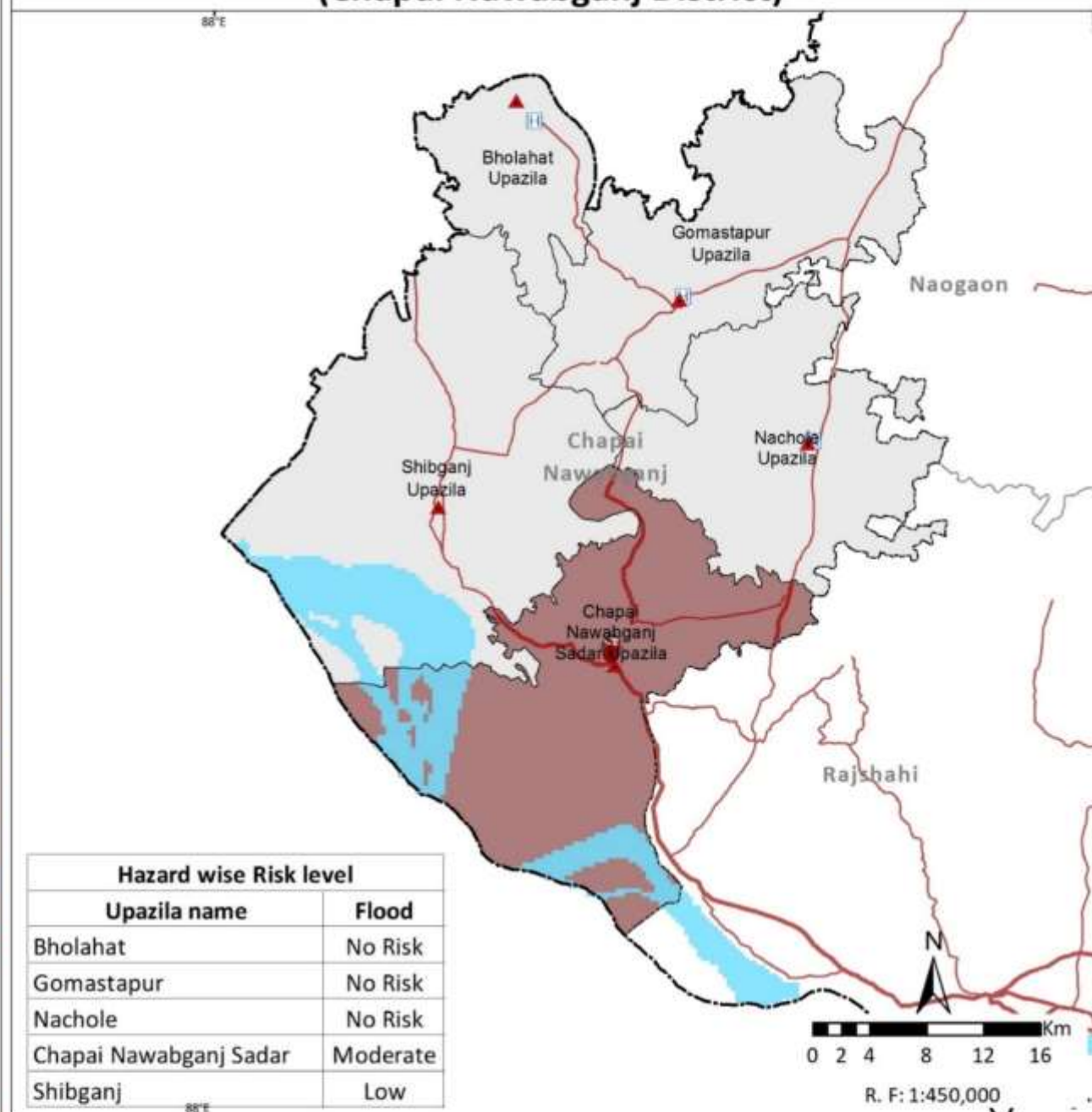
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Housing (Pucka and Semi-Pucka) Risk to Multi-Hazard (Bogra District)



Housing (Pucka and Semi-Pucka) Risk to Multi-Hazard (Chapai Nawabganj District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Health Facilities
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood, Earthquake
- Flood
- Earthquake
- Risk level below moderate

Note:

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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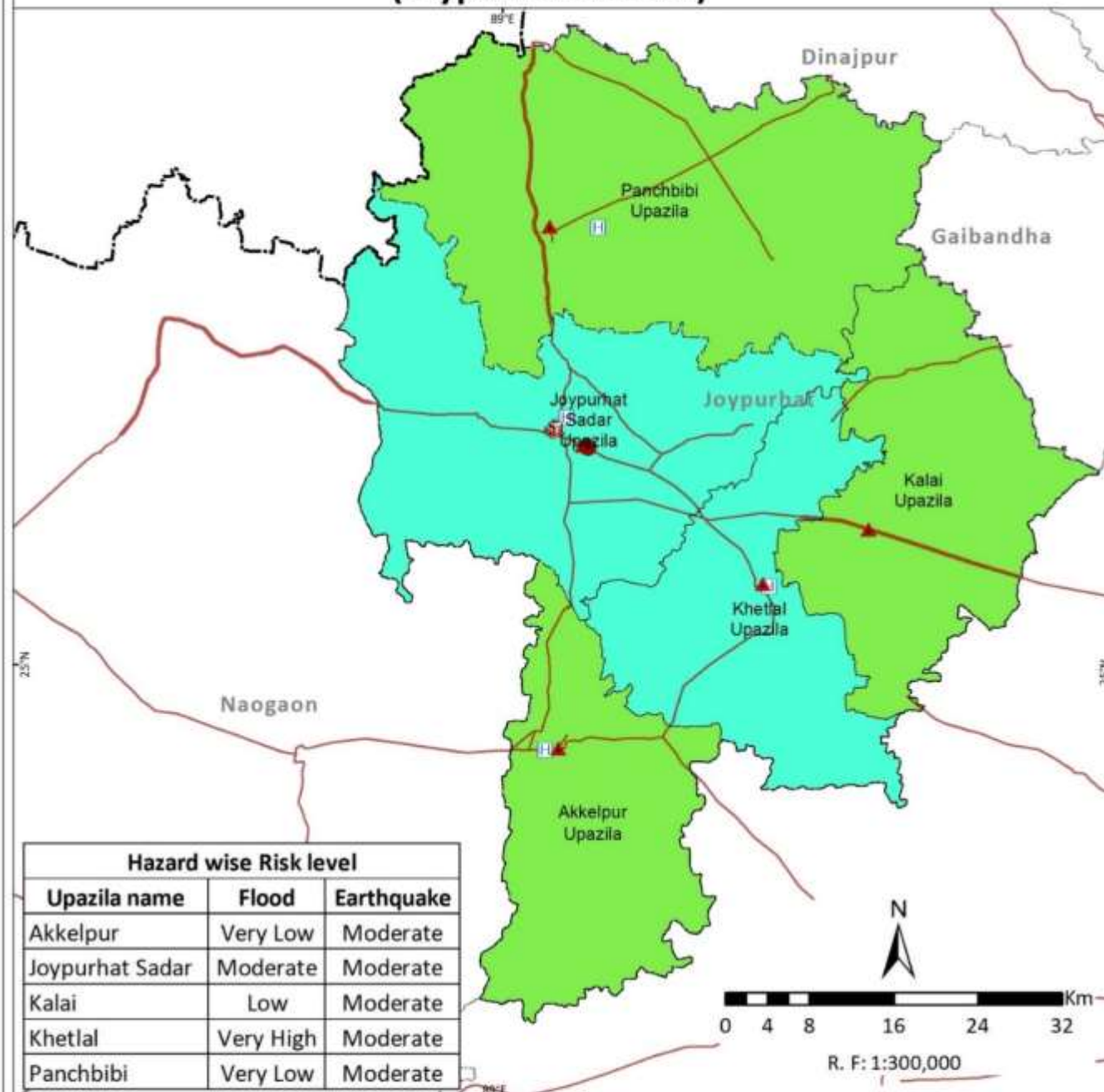
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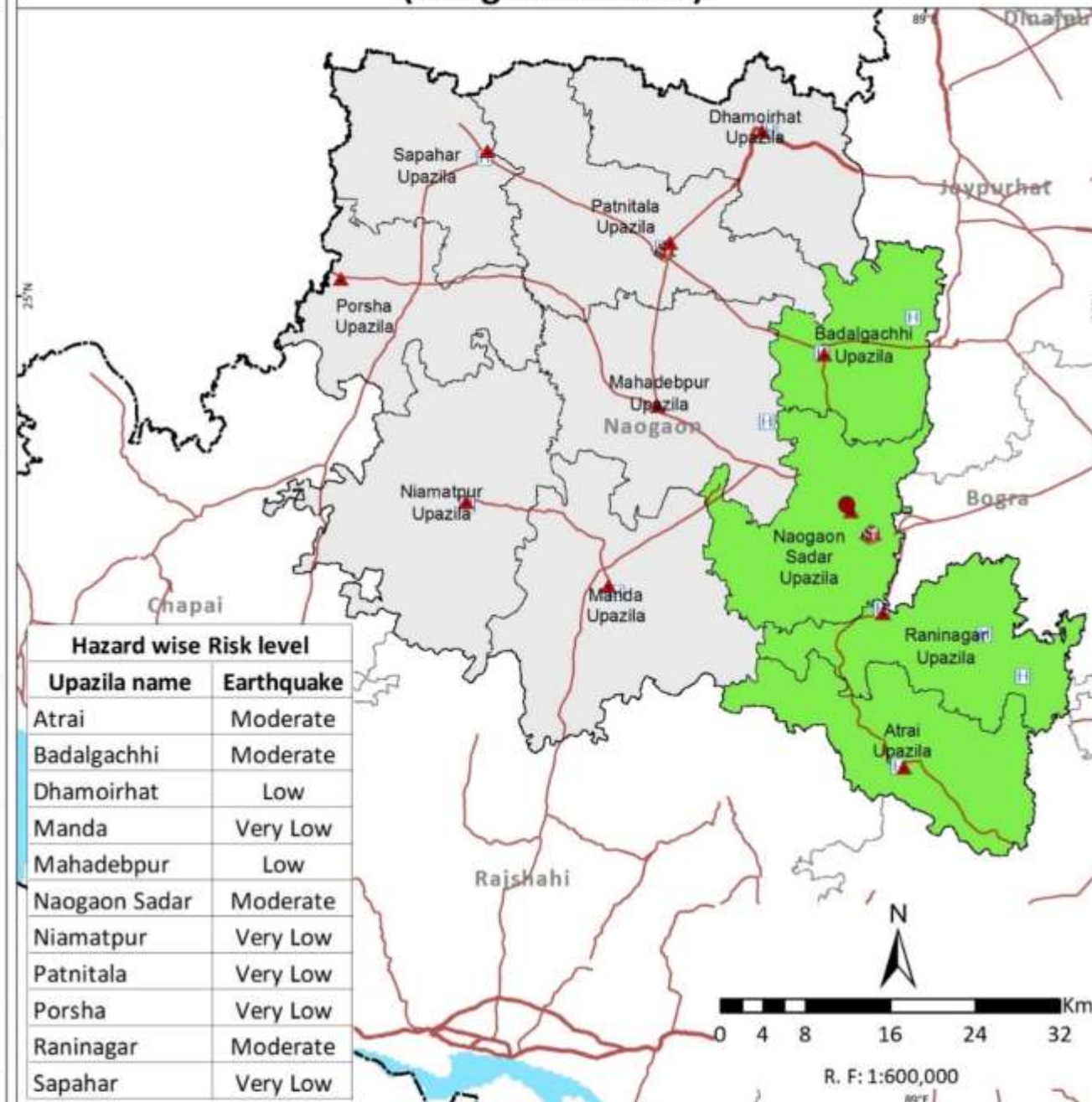
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Housing (Pucka and Semi-Pucka) Risk to Multi-Hazard (Joypurhat District)



Housing (Pucka and Semi-Pucka) Risk to Multi-Hazard (Naogaon District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood, Earthquake
- Earthquake
- Risk level below moderate

Note:

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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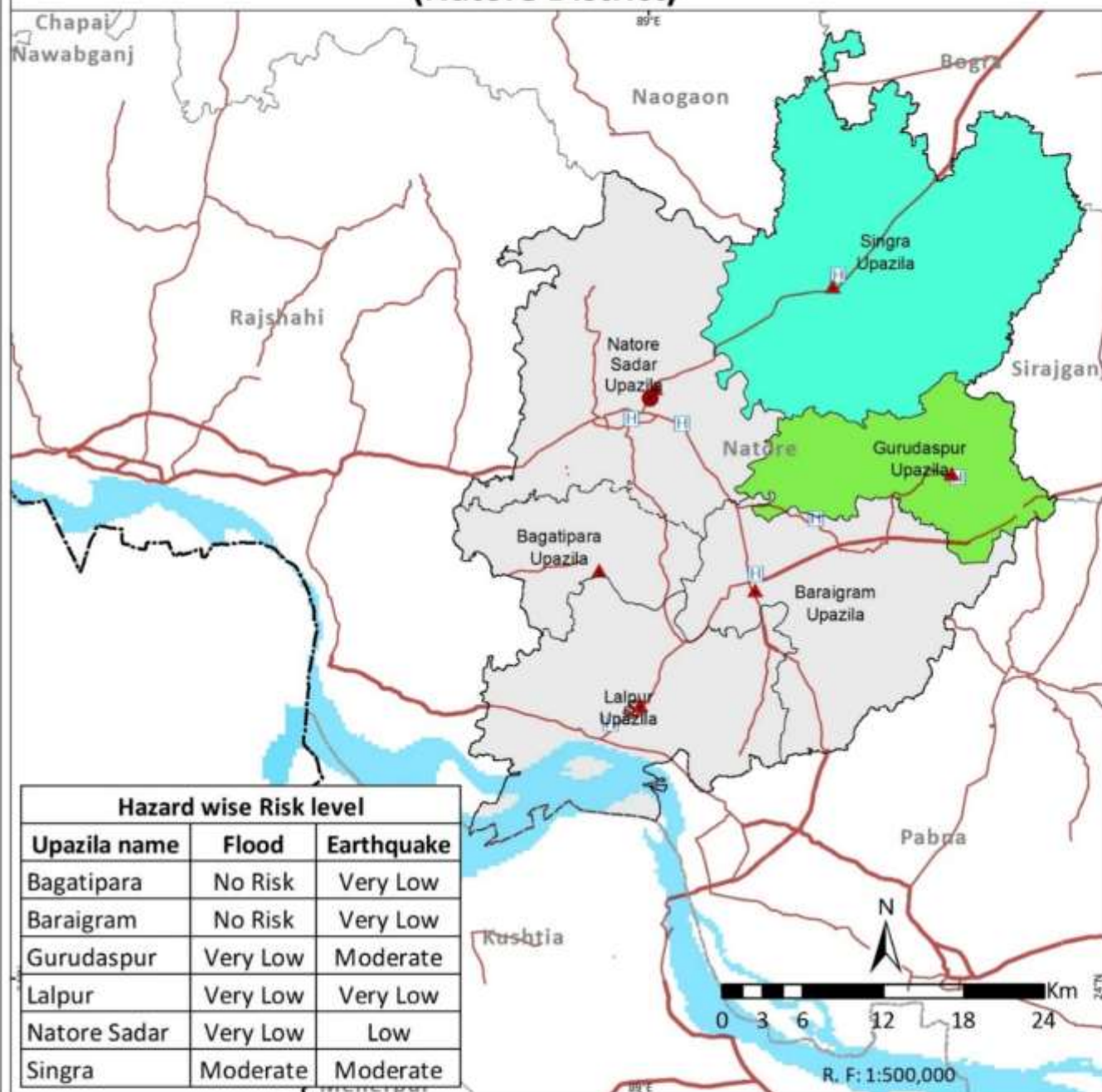
Multi-Hazard Risk and Vulnerability Assessment, Modelling and Mapping in Bangladesh



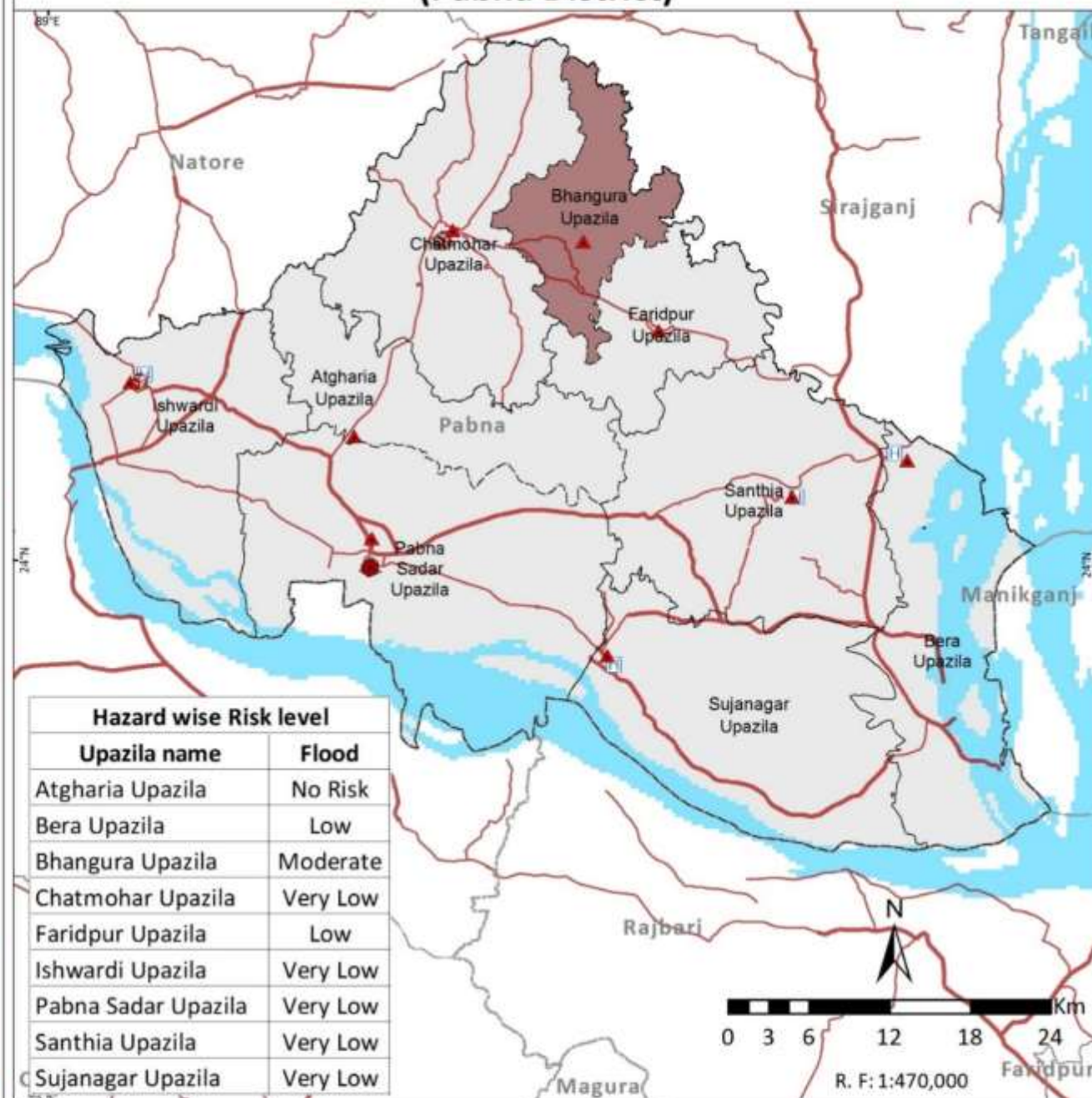
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Housing (Pucka and Semi-Pucka) Risk to Multi-Hazard (Natore District)



Housing (Pucka and Semi-Pucka) Risk to Multi-Hazard (Pabna District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood, Earthquake
- Flood
- Earthquake
- Risk level below moderate

Note:

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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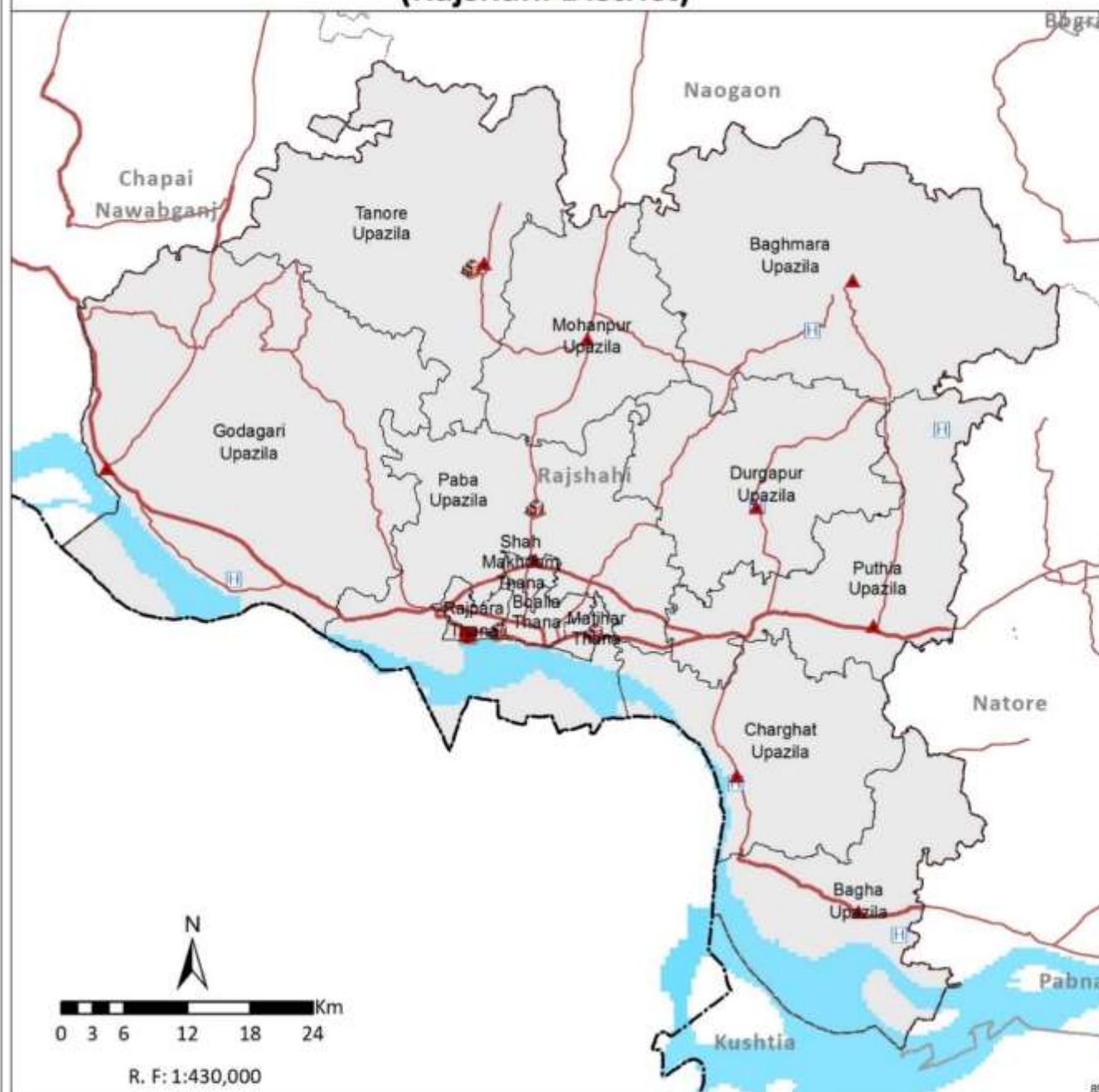
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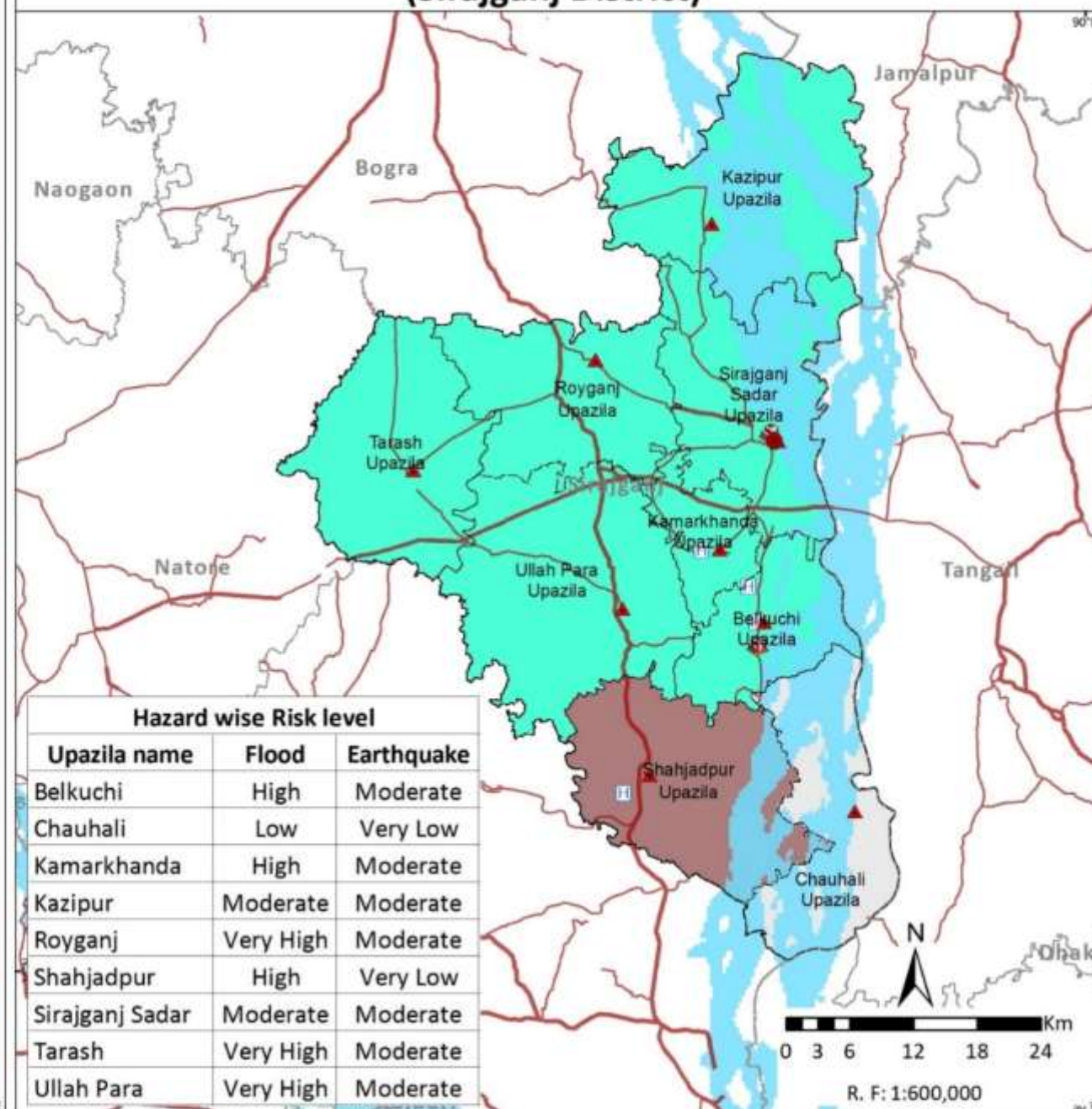
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Housing (Pucka and Semi-Pucka) Risk to Multi-Hazard (Rajshahi District)



Housing (Pucka and Semi-Pucka) Risk to Multi-Hazard (Sirajganj District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- Division Head Quarter
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood, Earthquake
- Flood
- Risk level below moderate

Note:

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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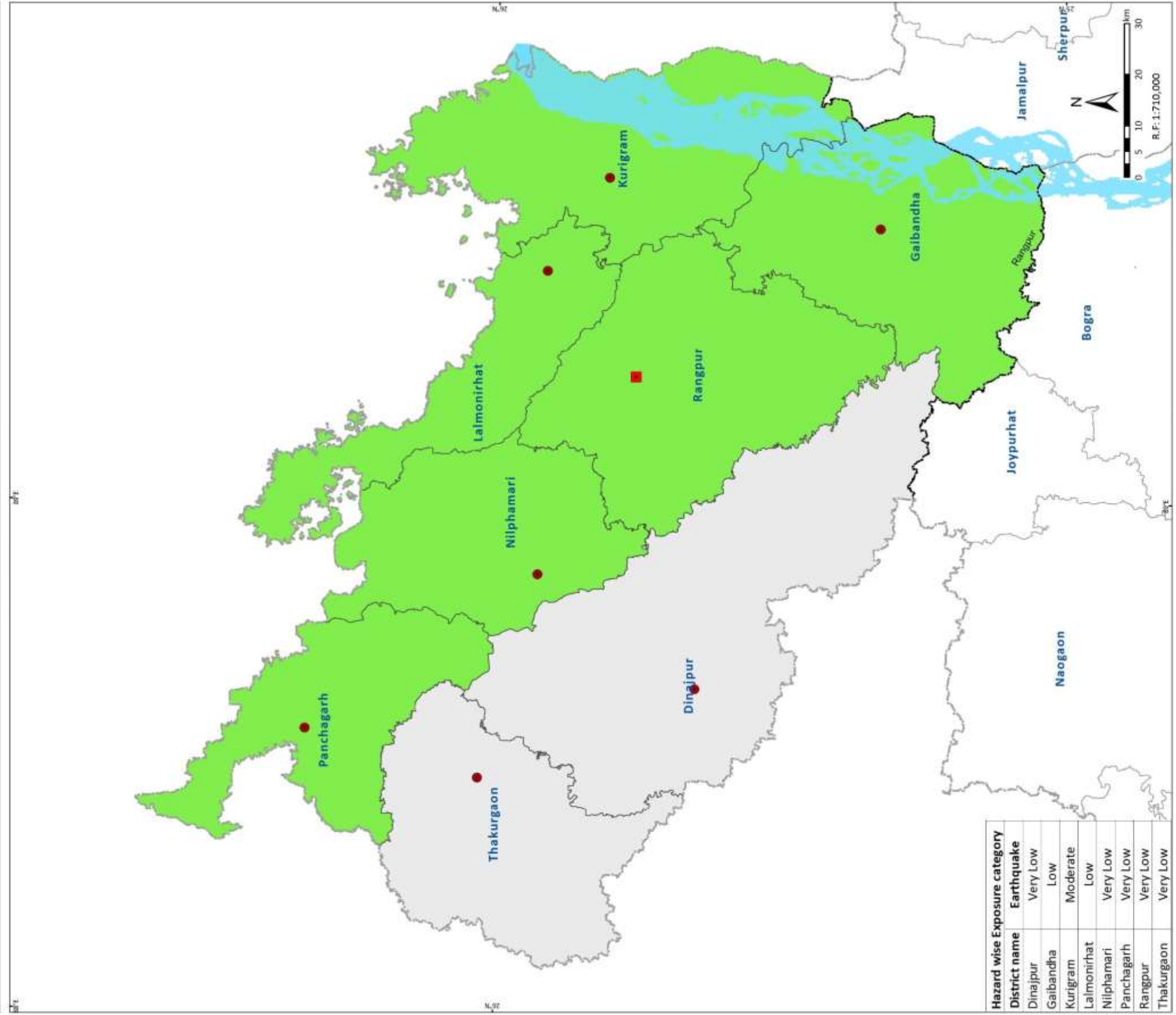


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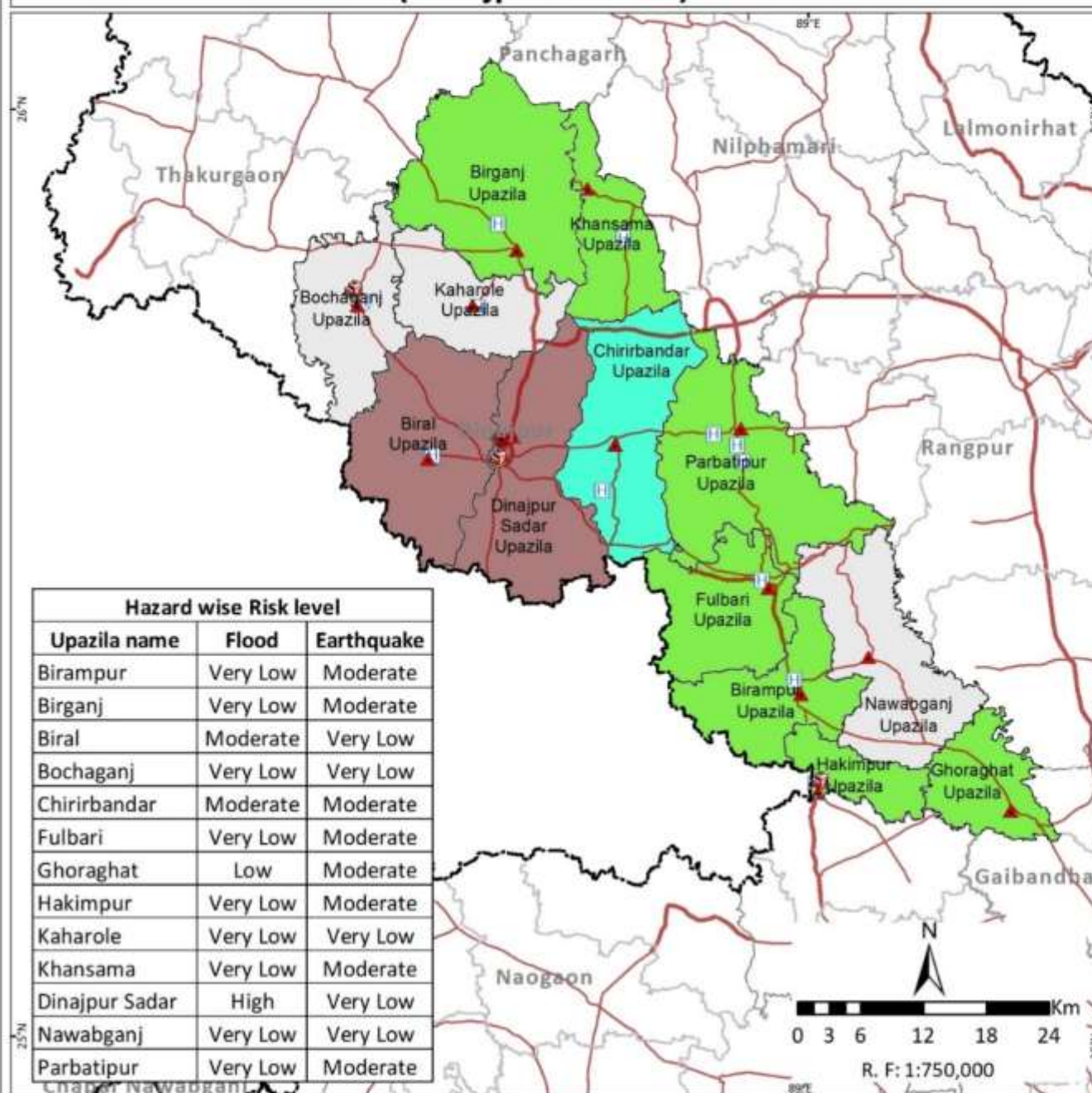
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Risk Levels of Housing (Pucka and Semi-Pucka) to Multi-Hazard (Rangpur Division)

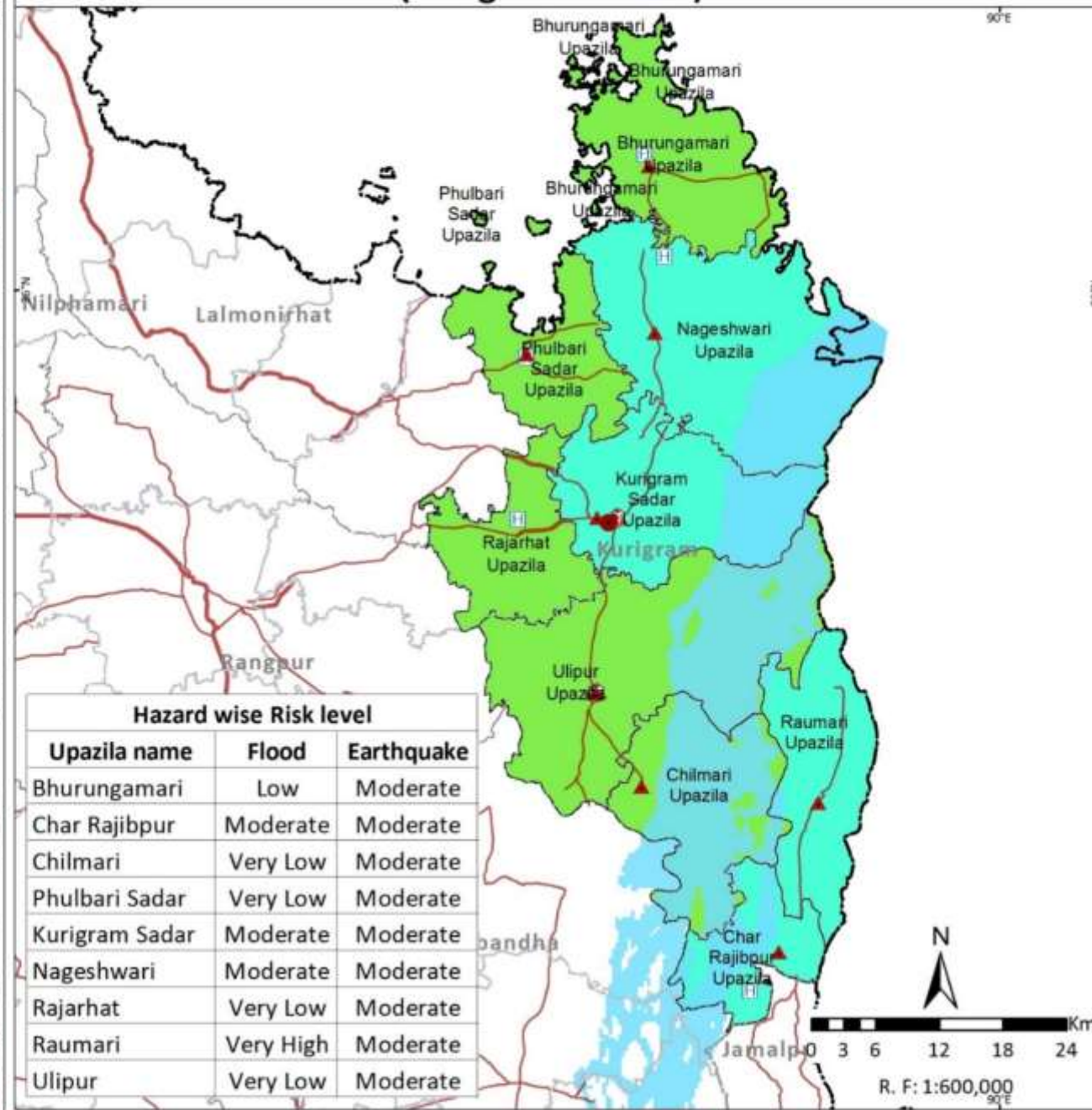




Housing (Pucka and Semi-Pucka) Risk to Multi-Hazard (Dinajpur District)



Housing (Pucka and Semi-Pucka) Risk to Multi-Hazard (Kurigram District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood, Earthquake
- Flood
- Earthquake
- Risk level below moderate

Note:

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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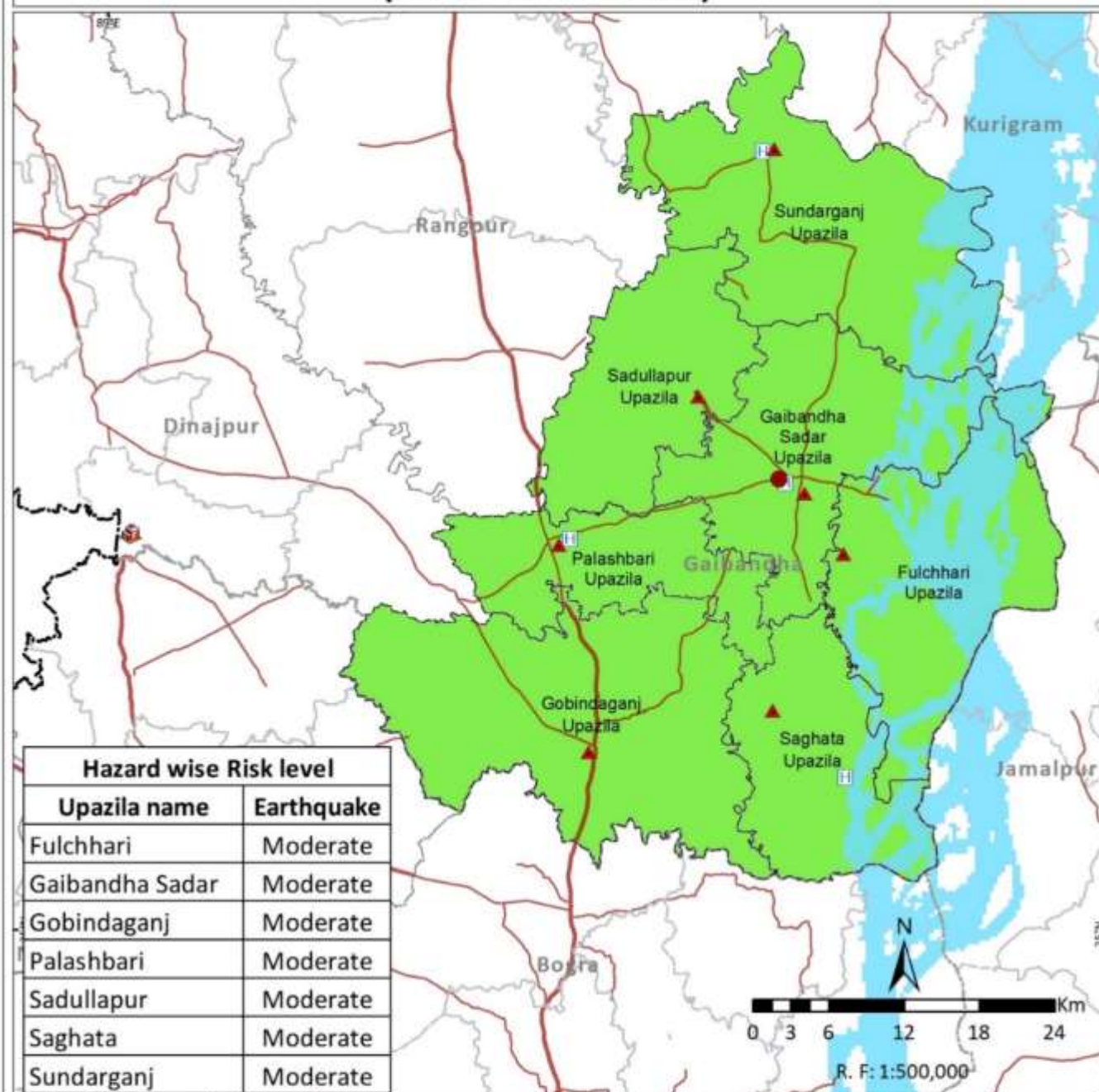
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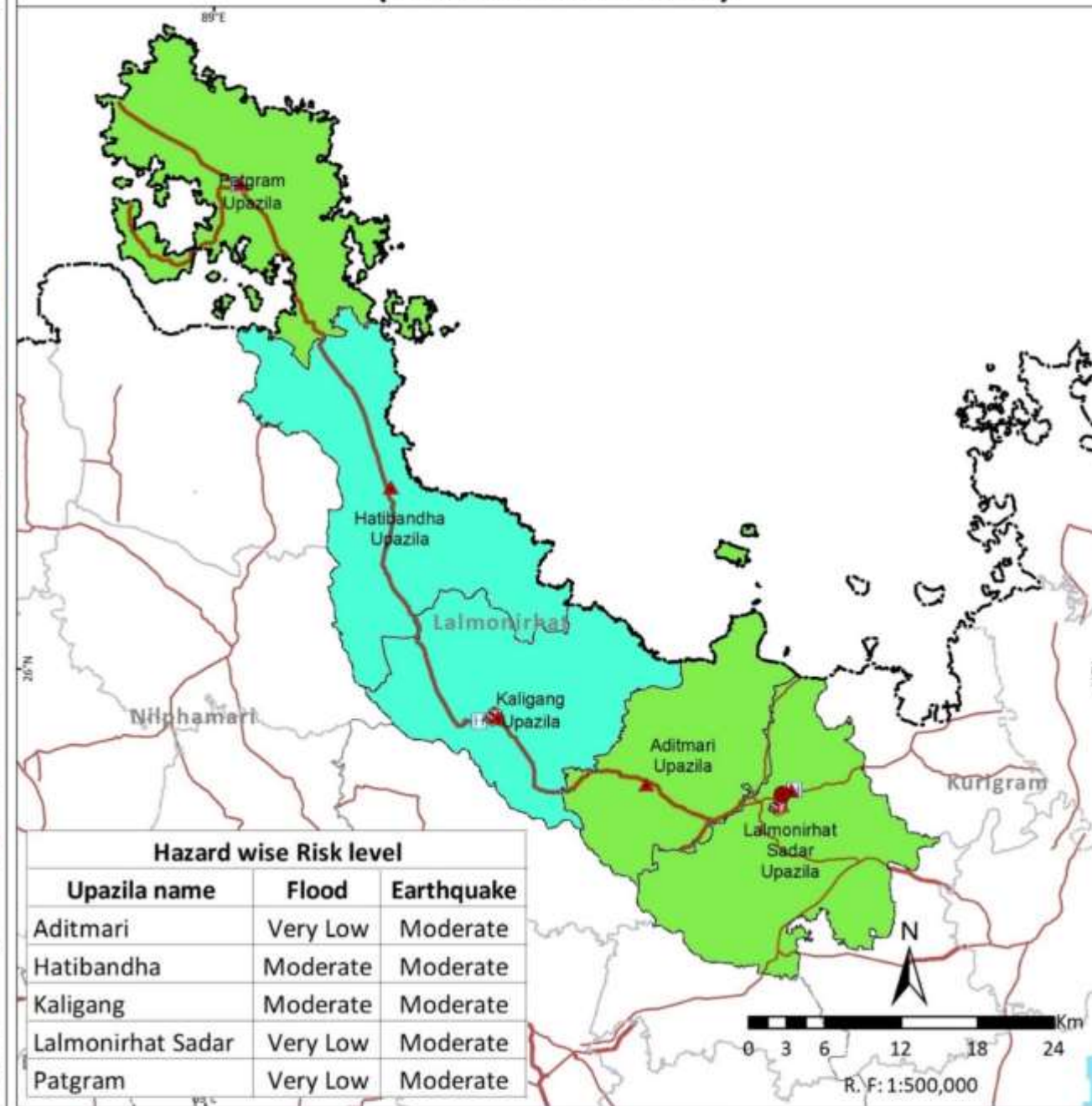
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Housing (Pucka and Semi-Pucka) Risk to Multi-Hazard (Gaibandha District)



Housing (Pucka and Semi-Pucka) Risk to Multi-Hazard (Lalmonirhat District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood, Earthquake
- Earthquake

Note:

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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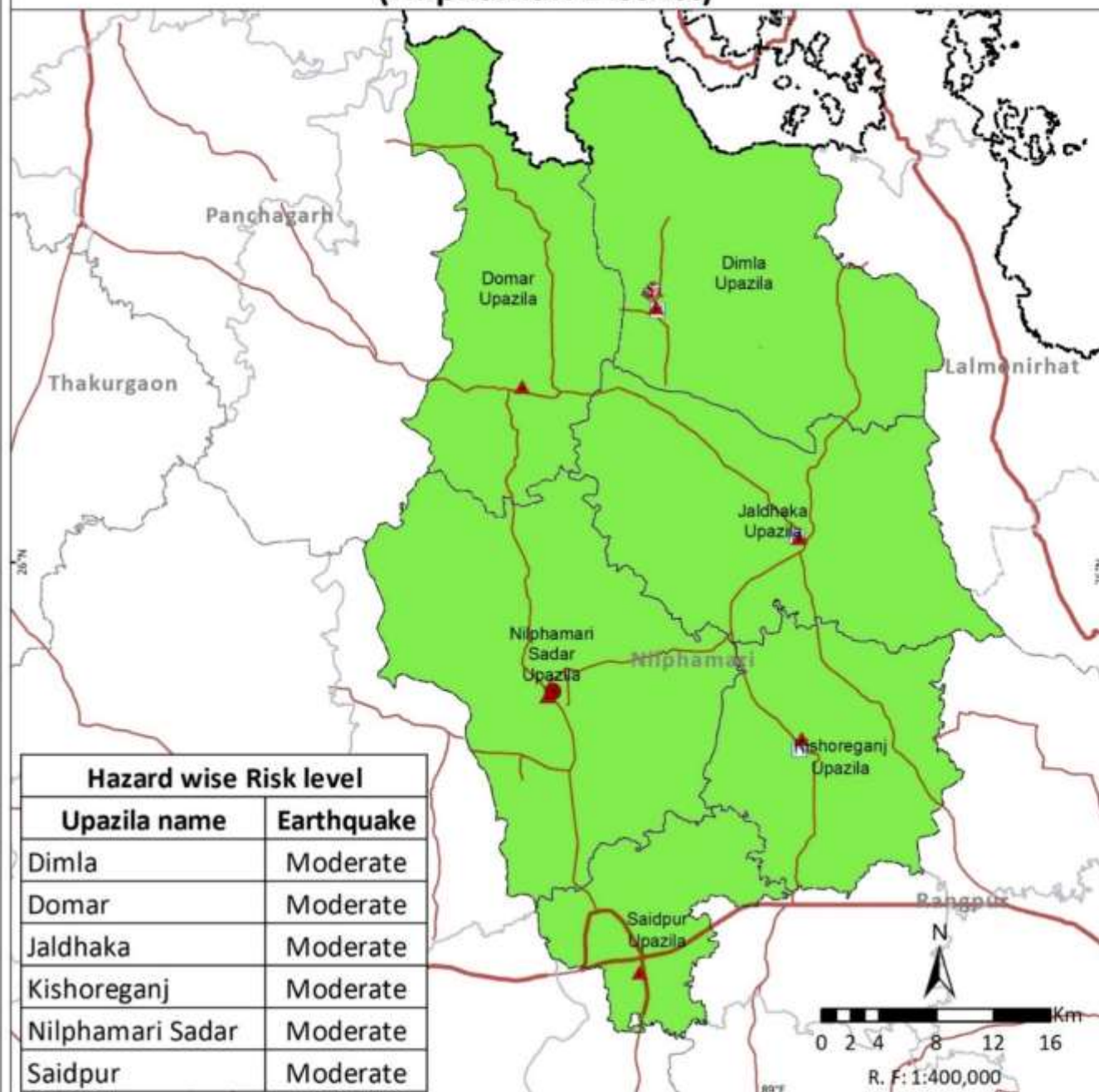
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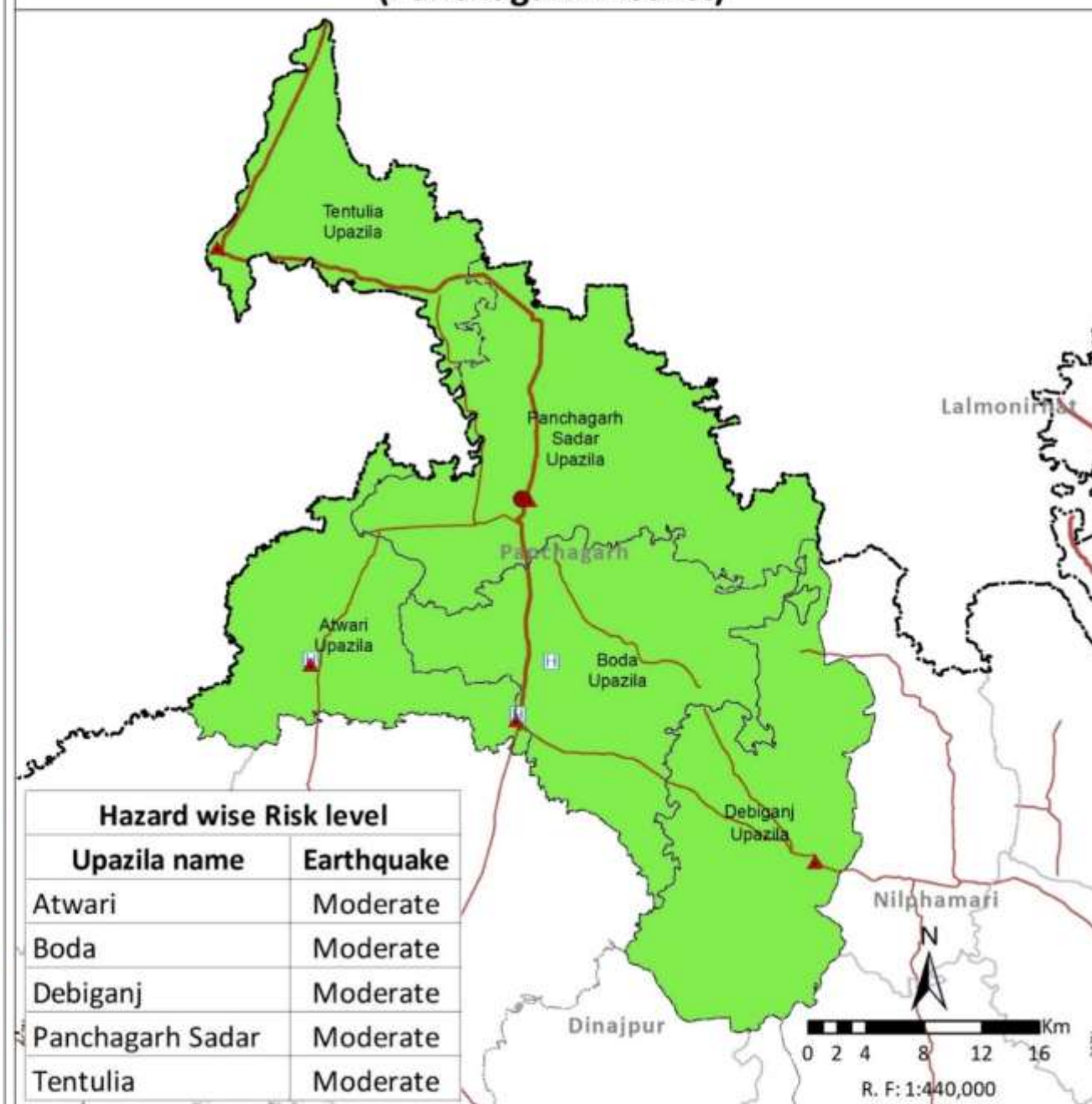
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Housing (Pucka and Semi-Pucka) Risk to Multi-Hazard (Nilphamari District)



Housing (Pucka and Semi-Pucka) Risk to Multi-Hazard (Panchagarh District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Earthquake

Note:

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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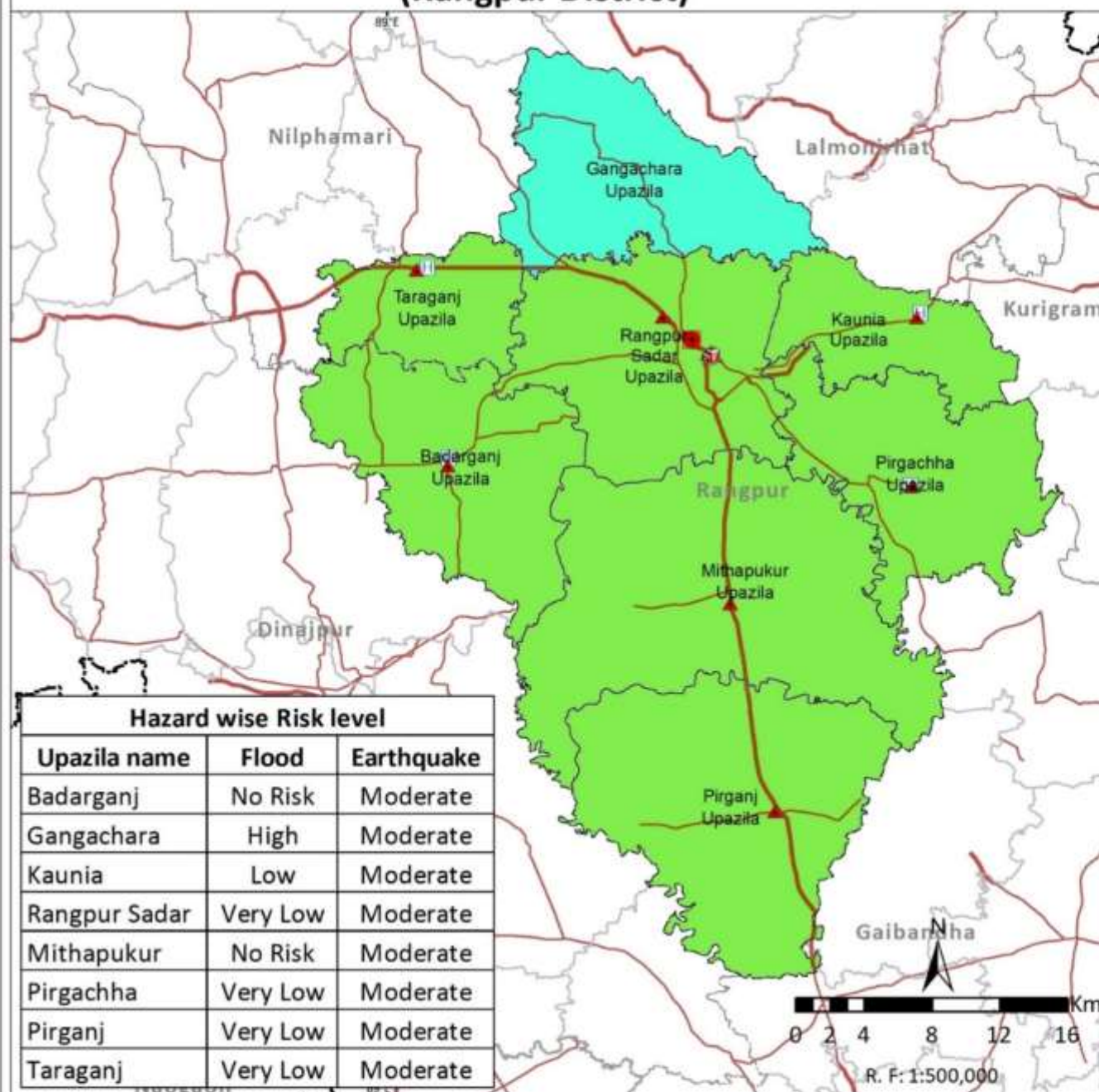
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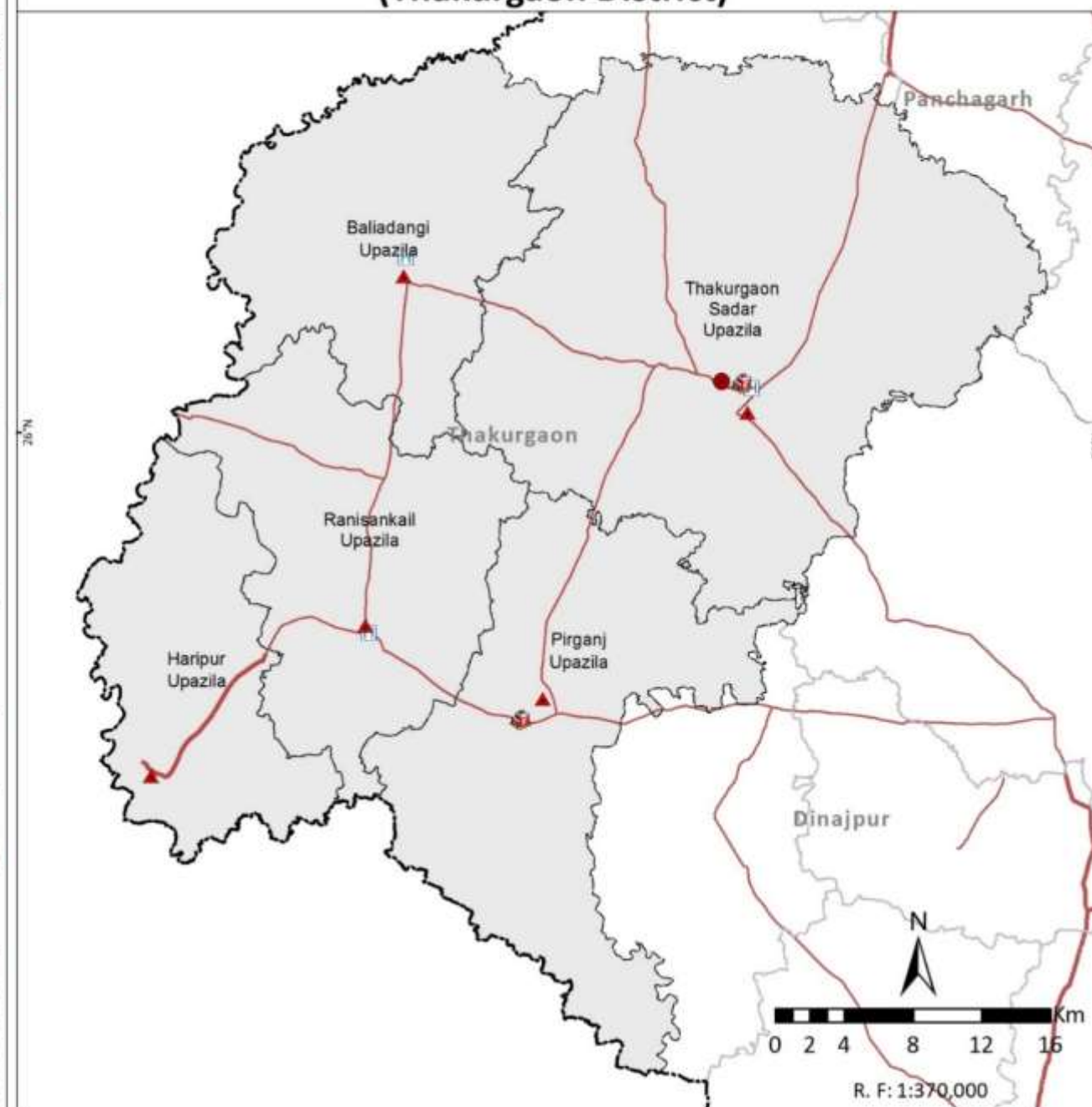
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Housing (Pucka and Semi-Pucka) Risk to Multi-Hazard (Rangpur District)



Housing (Pucka and Semi-Pucka) Risk to Multi-Hazard (Thakurgaon District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- Division Head Quarter
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood, Earthquake
- Earthquake
- Risk level below moderate

Note:

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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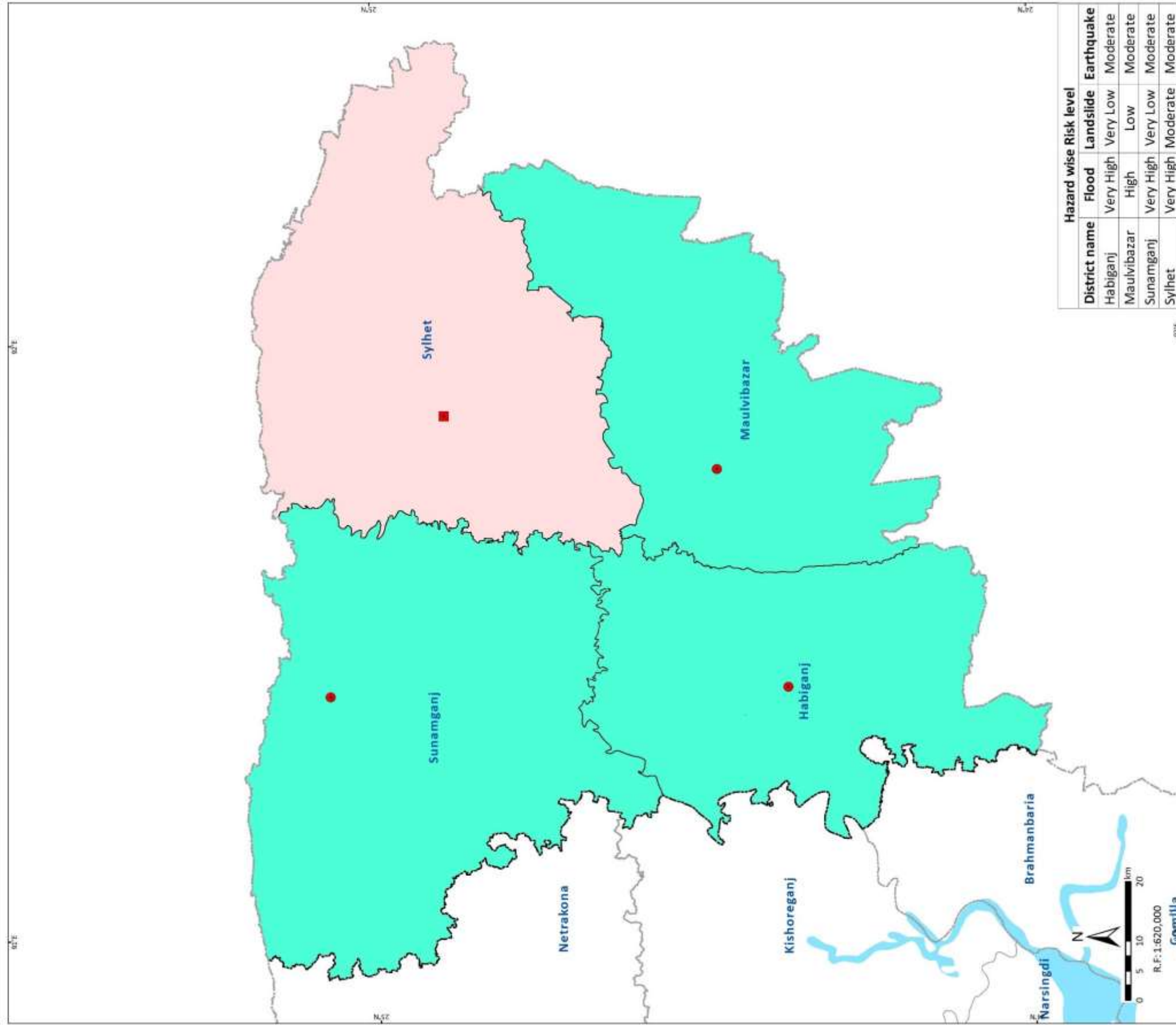


Multi-Hazard Risk and Vulnerability Assessment, Modelling and Mapping in Bangladesh



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Risk Levels of Housing (Pucka and Semi-Pucka) to Multi-Hazard (Sylhet Division)



Multi-Hazard Risk level for

- Flood, Landslide, Earthquake
- Flood, Earthquake

Country Boundary

Division Boundary

District Boundary

District Head Quarter

River/Sea/Lake

Sundarbans

Note:

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDM-P-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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

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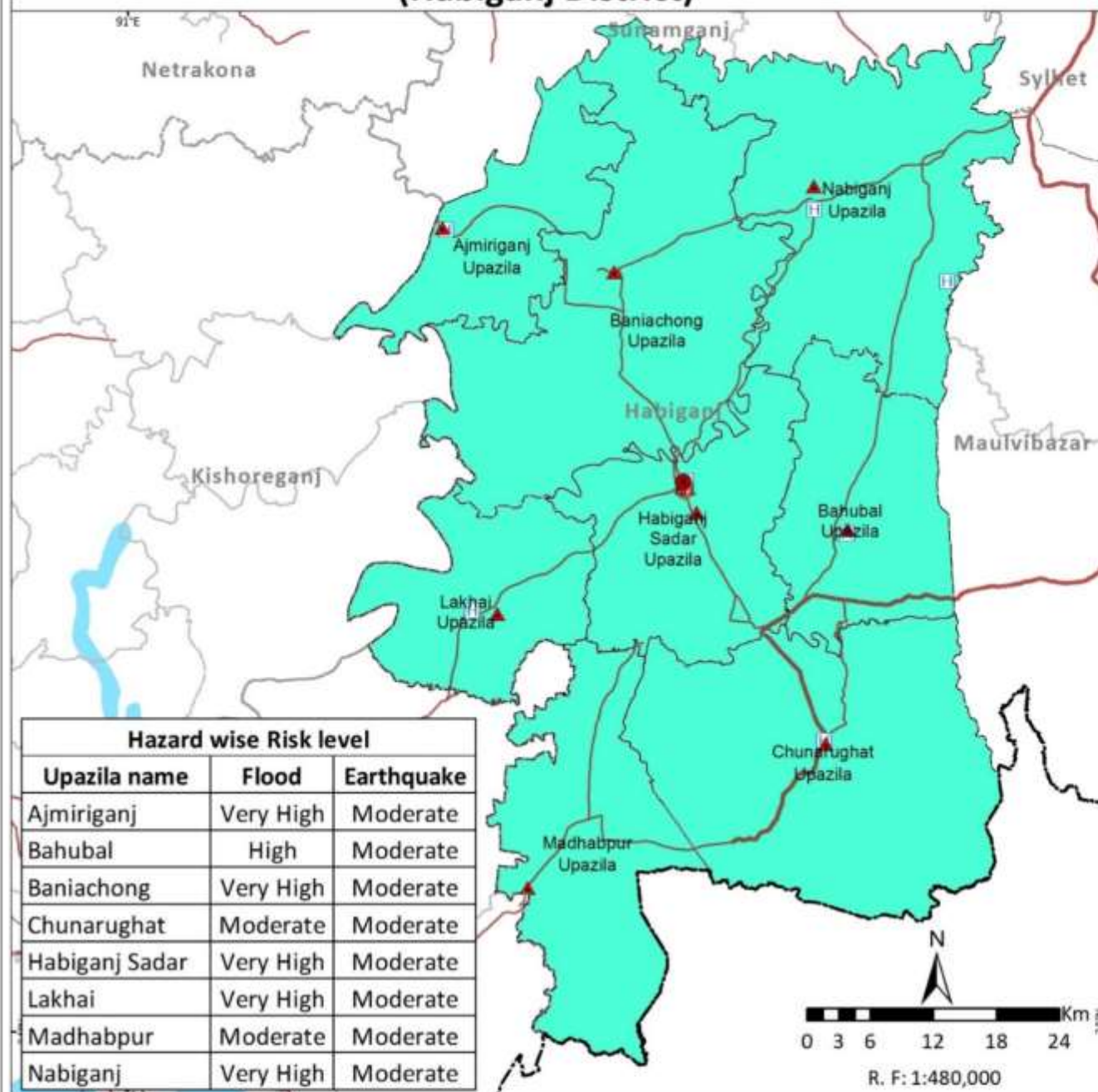
Department of Disaster Management (DDM)

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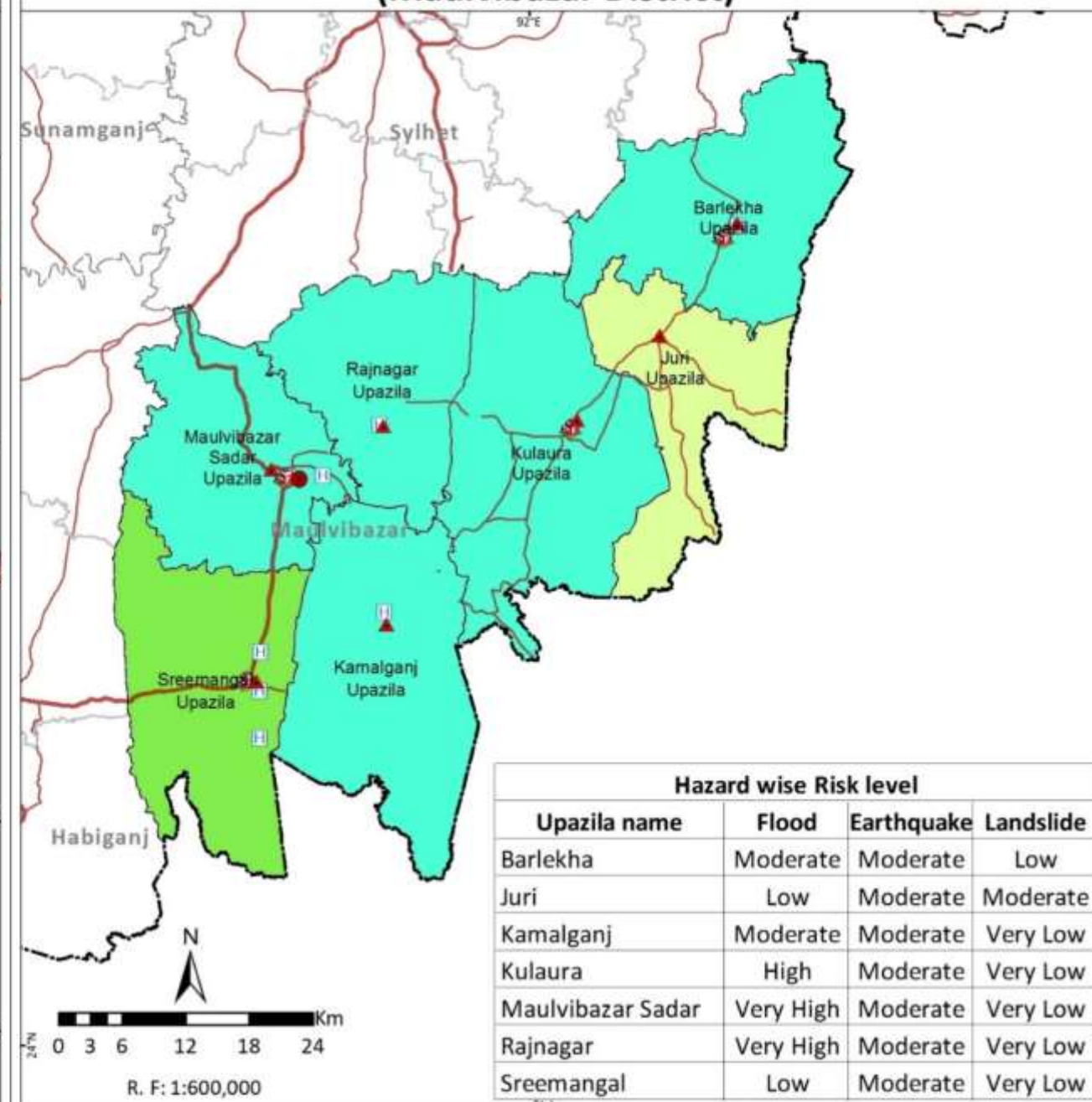




Housing (Pucka and Semi-Pucka) Risk to Multi-Hazard (Habiganj District)



Housing (Pucka and Semi-Pucka) Risk to Multi-Hazard (Maulvibazar District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Landslide, Earthquake
- Flood, Earthquake
- Earthquake

Note:

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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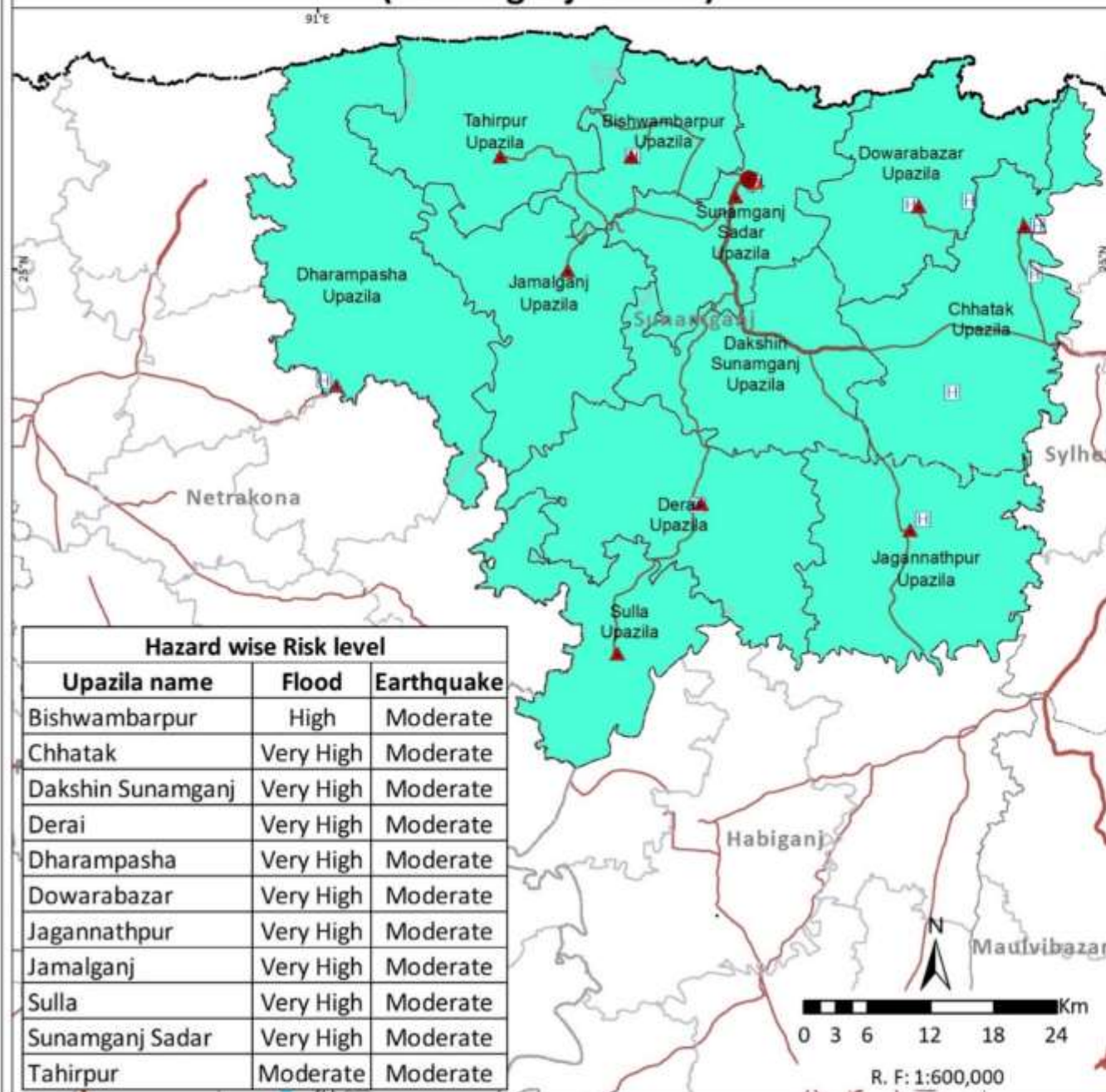
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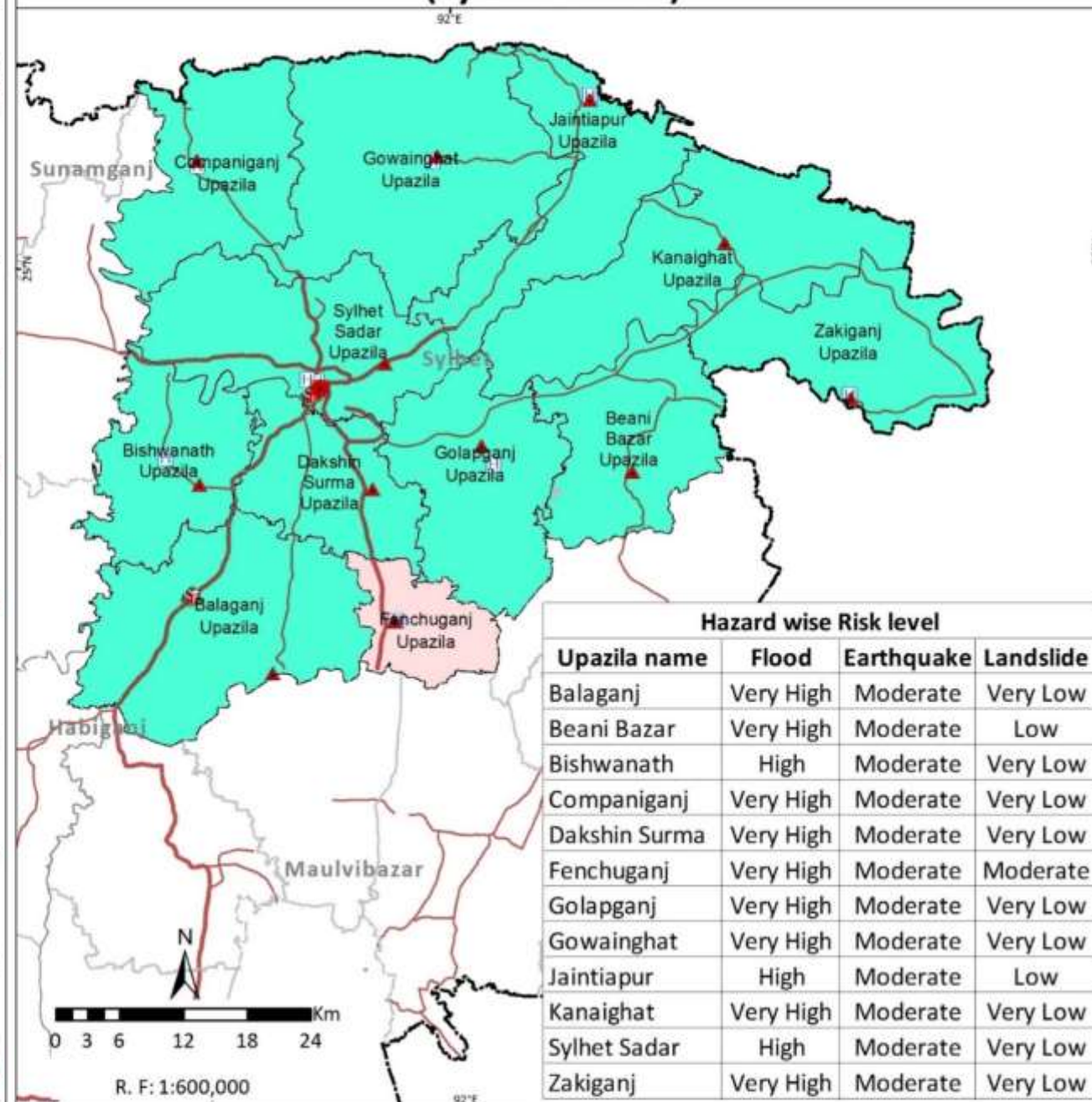
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Housing (Pucka and Semi-Pucka) Risk to Multi-Hazard (Sunamganj District)



Housing (Pucka and Semi-Pucka) Risk to Multi-Hazard (Sylhet District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- Division Head Quarter
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood, Landslide, Earthquake
- Flood, Earthquake

Note:

Housing (Pucka and Semi-Pucka) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

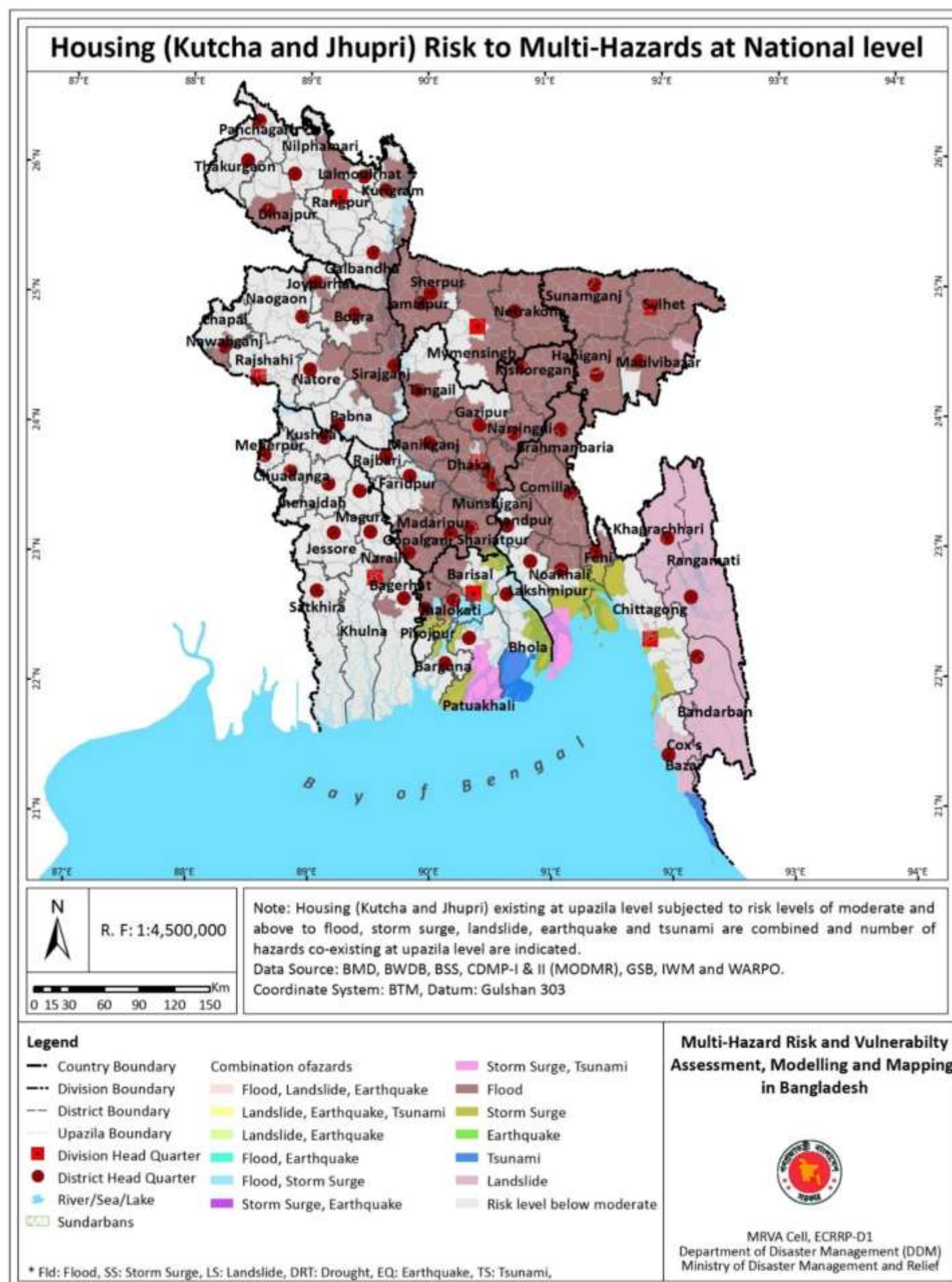
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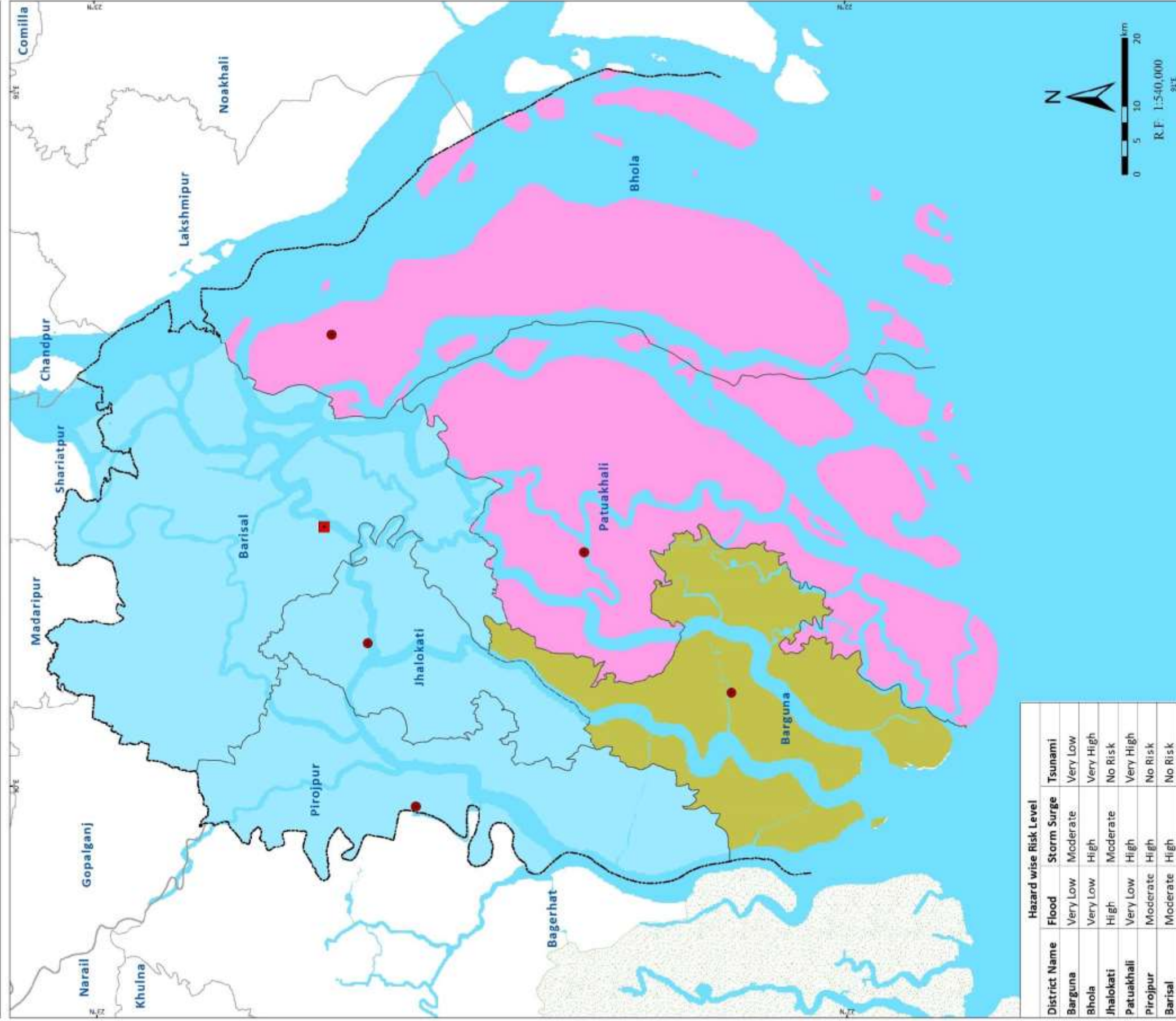
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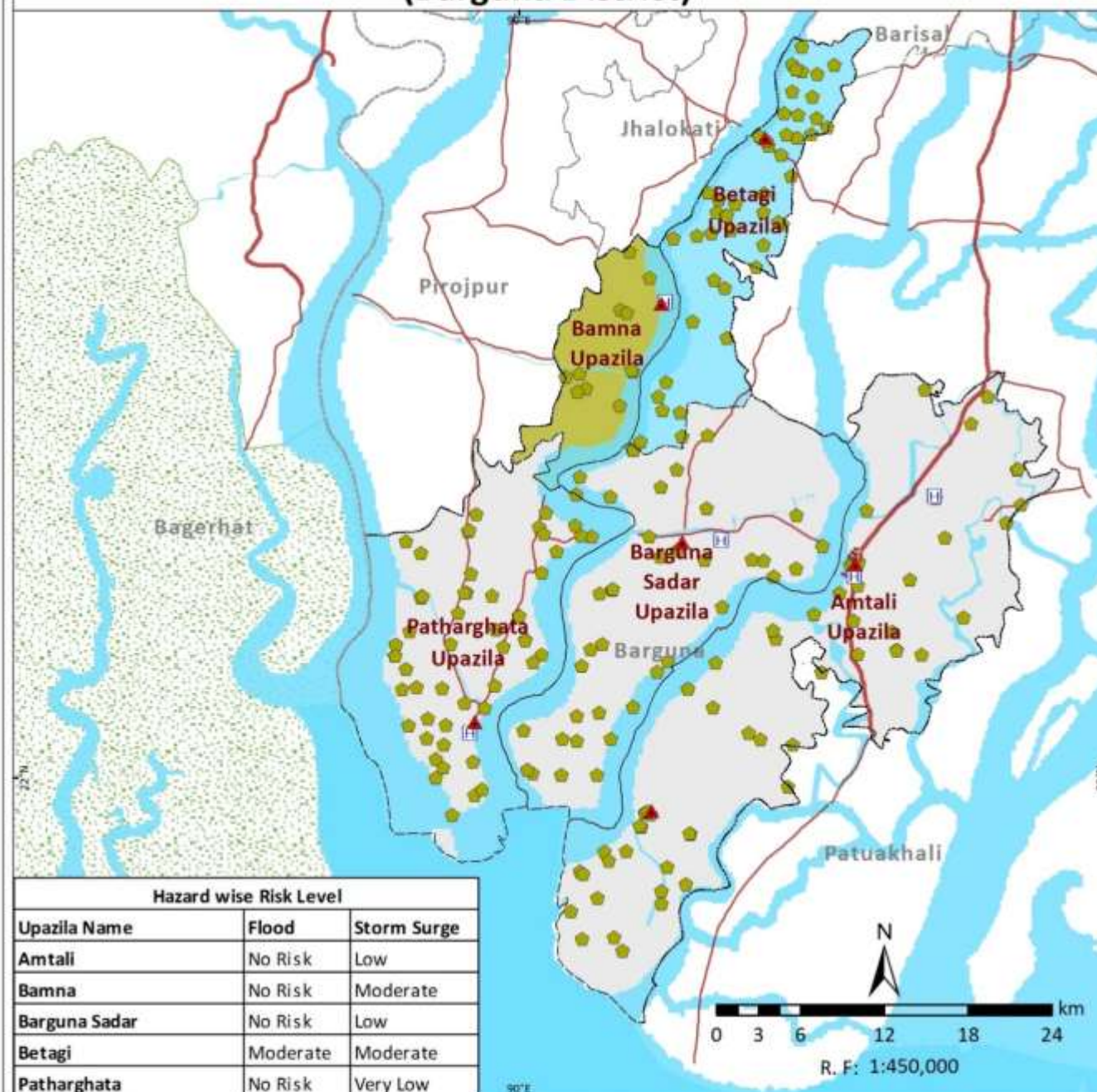


Risk Levels of Housing (Kutchha and Jhupri) to Multi-Hazard (Barisal Division)

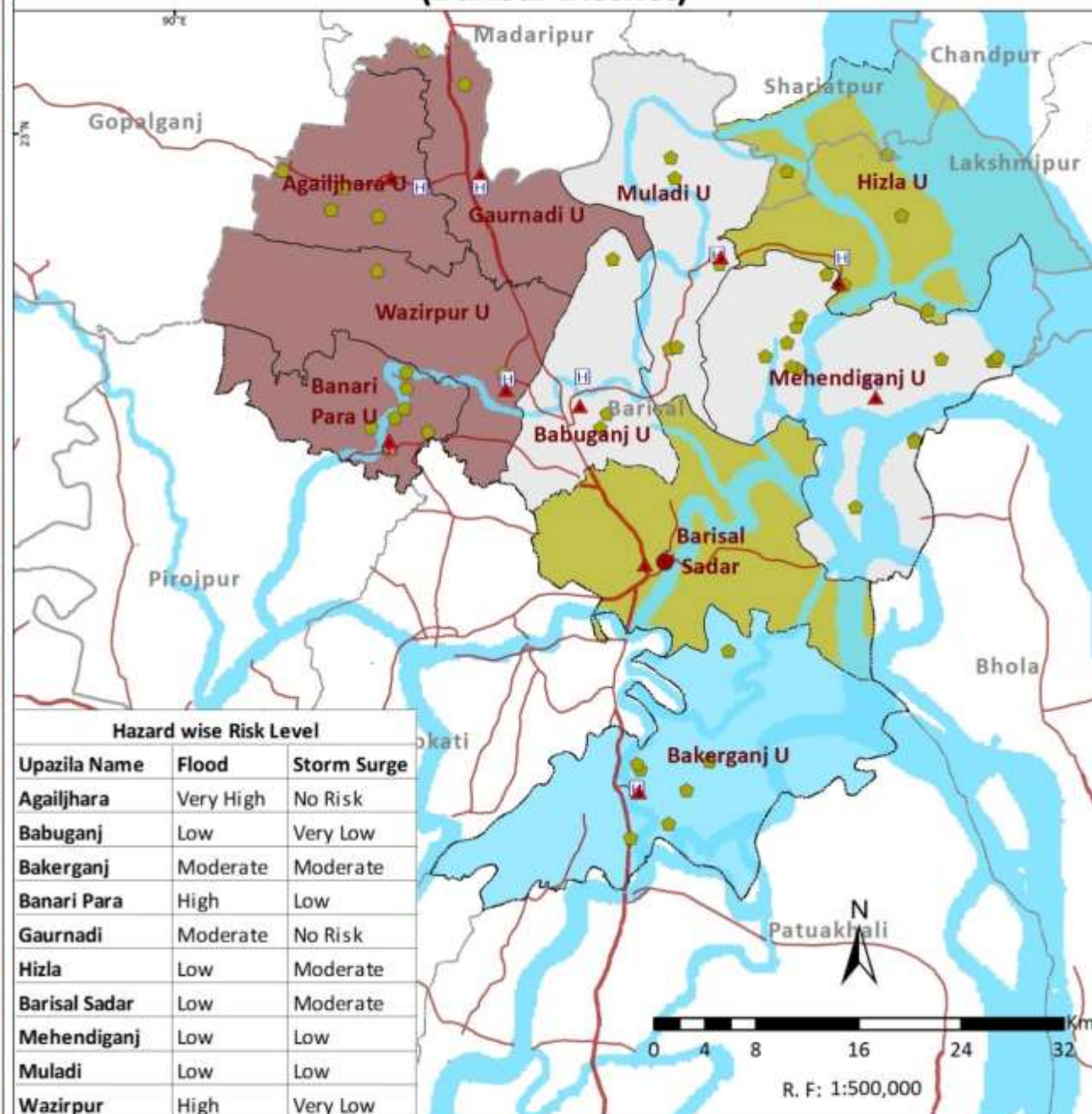




Risk Levels of Housing (Kutcha and Jhupri) to Multi hazard (Barguna District)



Risk Levels of Housing (Kutcha and Jhupri) to Multi hazard (Barisal District)



- Country Boundary
- Division Boundary
- District Boundary
- Upazila_Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
- Flood, Storm Surge
- Flood
- Storm Surge
- Risk level below moderate

Note
Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

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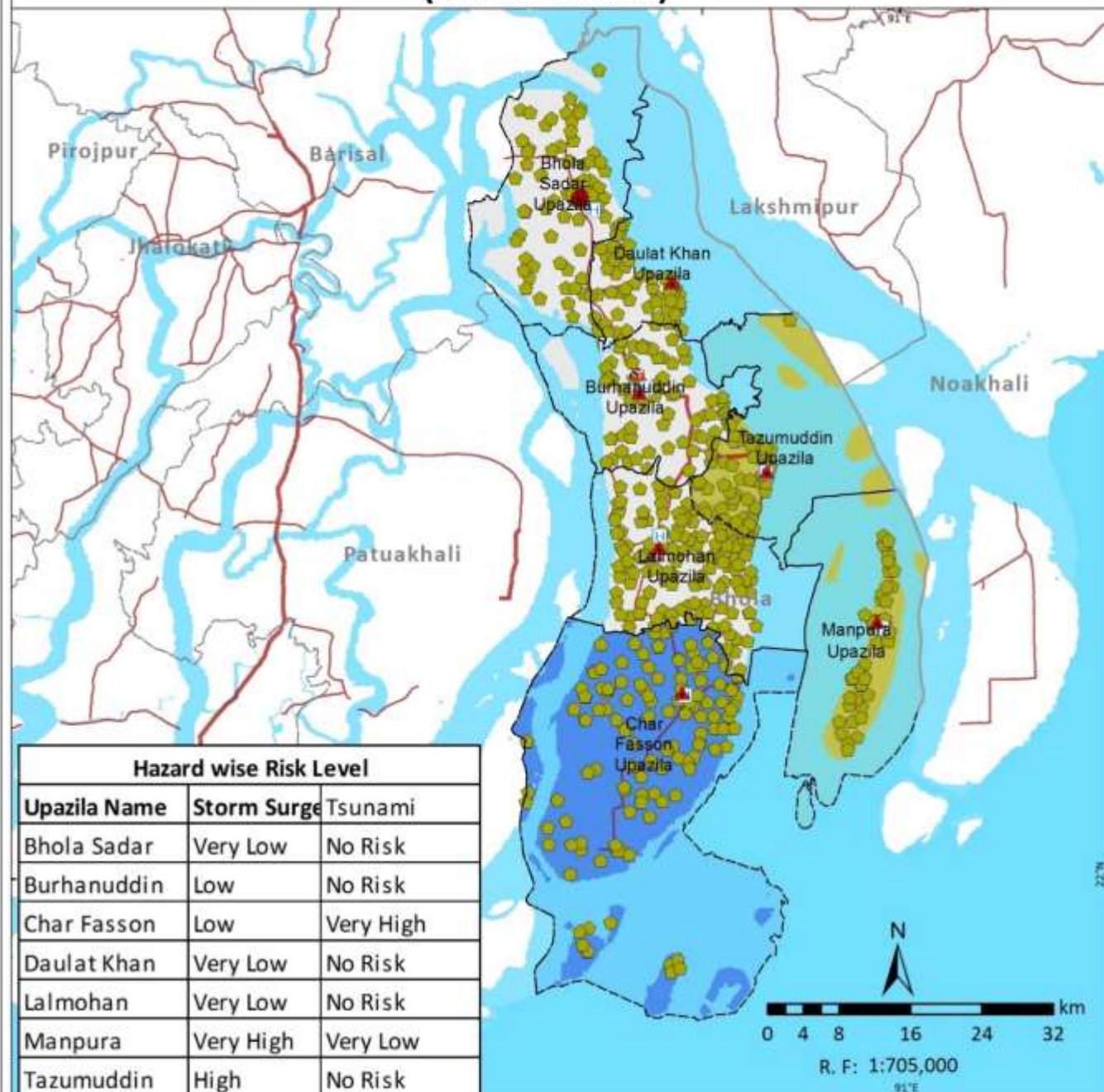
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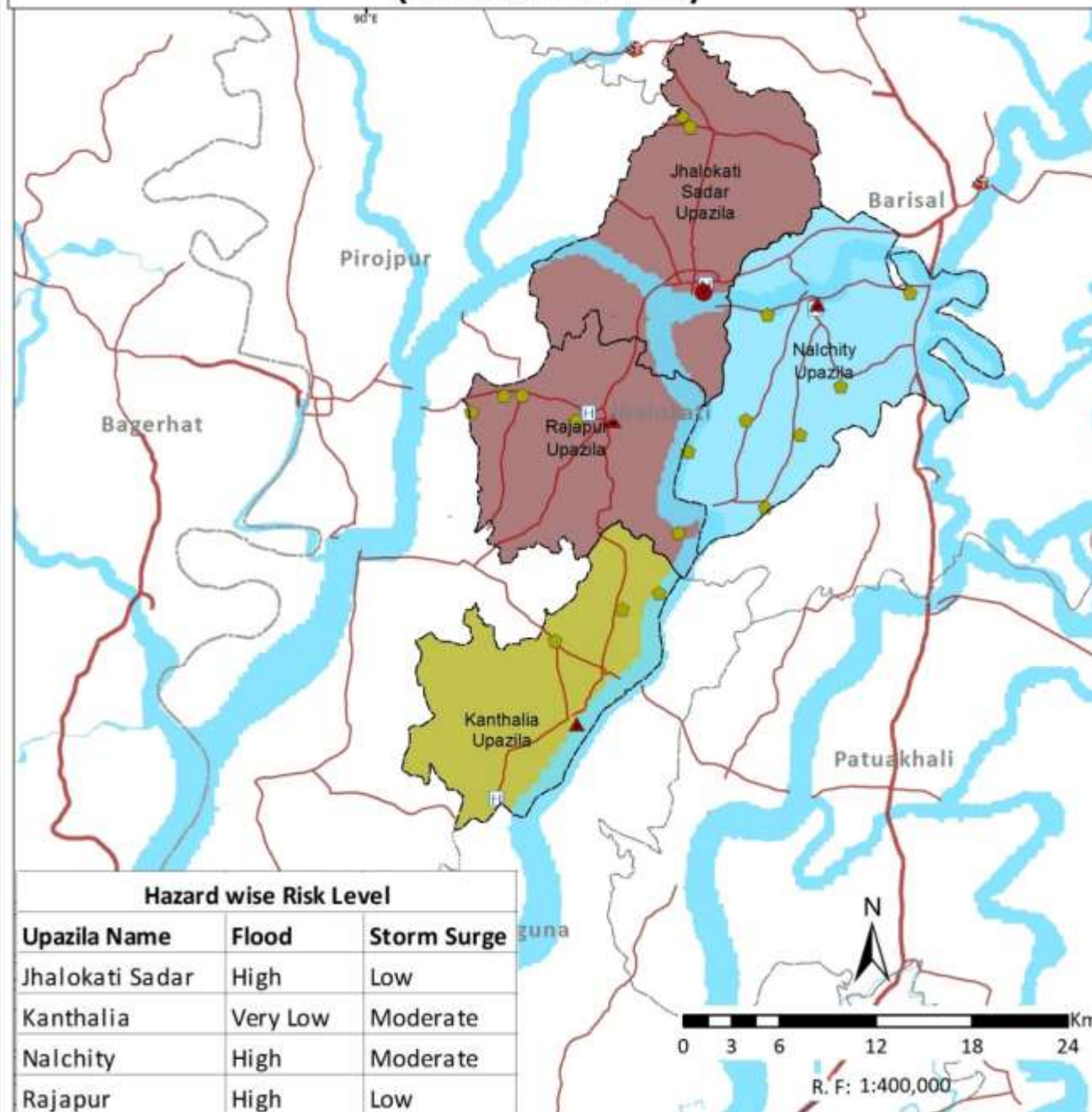
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Risk Levels of Housing (Kutcha and Jhupri) to Multi hazard (Bhola District)



Risk Levels of Housing (Kutcha and Jhupri) to Multi hazard (Jhalokati District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- Disrict Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
- Flood, Storm Surge
- Flood
- Storm Surge
- Tsunami
- Risk level below moderate

Note

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

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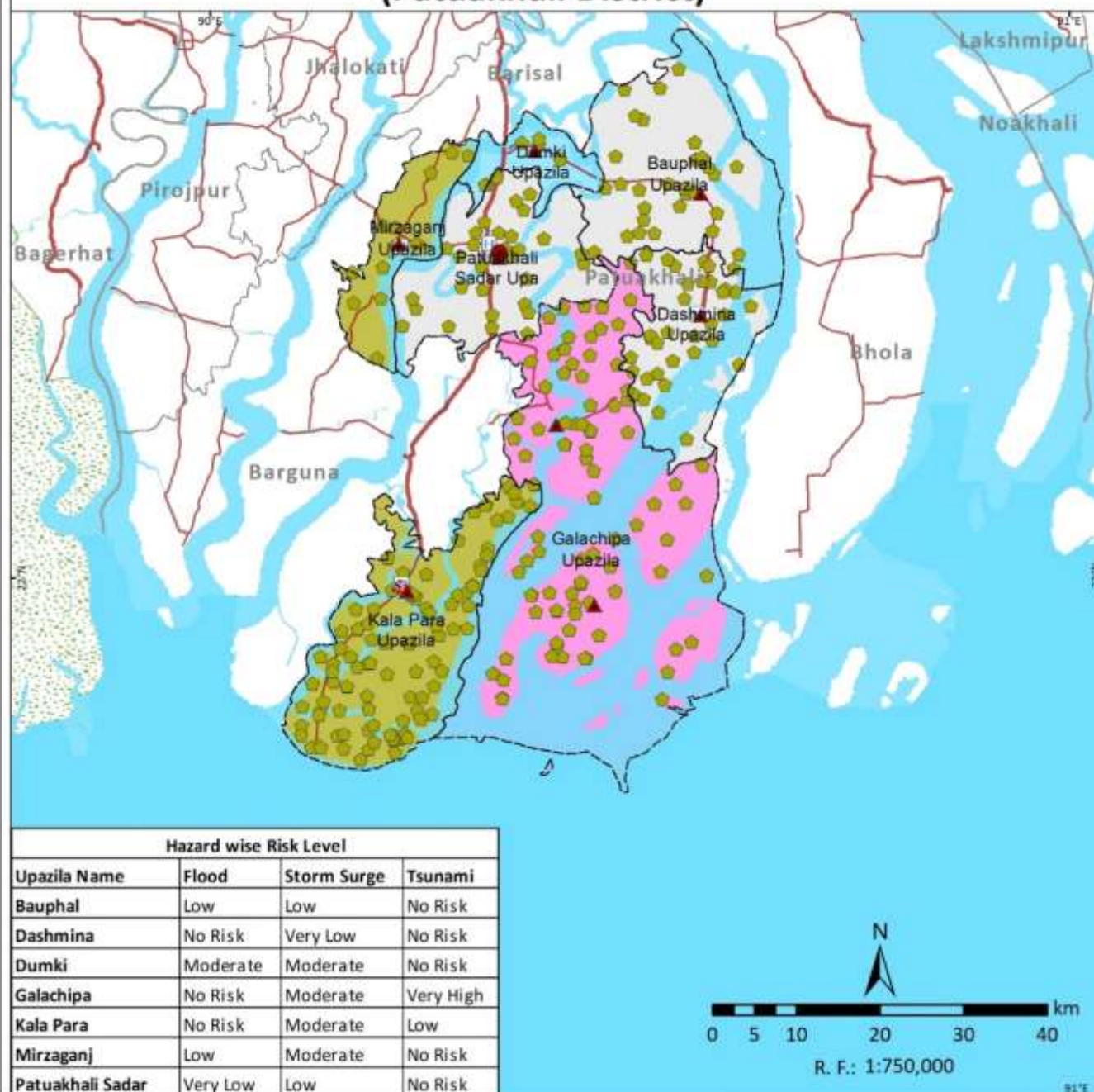
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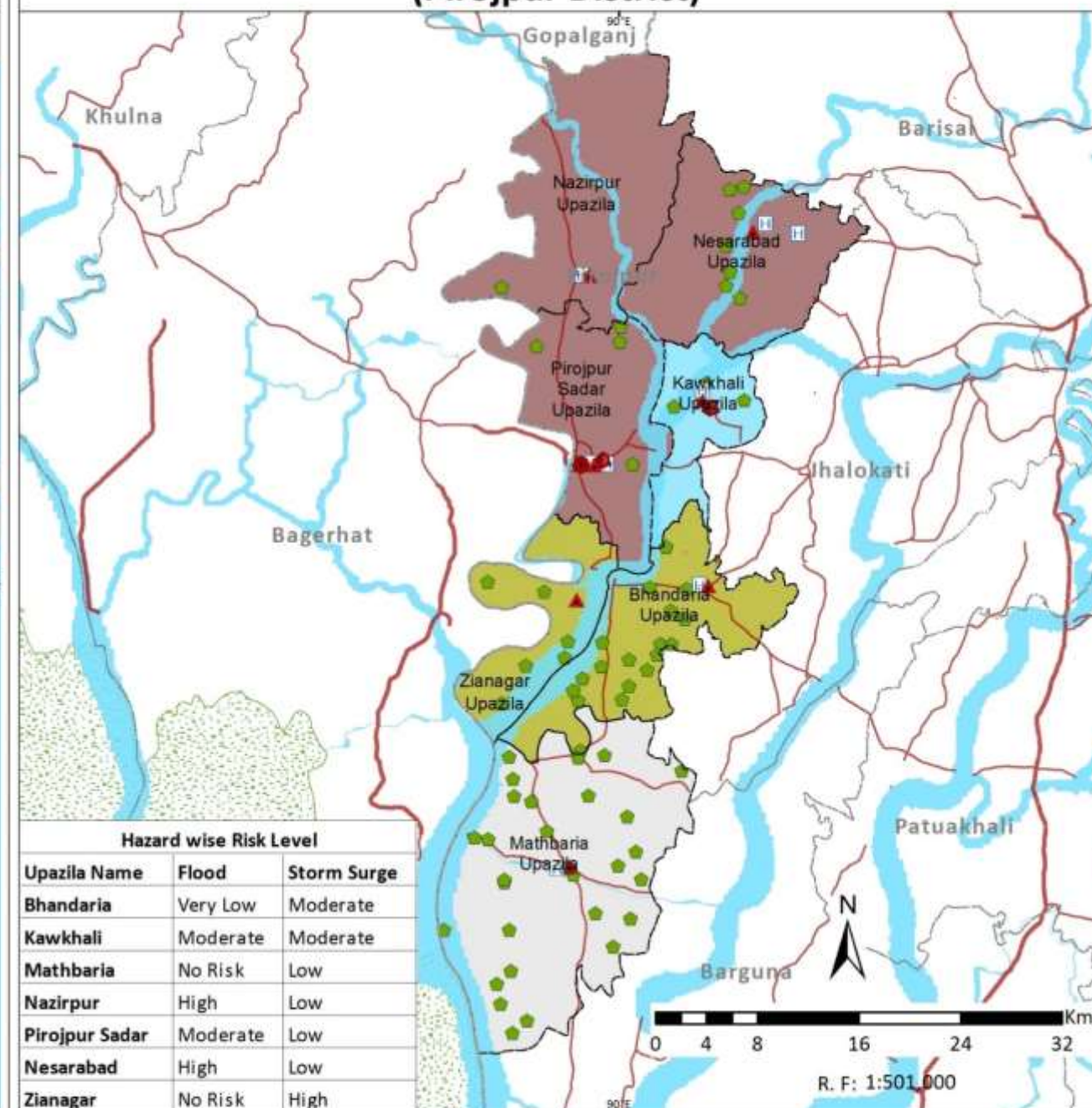
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Risk Levels of Housing (Kutcha and Jhupri) to Multi hazard (Patuakhali District)



Risk Levels of Housing (Kutcha and Jhupri) to Multi hazard (Pirojpur District)



- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
- Flood, Storm Surge
- Storm Surge, Tsunami
- Flood
- Storm Surge
- Tsunami
- Risk level below moderate

Note
Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

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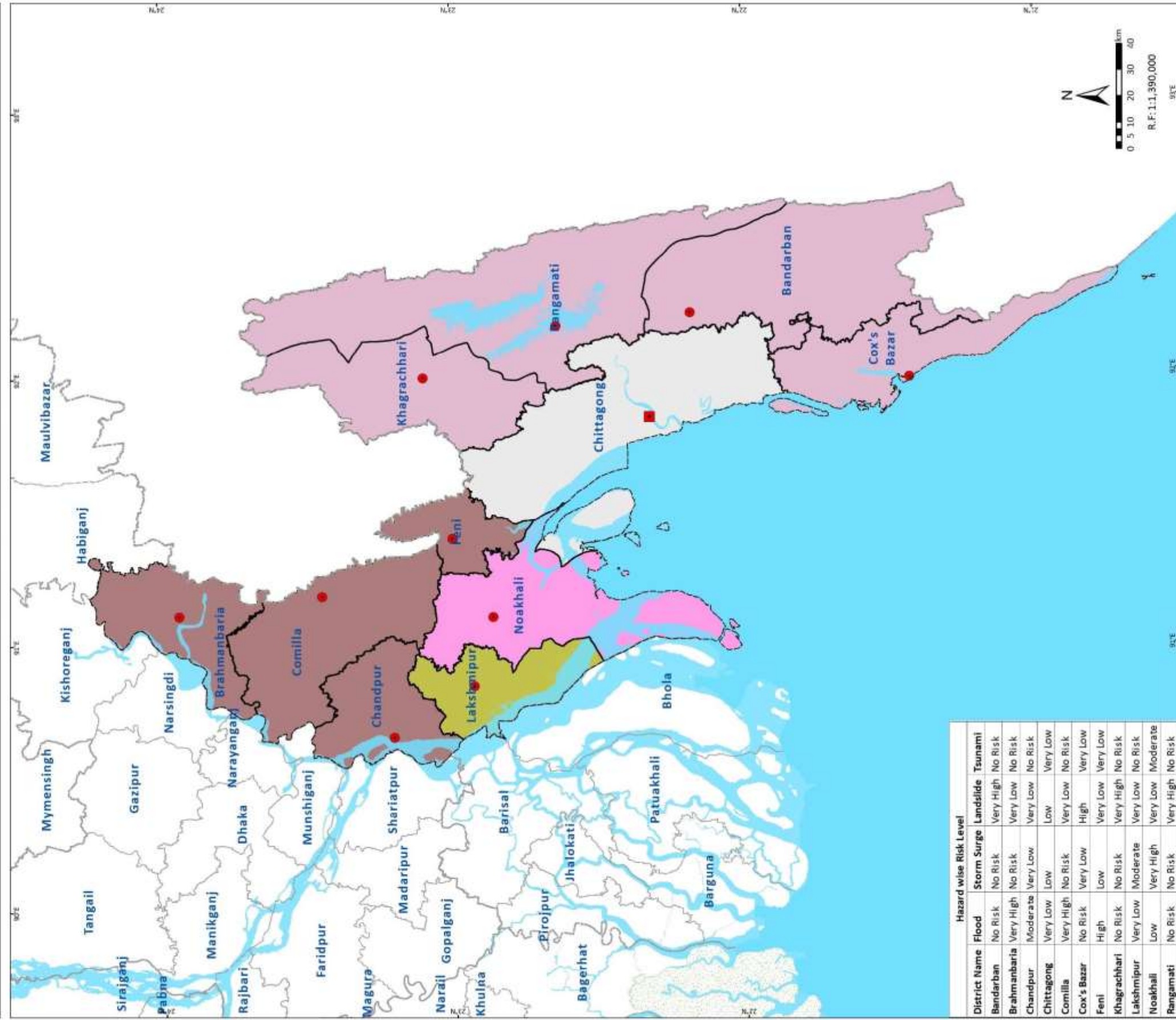


Multi-Hazard Risk and Vulnerability Assessment, Modelling and Mapping in Bangladesh



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Risk Levels of Housing (Kutcha and Jhupri) to Multi-Hazard (Chittagong Division)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Division Head Quarter
- District Head Quarter
- River/Sea/Lake
- Sundarbans

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDM-1 & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

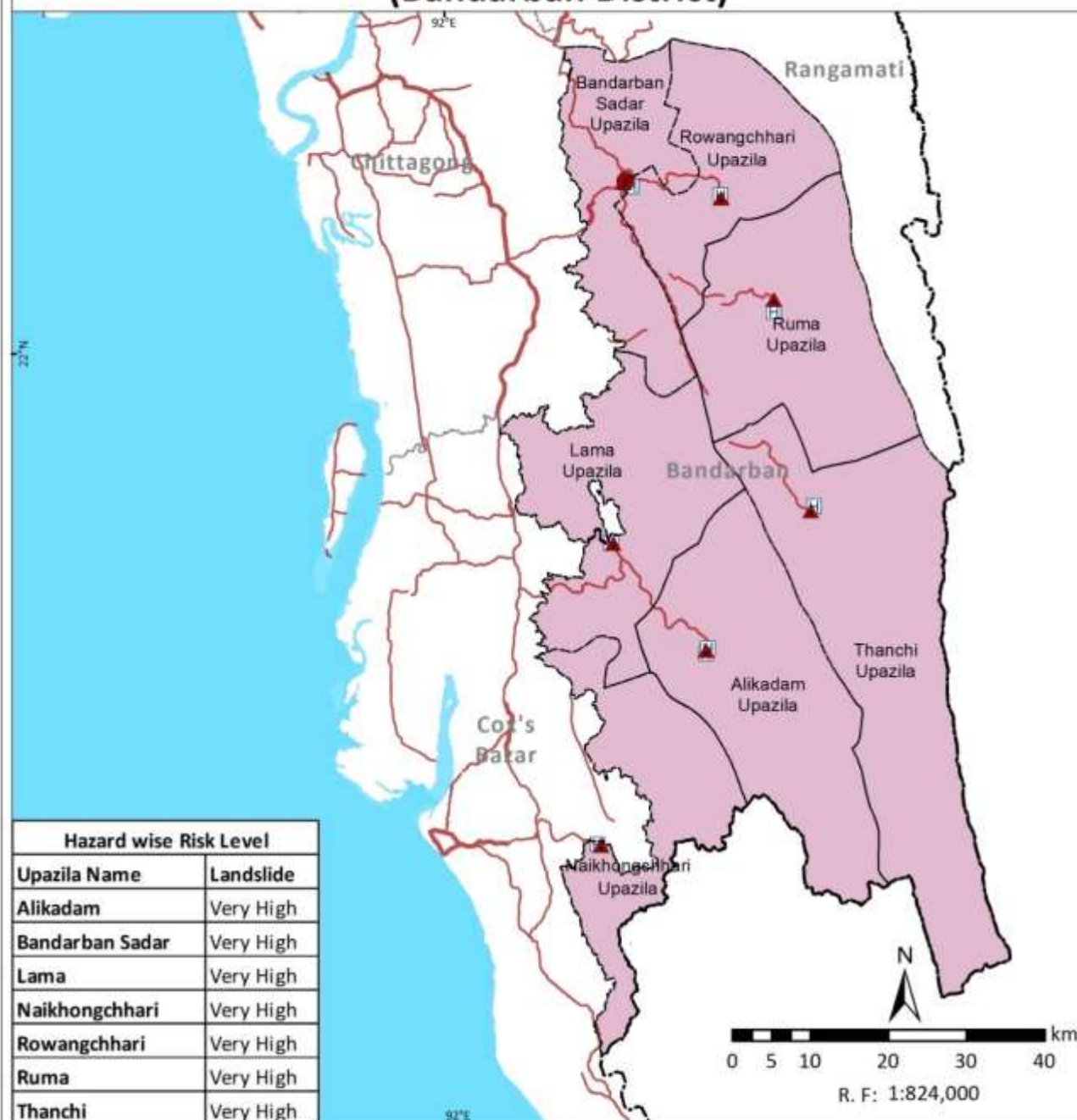
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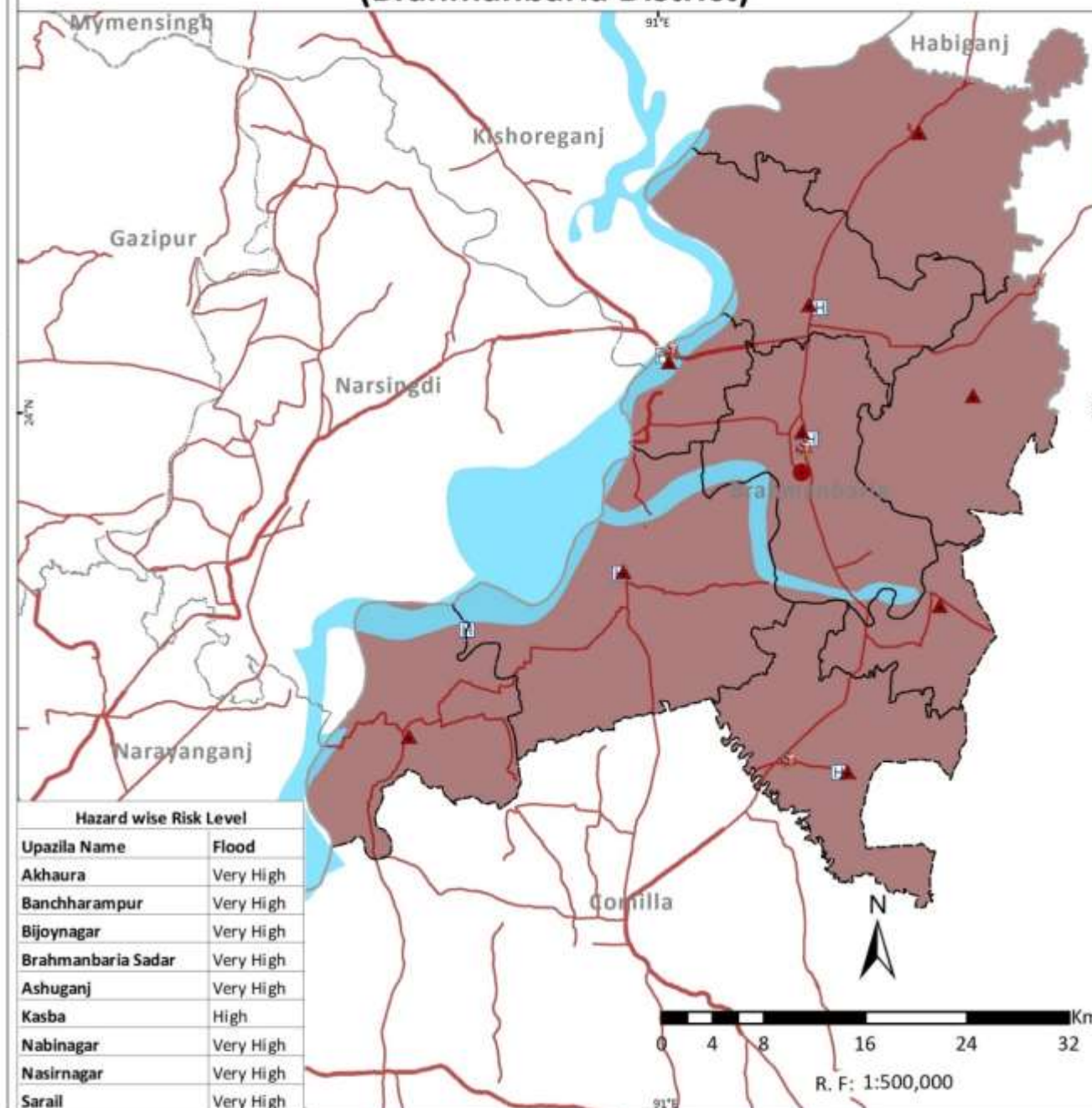
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Risk Levels of Housing (Kutcha and Jhupri) to Multi hazard (Bandarban District)



Risk Levels of Housing (Kutcha and Jhupri) to Multi hazard (Brahmanbaria District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
- Flood
- Landslide

Note

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

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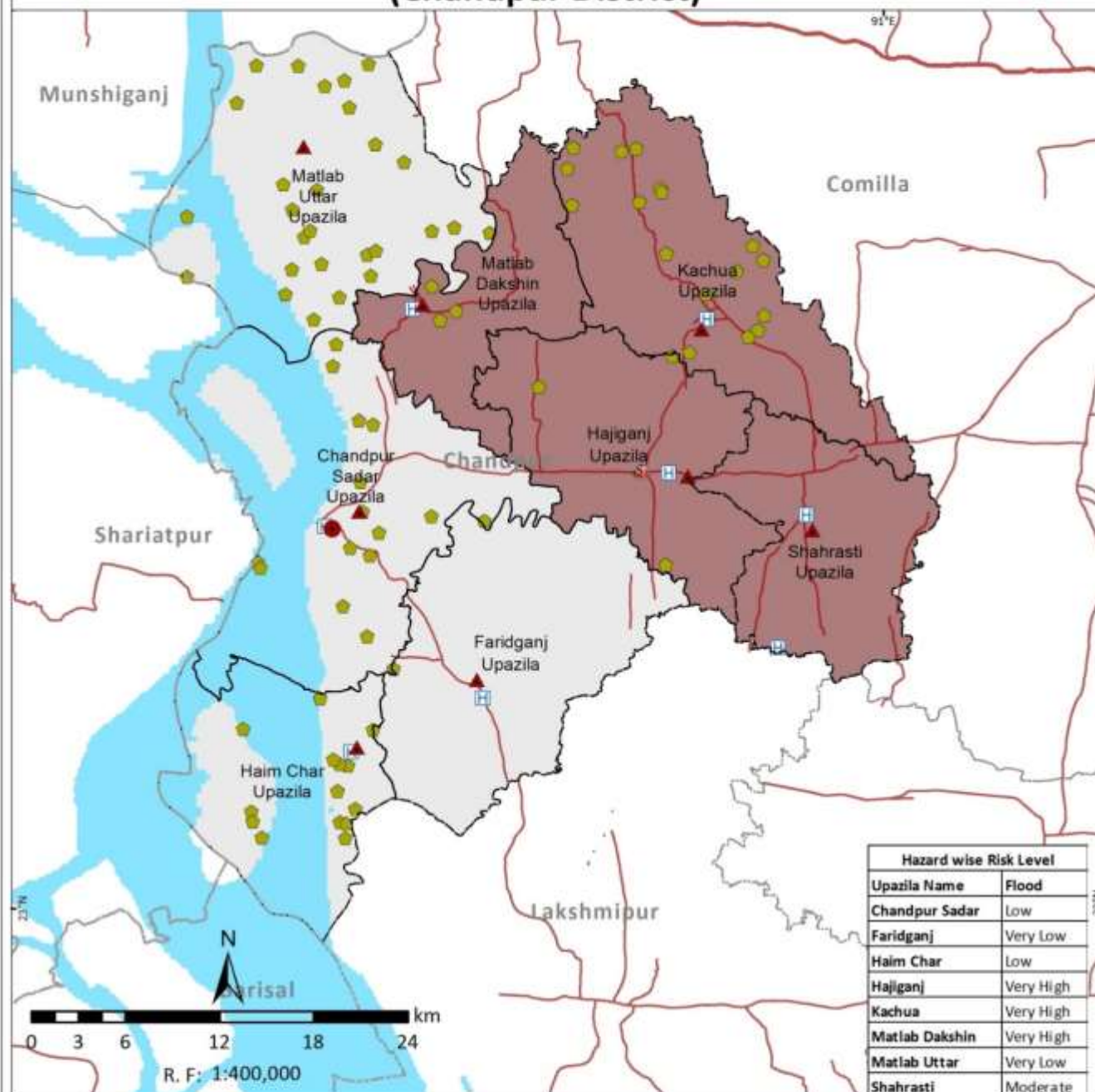
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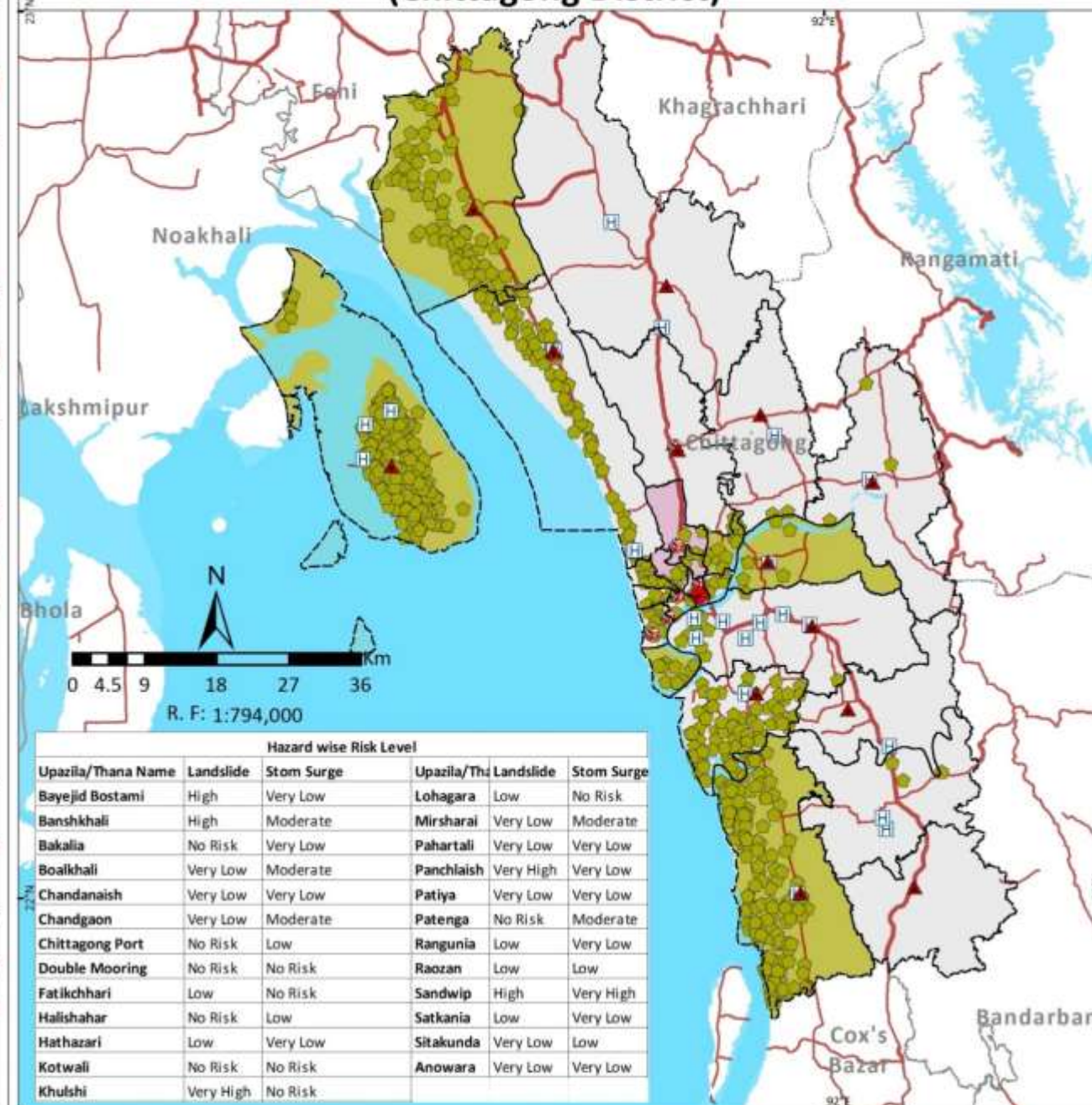
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Risk Levels of Housing (Kutcha and Jhupri) to Multi hazard (Chandpur District)



Risk Levels of Housing (Kutcha and Jhupri) to Multi hazard (Chittagong District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Center
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
- Flood
- Storm Surge
- Landslide
- Risk level below moderate

Note

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

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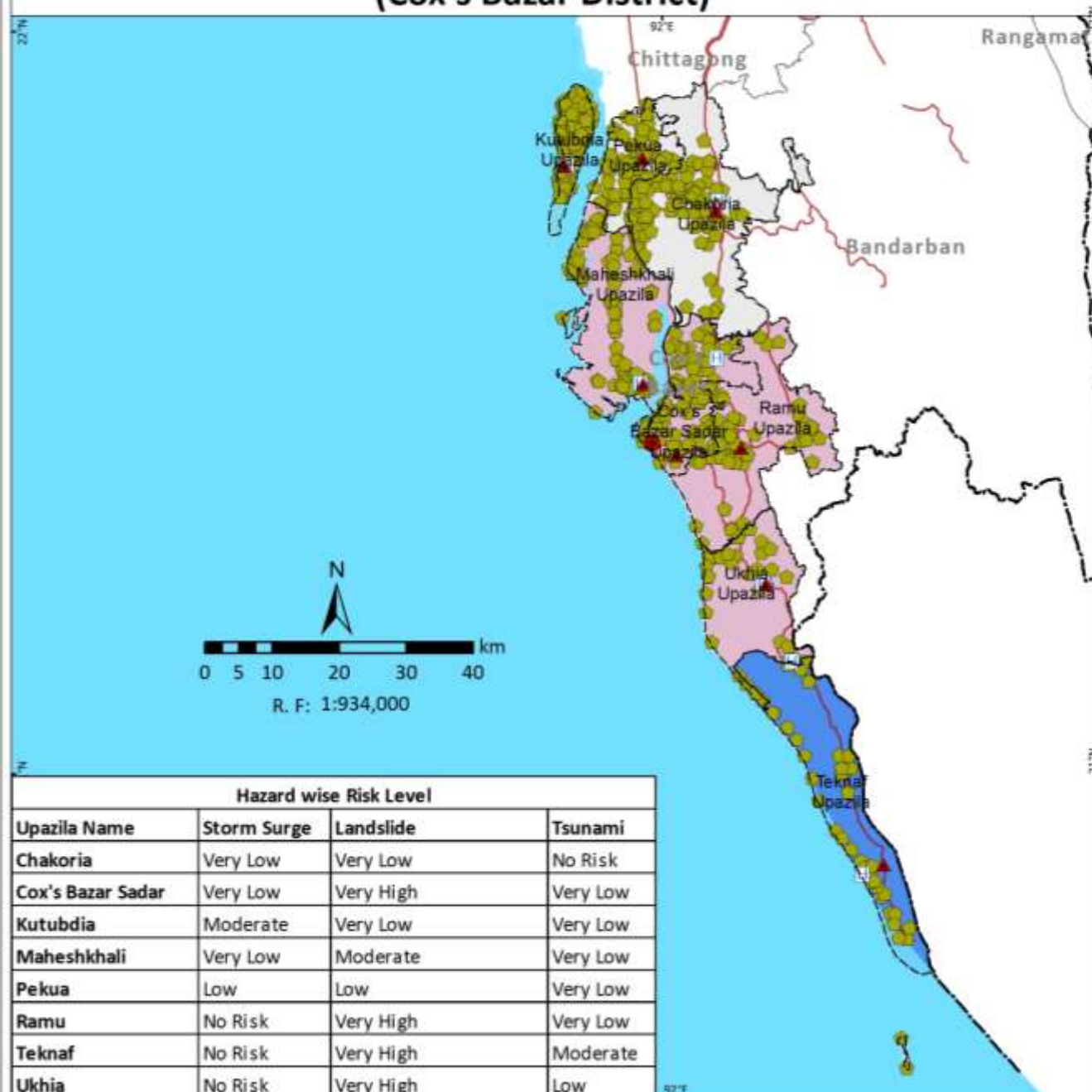
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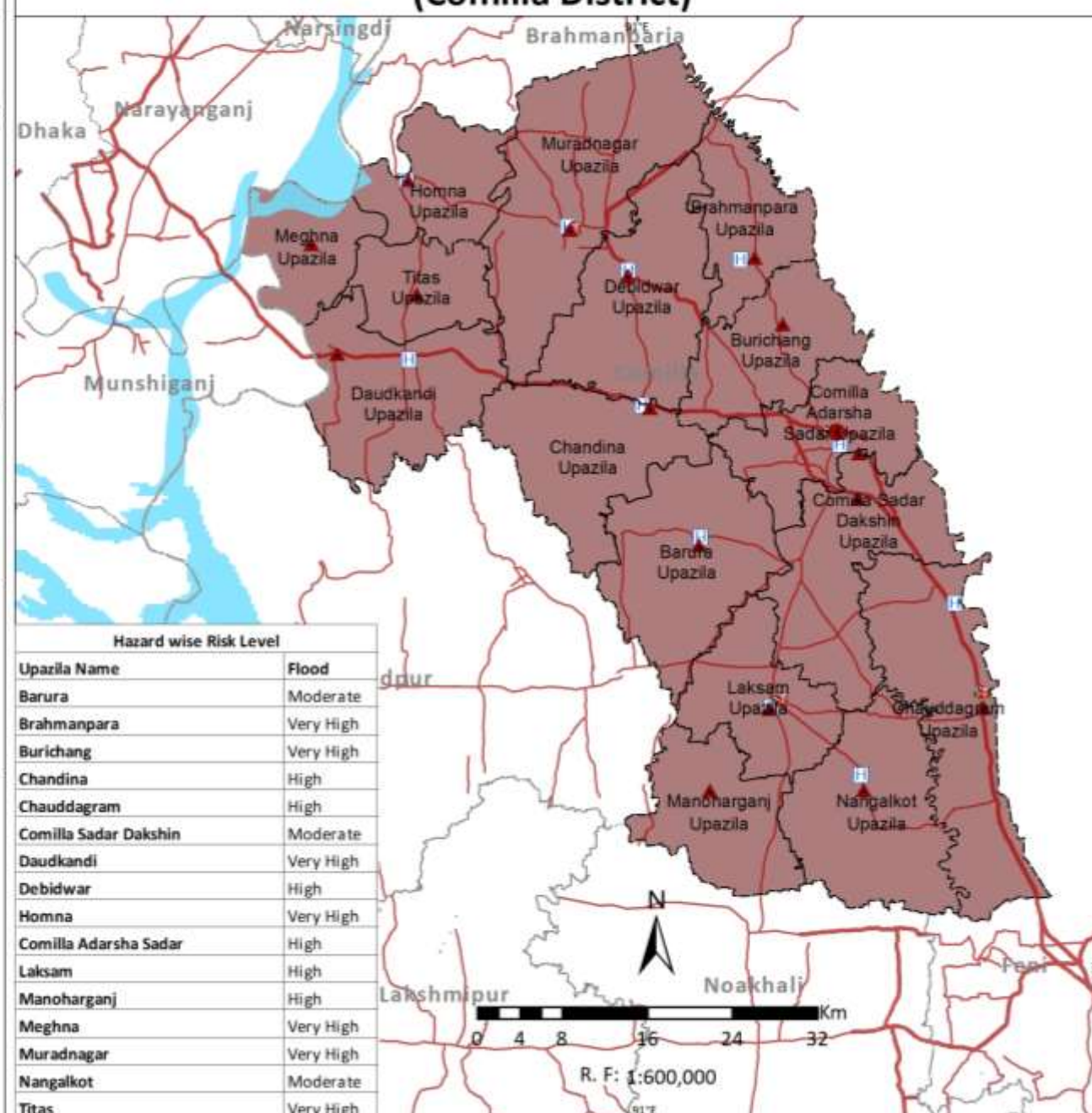
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Risk Levels of Housing (Kutcha and Jhupri) to Multi hazard (Cox's Bazar District)



Risk Levels of Housing (Kutcha and Jhupri) to Multi hazard (Comilla District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
- Flood
- Storm Surge
- Tsunami
- Landslide
- Risk level below moderate

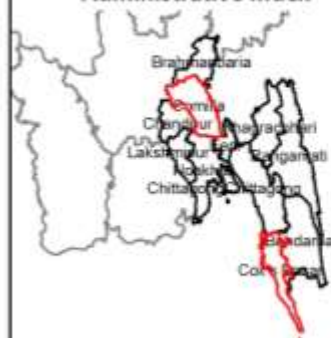
Note

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

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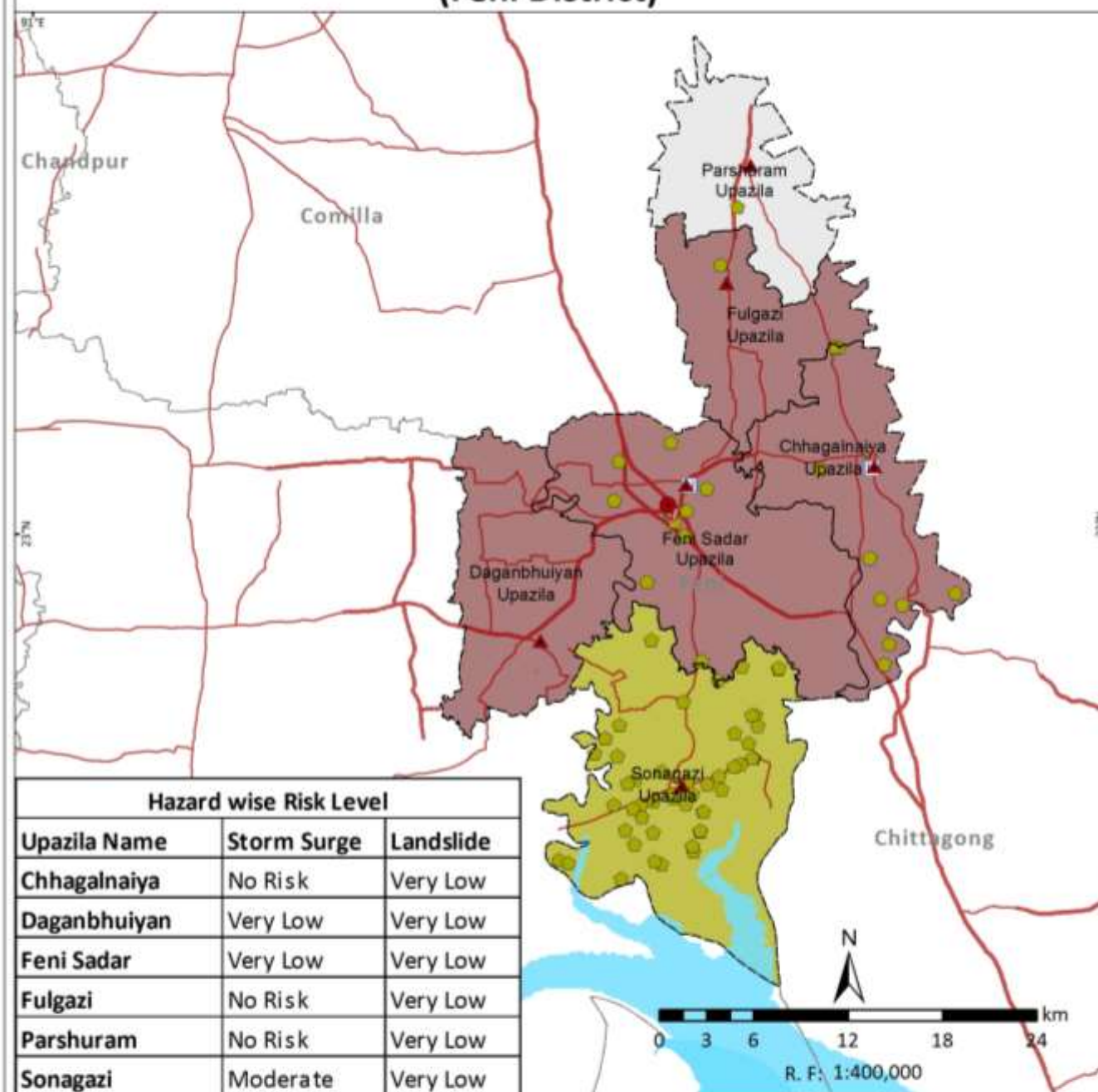
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Risk Levels of Housing (Kutcha and Jhupri) to Multi hazard (Feni District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
 - Flood
 - Storm Surge
 - Landslide
 - Risk level below moderate

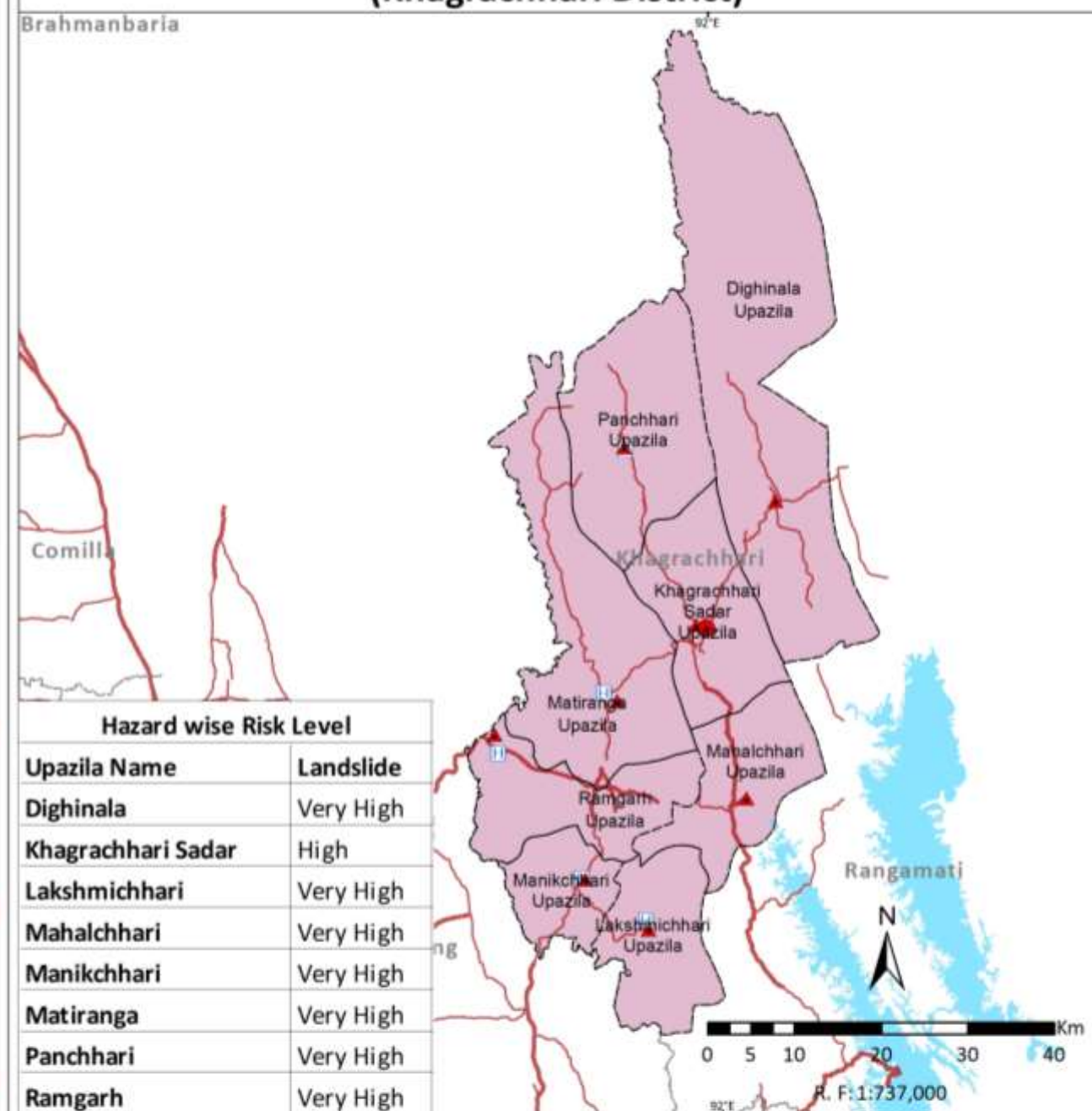
Note

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

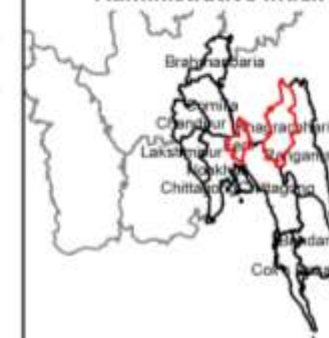
Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

Risk Levels of Housing (Kutcha and Jhupri) to Multi hazard (Khagrachhari District)



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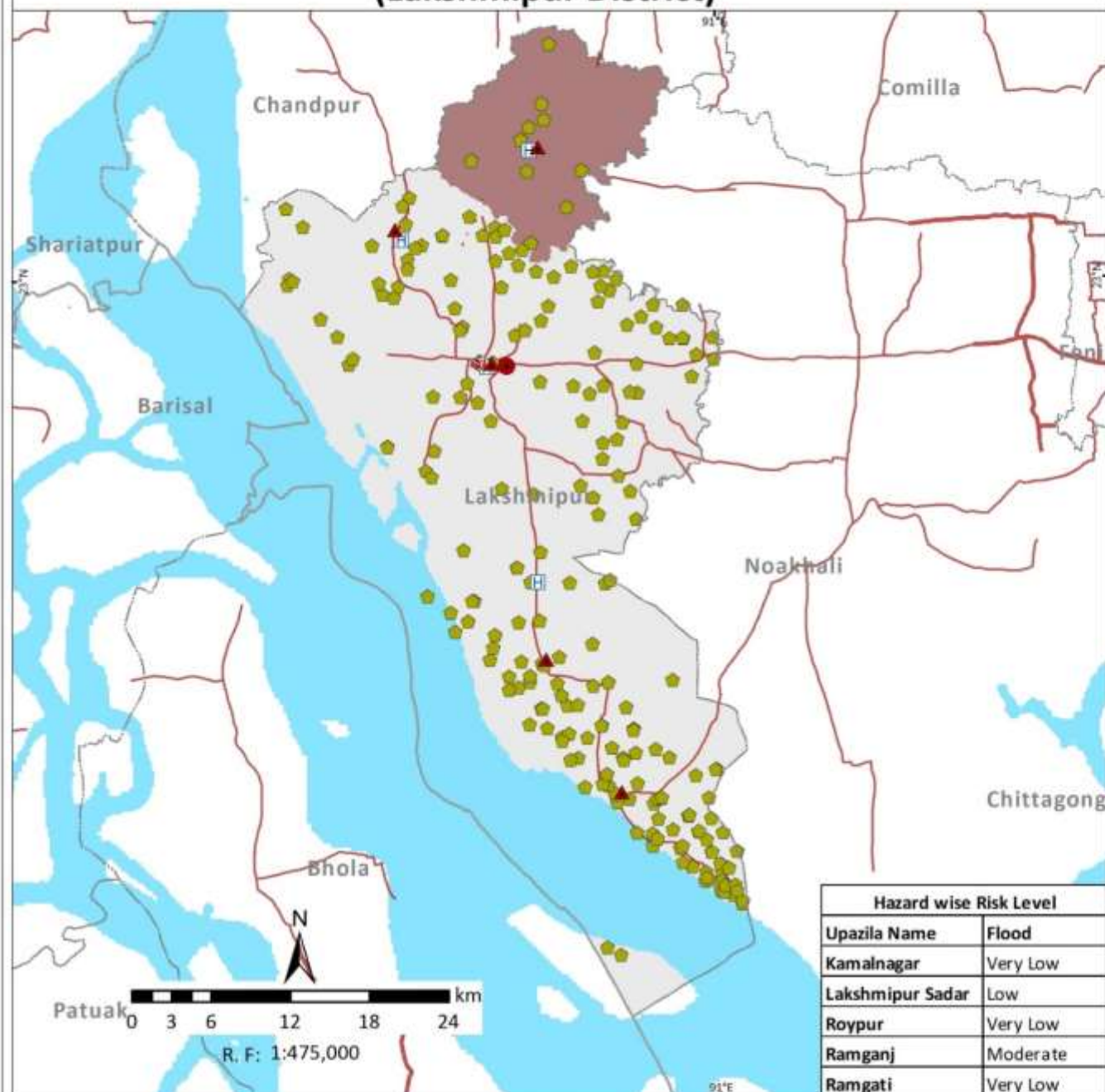
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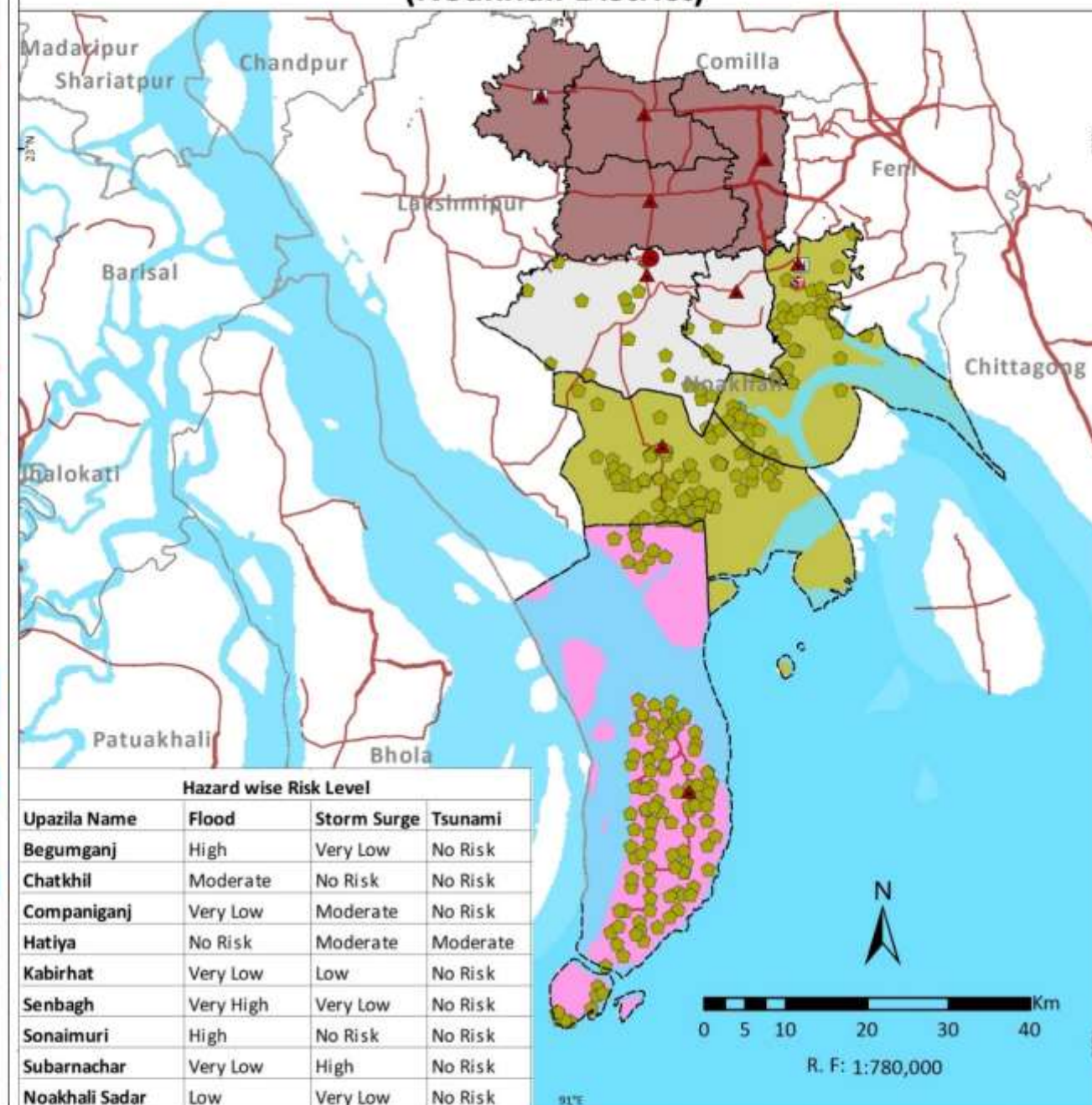
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Risk Levels of Housing (Kutcha and Jhupri) to Multi hazard (Lakshmipur District)



Risk Levels of Housing (Kutcha and Jhupri) to Multi hazard (Noakhali District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
- Storm Surge, Tsunami
- Flood
- Storm Surge
- Risk level below moderate

Note

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

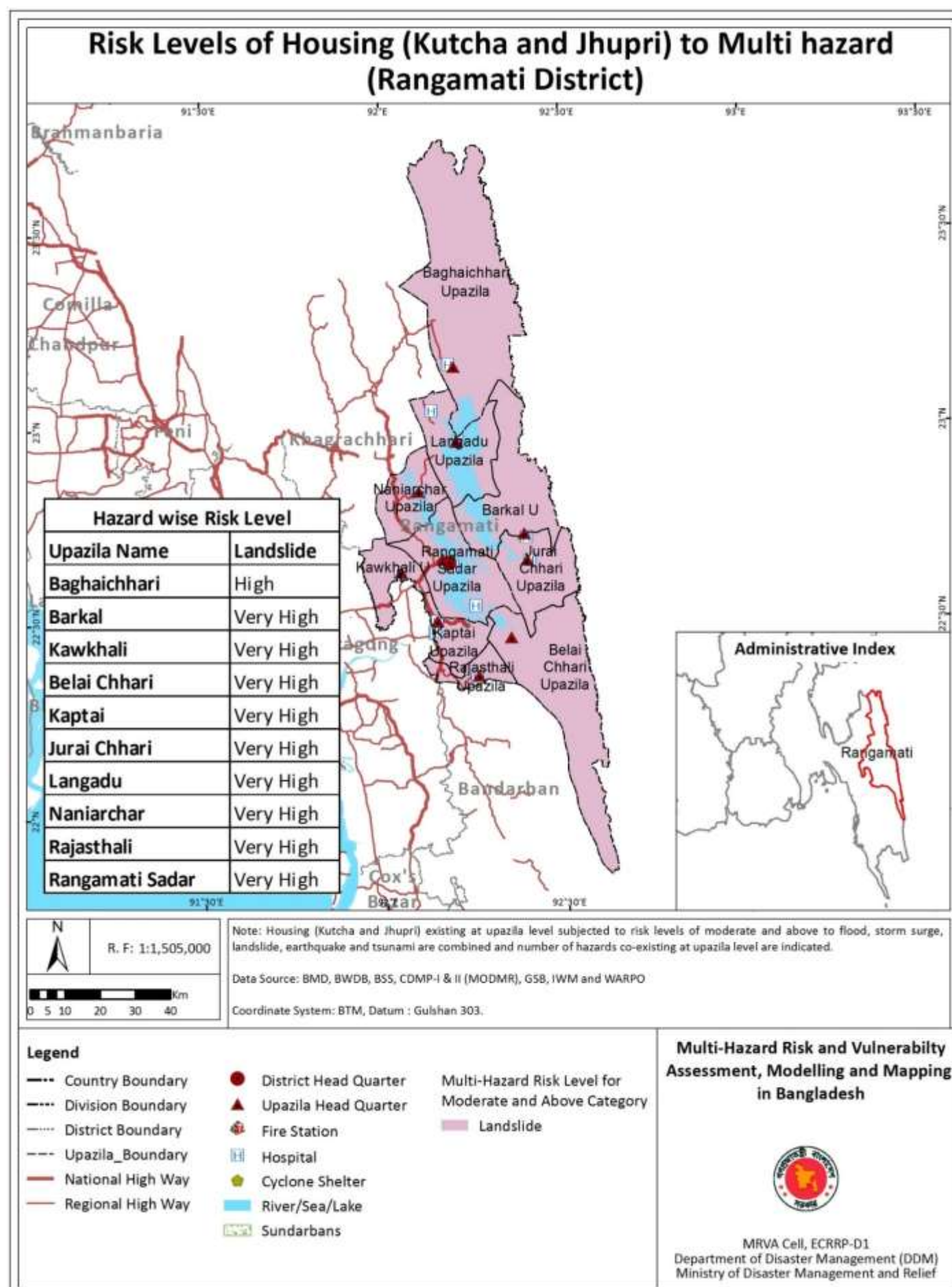
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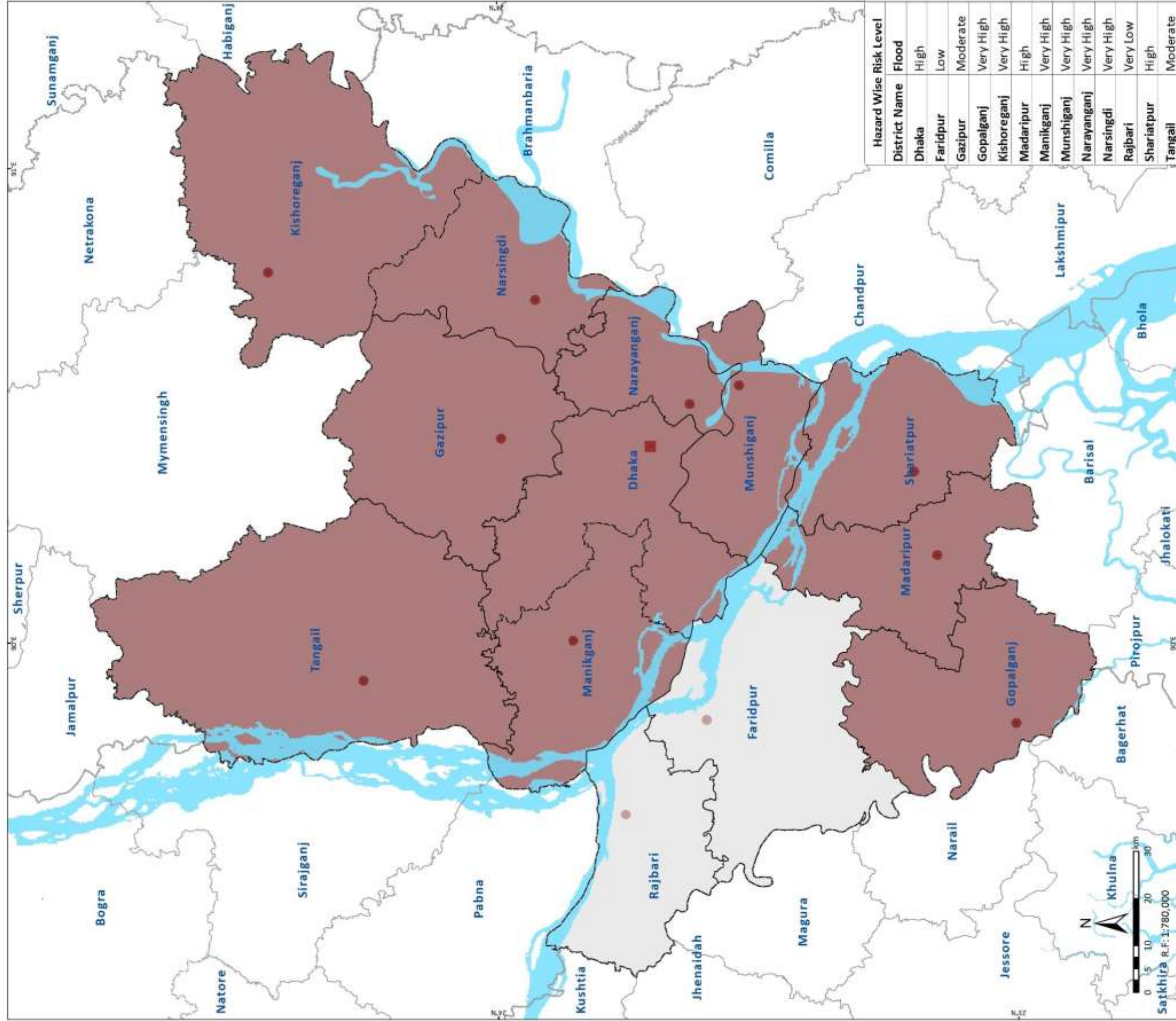
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Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Dhaka Division)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Division Head Quarter
- District Head Quarter
- River/Sea/Lake
- Sundarbans

Note: Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.



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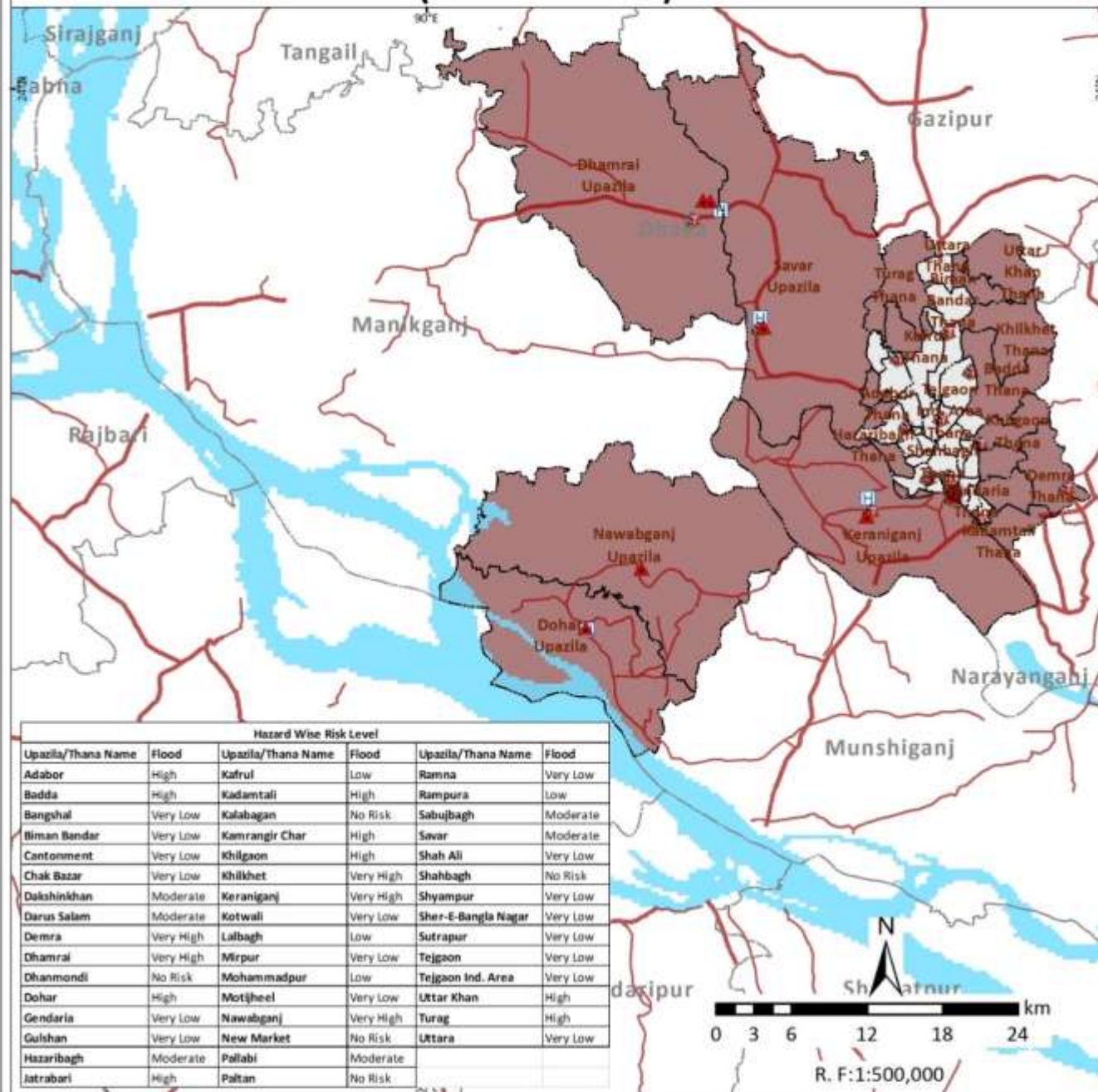


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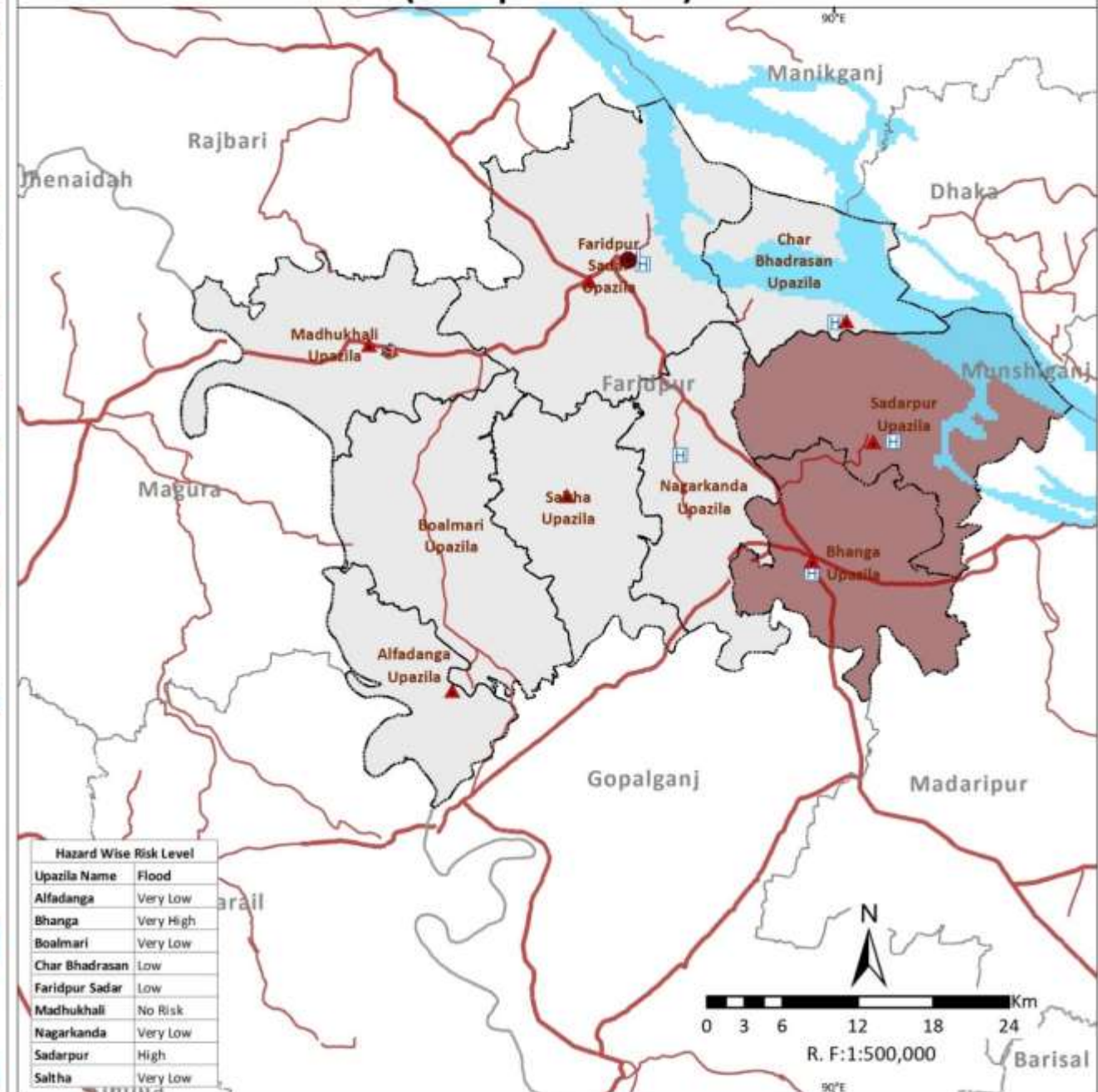




Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Dhaka District)



Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Faridpur District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila_Boundary
- National High Way
- Regional High Way
- Division Head Quarter
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level of Housing for Moderate and above Category
- Flood
- Risk level below moderate

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

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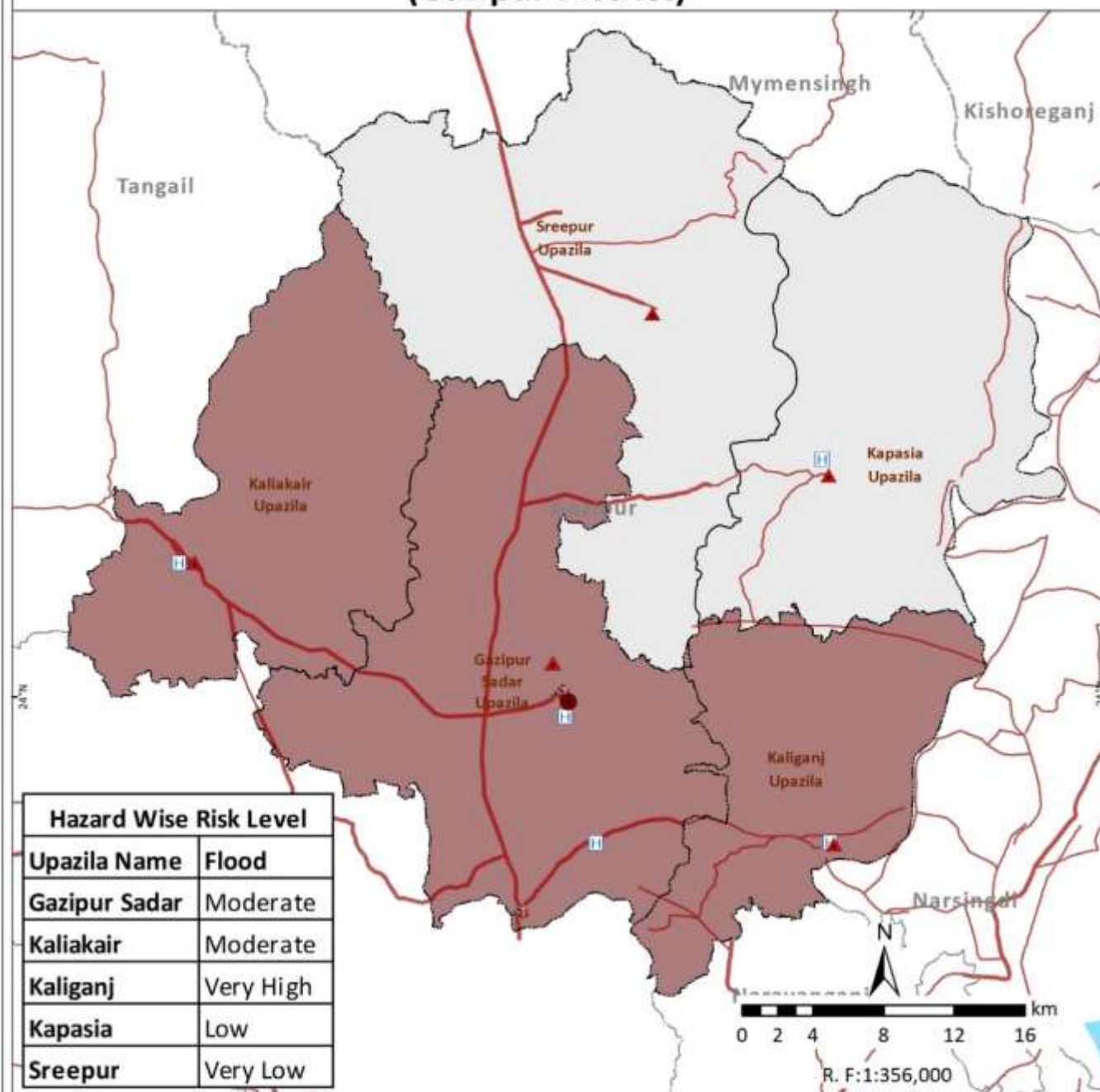
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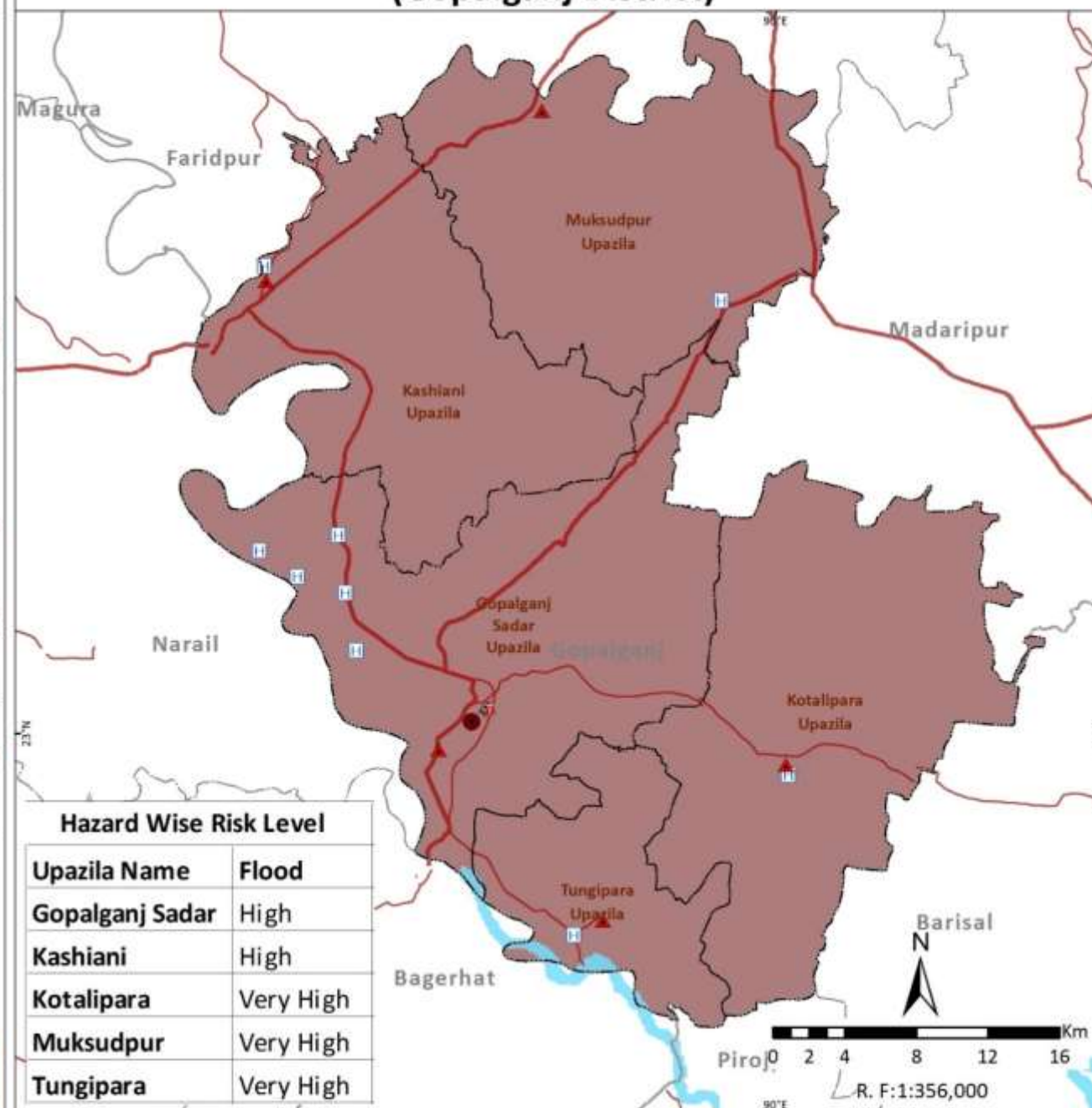
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Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Gazipur District)



Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Gopalganj District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level of Housing for Moderate and above Category
- Flood
- Risk level below moderate

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

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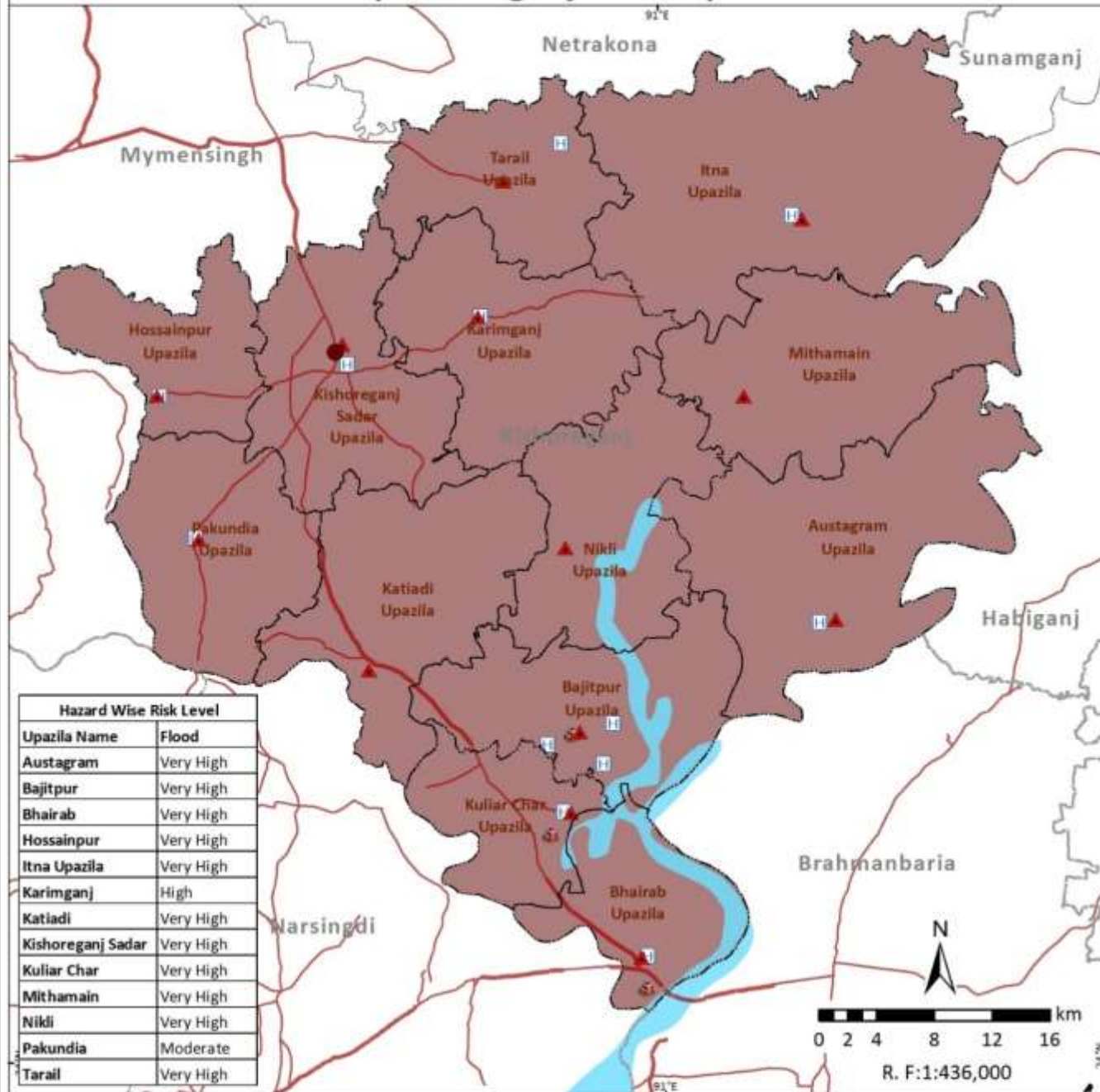
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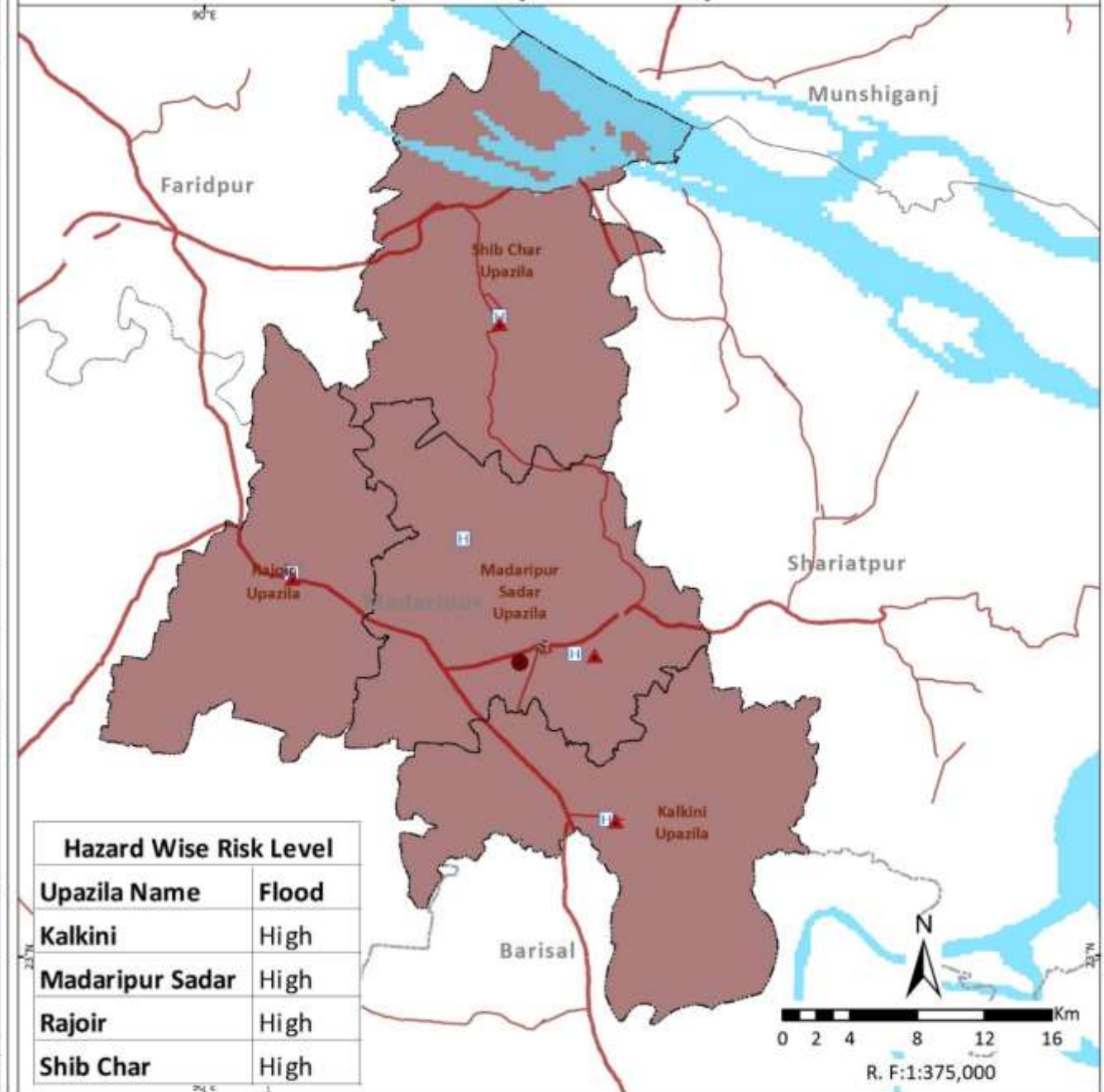
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Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Kishoreganj District)



Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Madaripur District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level of Housing for Moderate and above Category
- Flood

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.



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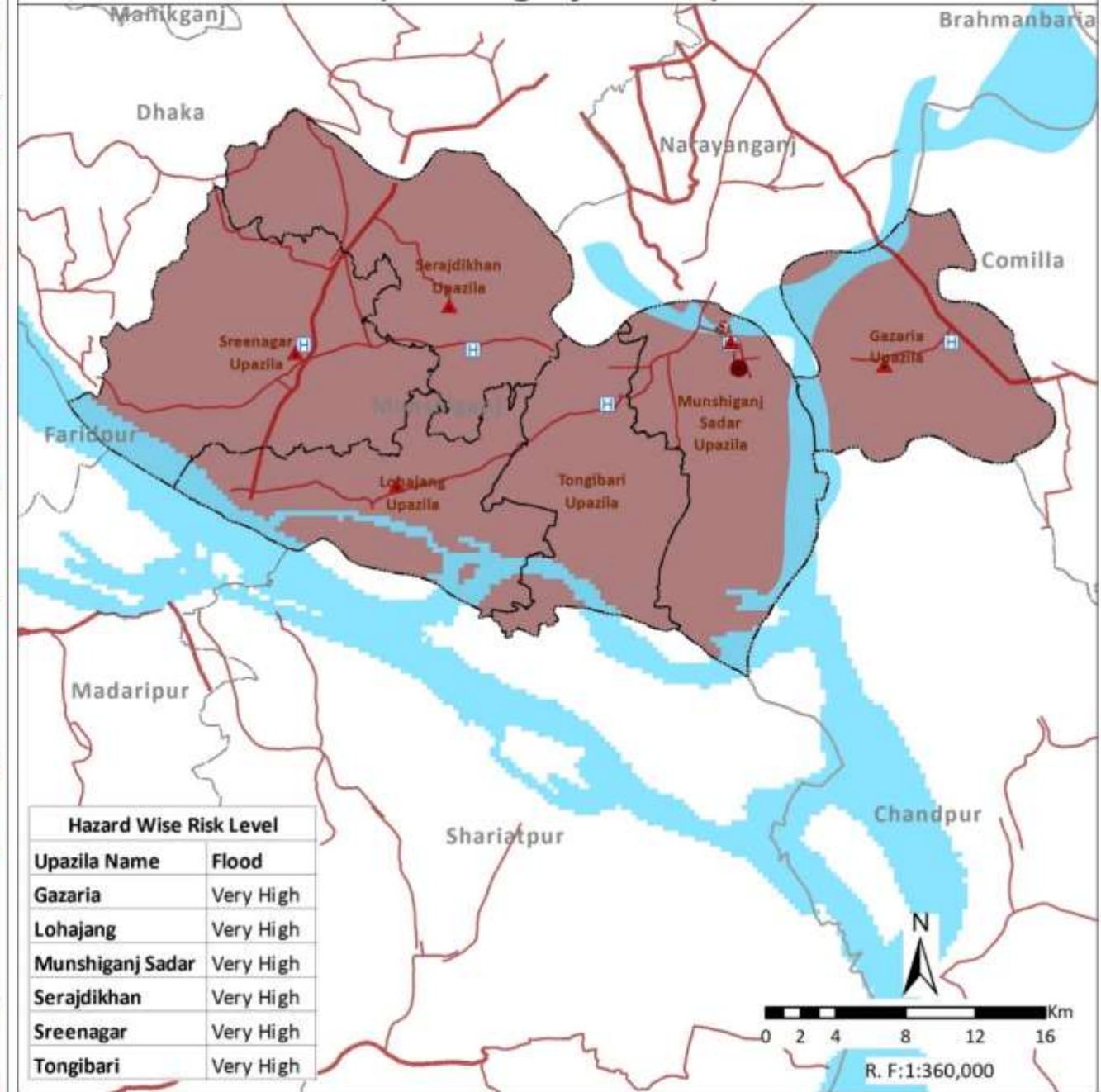
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Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Manikganj District)



Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Munshiganj District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level of Housing for Moderate and above Category
- Flood

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.



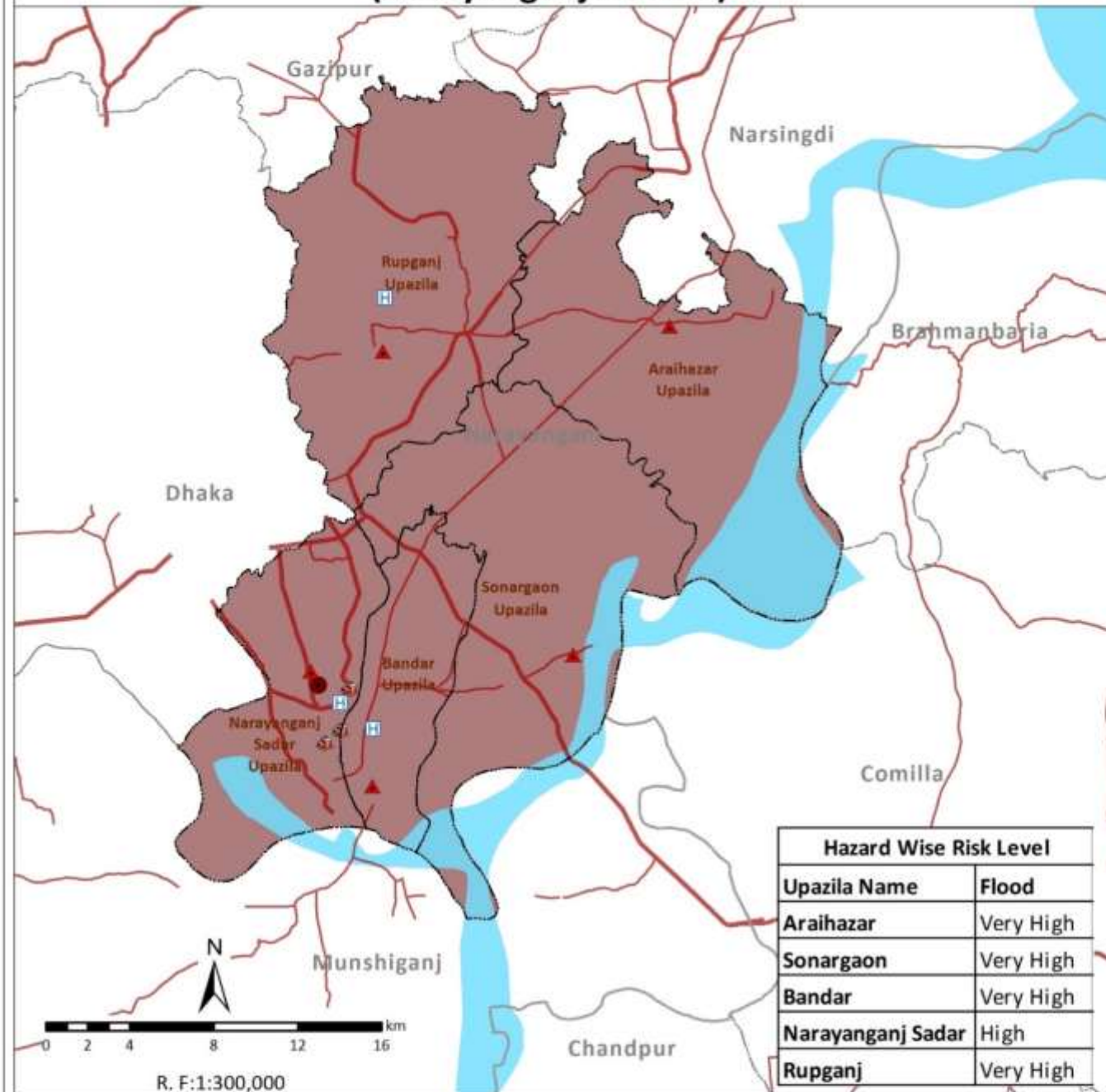
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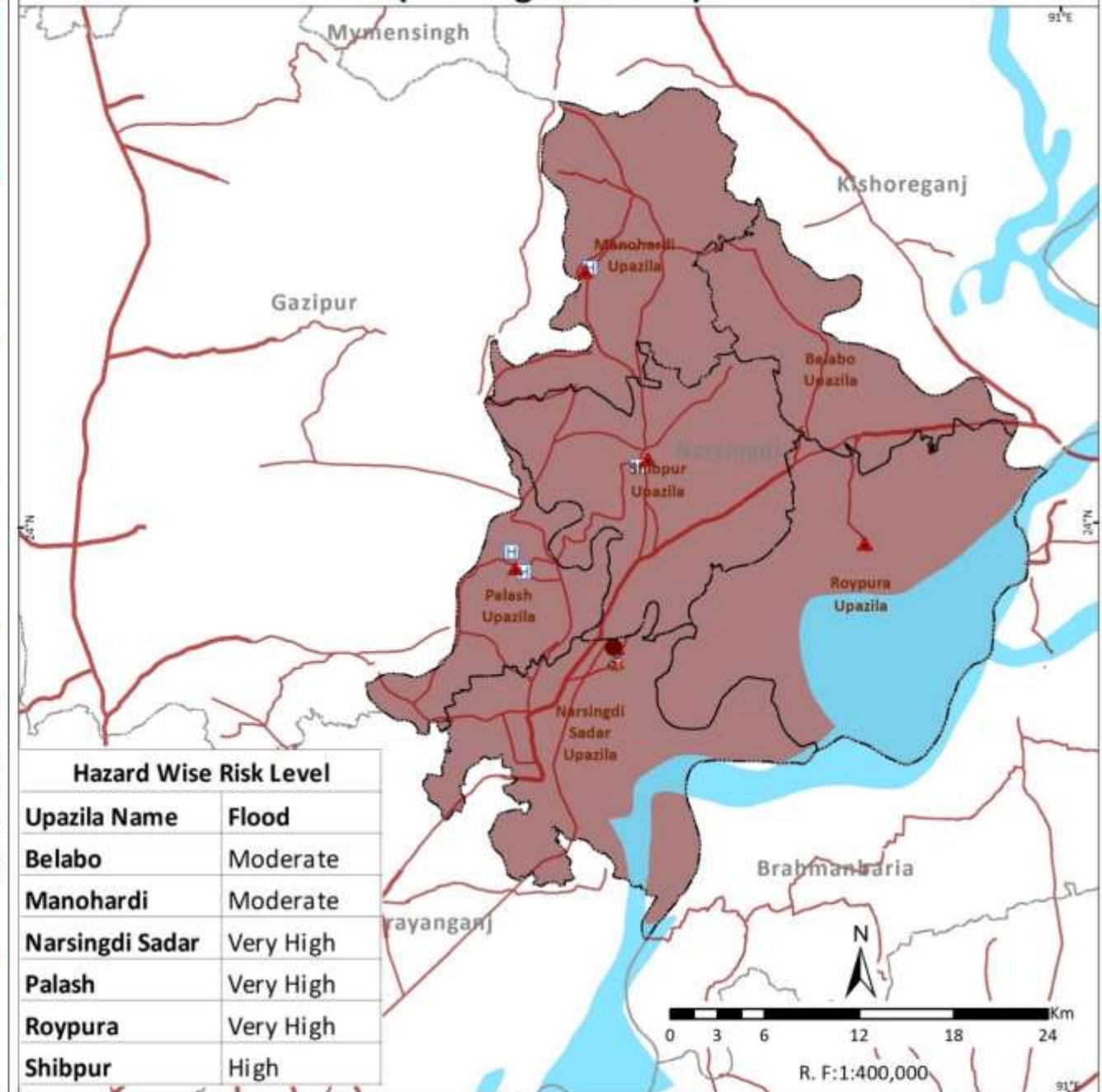


Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Narayanganj District)



Hazard Wise Risk Level	
Upazila Name	Flood
Araihazar	Very High
Sonargaon	Very High
Bandar	Very High
Narayanganj Sadar	High
Rupganj	Very High

Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Narsingdi District)



Hazard Wise Risk Level	
Upazila Name	Flood
Belabo	Moderate
Manohardi	Moderate
Narsingdi Sadar	Very High
Palash	Very High
Royapura	Very High
Shibpur	High

Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level of Housing for Moderate and above Category
- Flood

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.



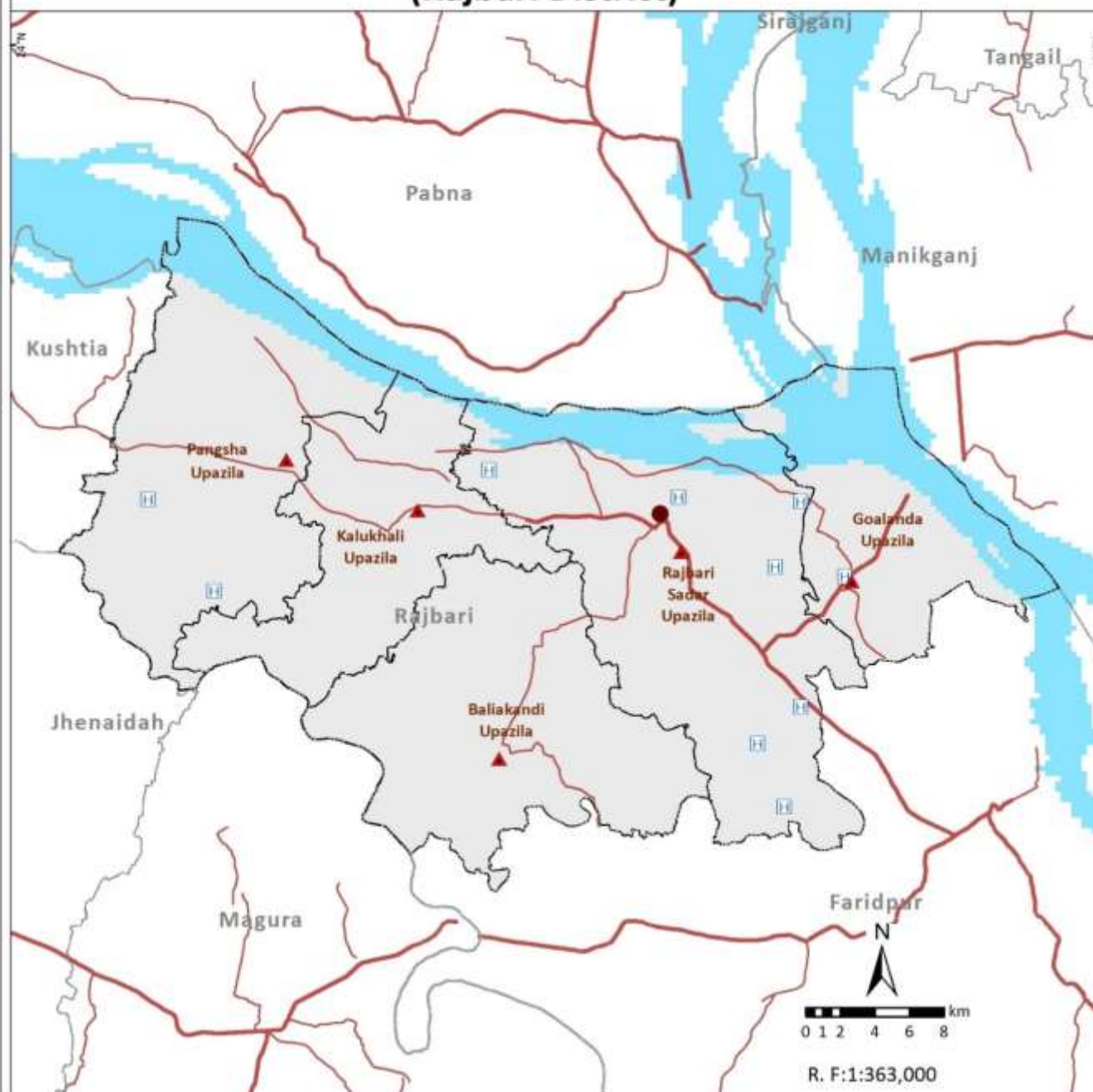
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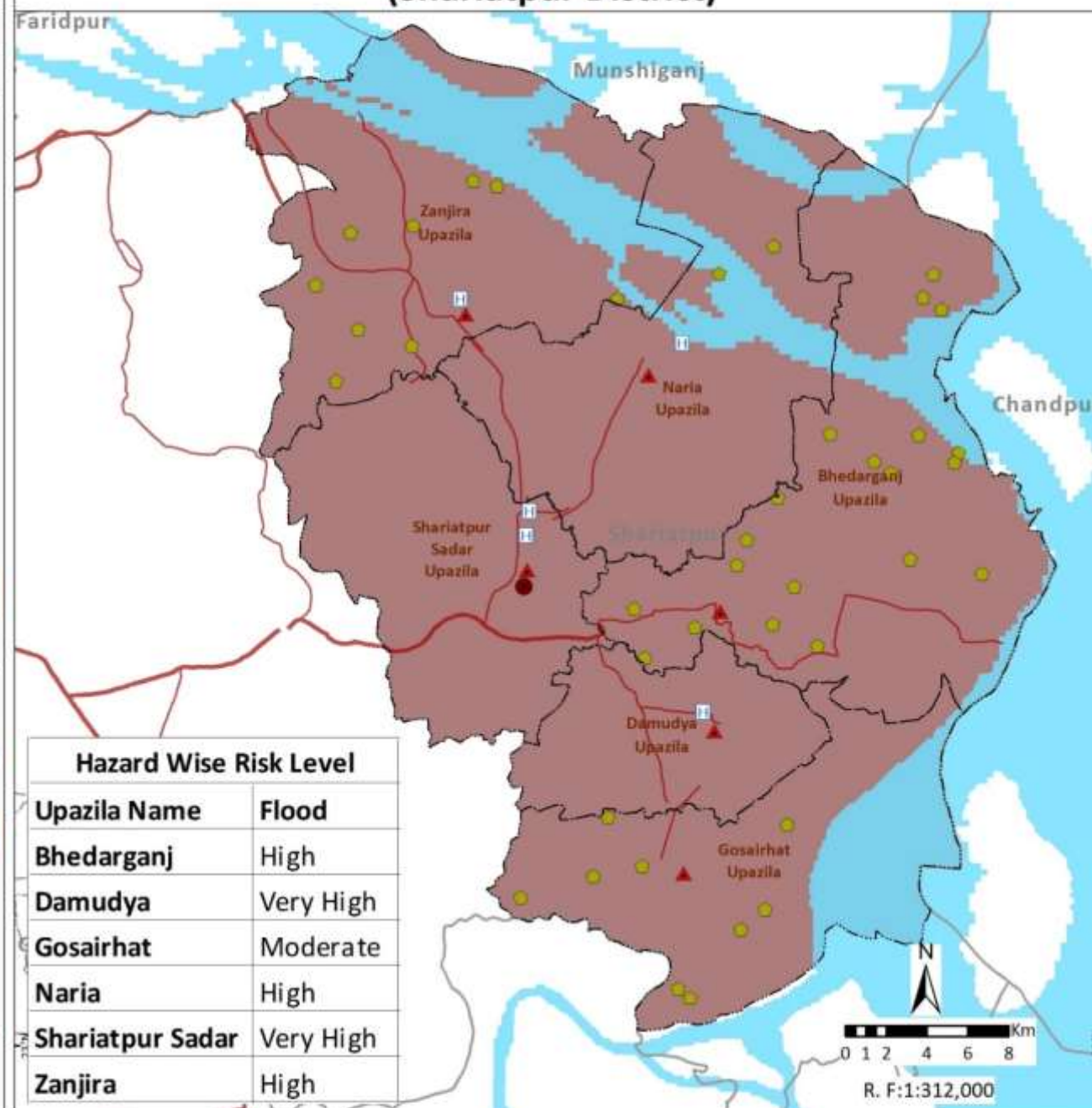
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Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Rajbari District)



Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Shariatpur District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level of Housing for Moderate and above Category
- Flood
- Risk level below moderate

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.



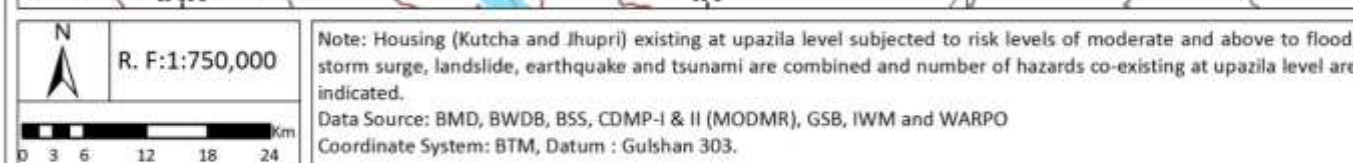
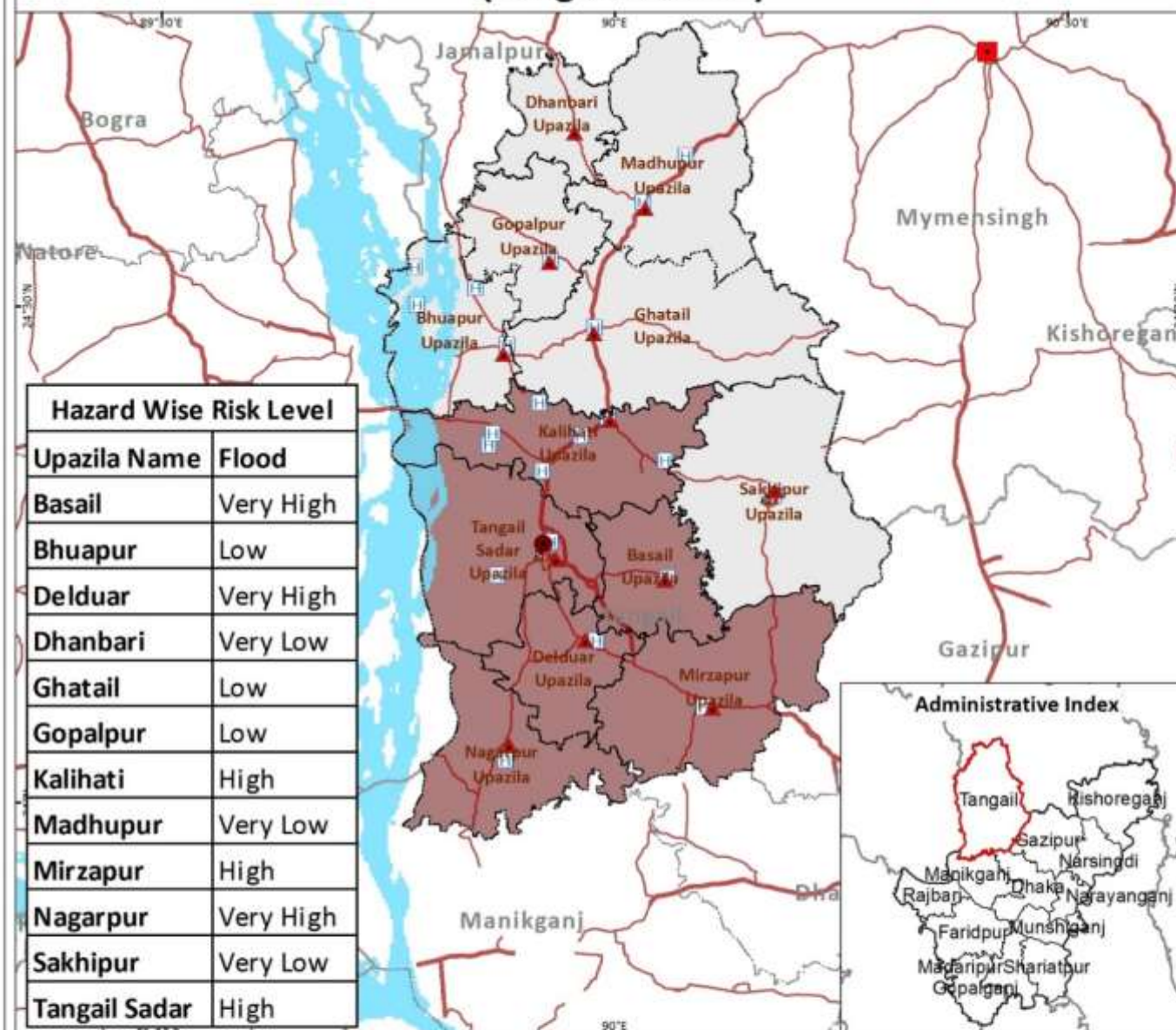
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Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Tangail District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level for Moderate and above Category
- Flood
- Risk level below moderate

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Risk Levels of Housing (Kutchha and Jhupri) to Multi-Hazard (Khulna Division)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Division Head Quarter
- River/Sea/Lake
- Sundarbans

Multi-Hazard Risk Level for Moderate and above Category

- Risk level below moderate

Note:
Housing (Kutchha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.



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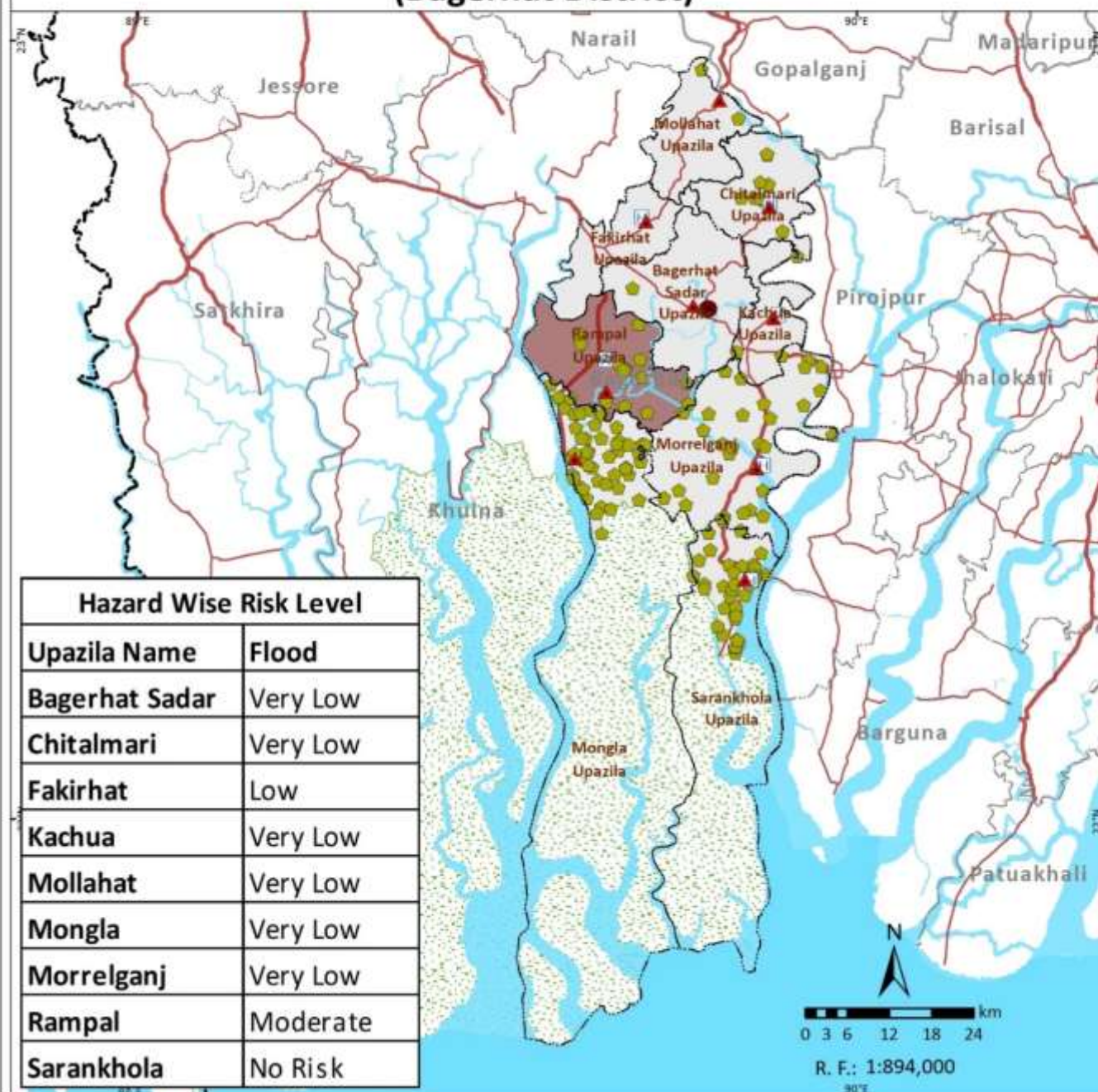


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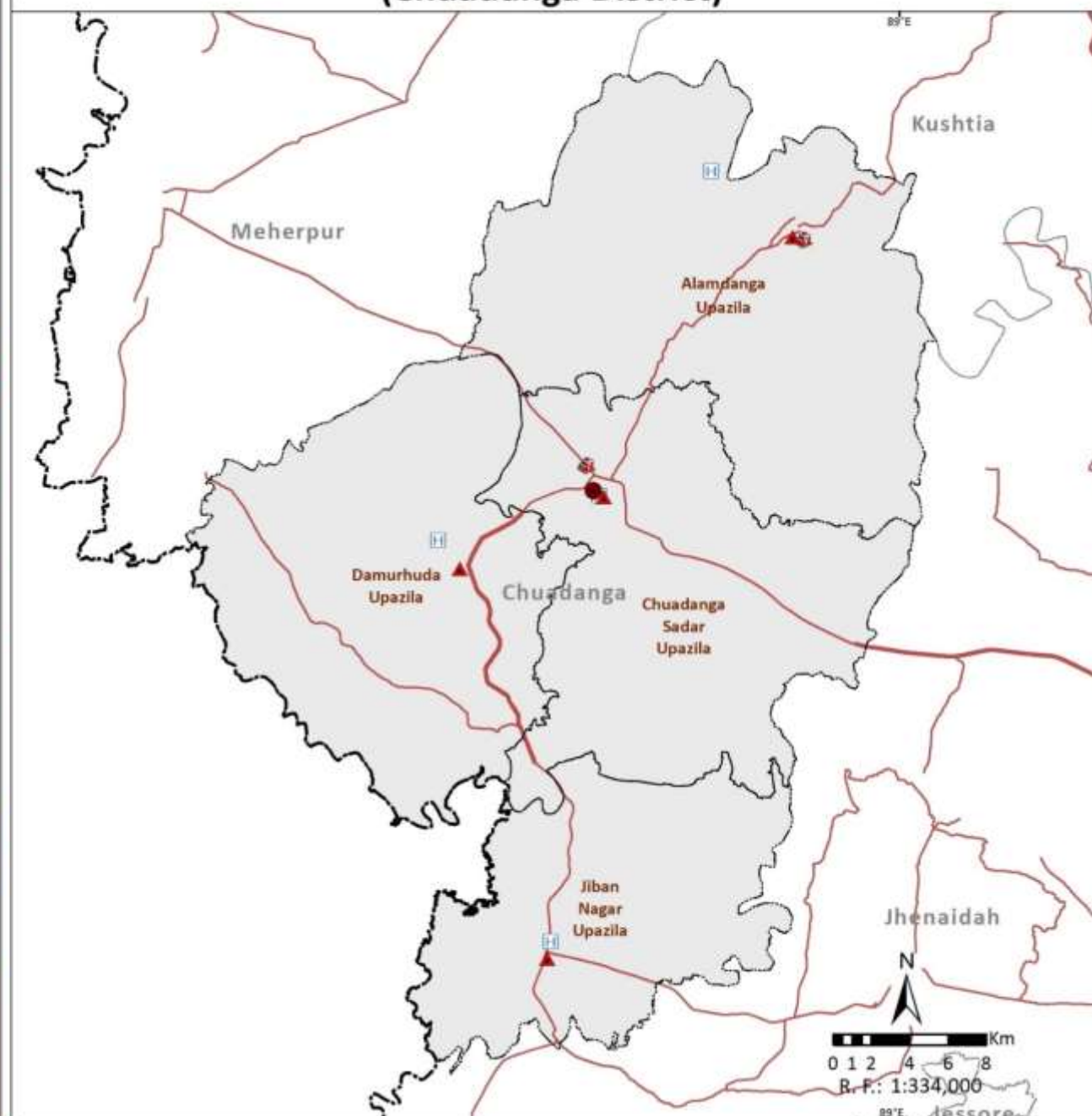




Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Bagerhat District)



Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Chuadanga District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level of Housing for Moderate and above Category
- Flood
- Risk level below moderate

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

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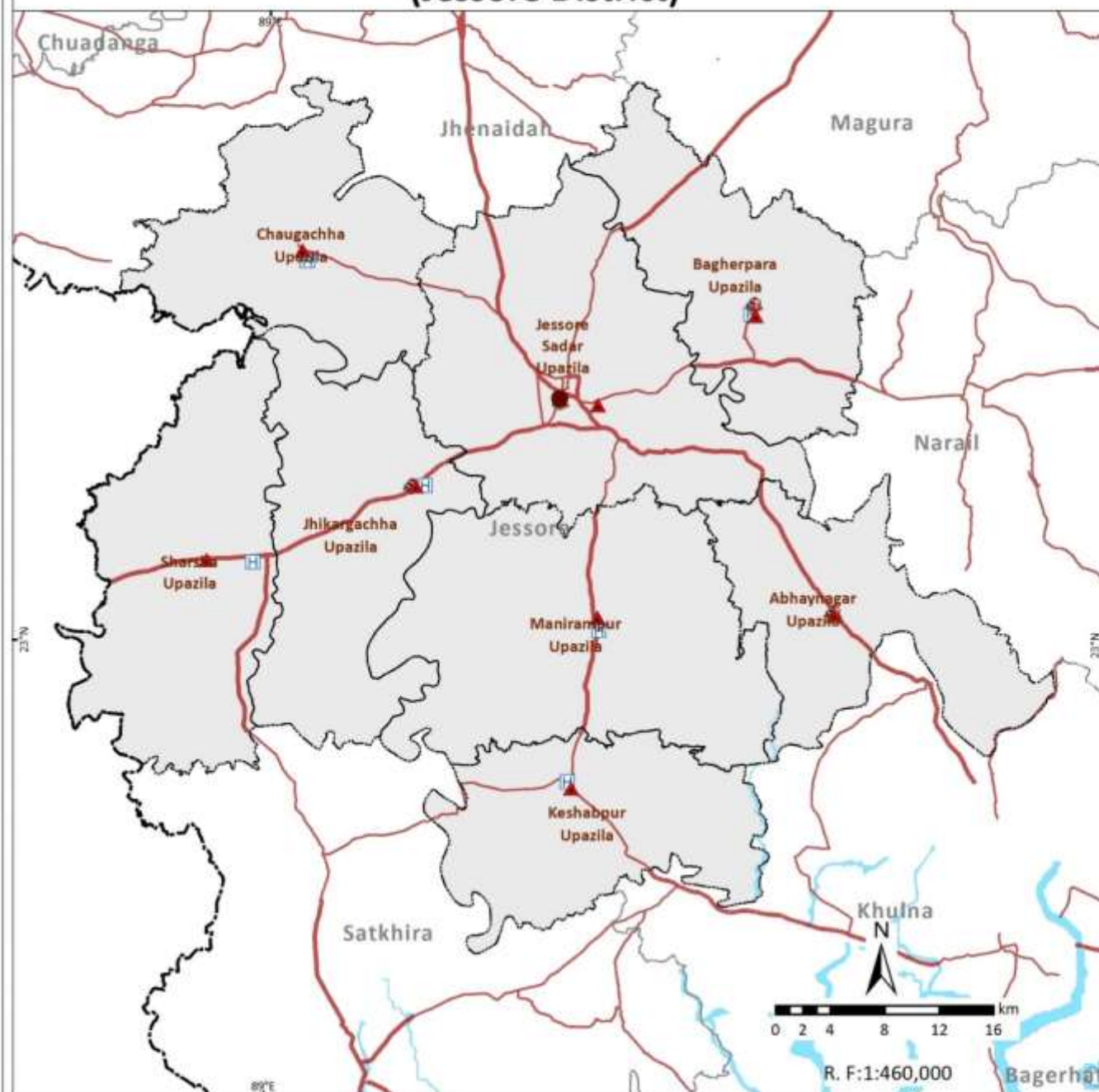
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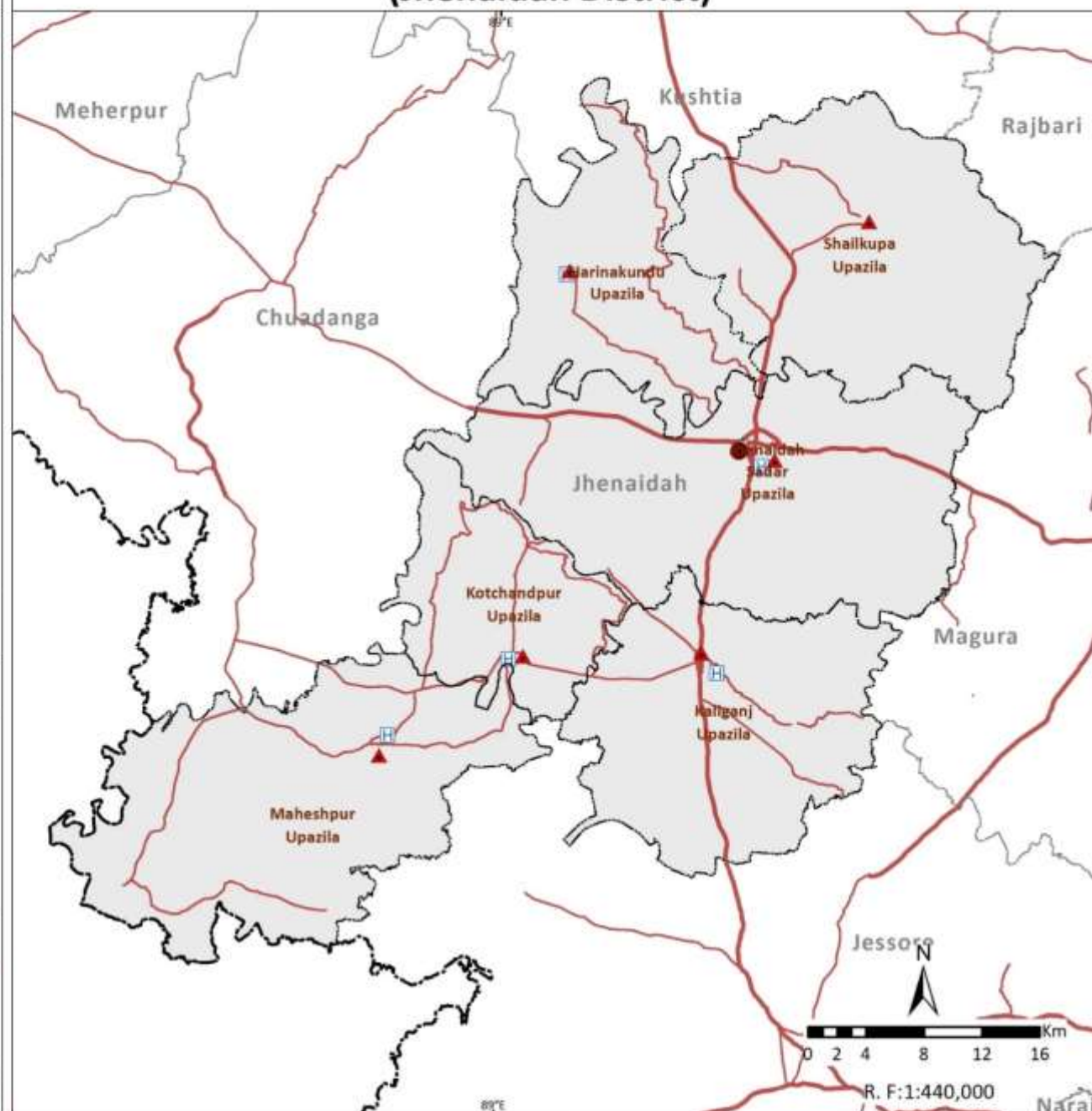
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Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Jessore District)



Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Jhenaidah District)



Legend

- | | | |
|-------------------------|-------------------------|---|
| — Country Boundary | ● District Head Quarter | Multi- Hazard Risk Level of Housing for Moderate and above Category |
| - - - Division Boundary | ▲ Upazila Head Quarter | |
| — District Boundary | 🚒 Fire Station | ■ Risk level below moderate |
| - - - Upazila Boundary | 🏥 Hospital | |
| — National High Way | 🏠 Cyclone Shelter | |
| — Regional High Way | 🌊 River/Sea/Lake | |
| | 🌿 Sundarbans | |

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

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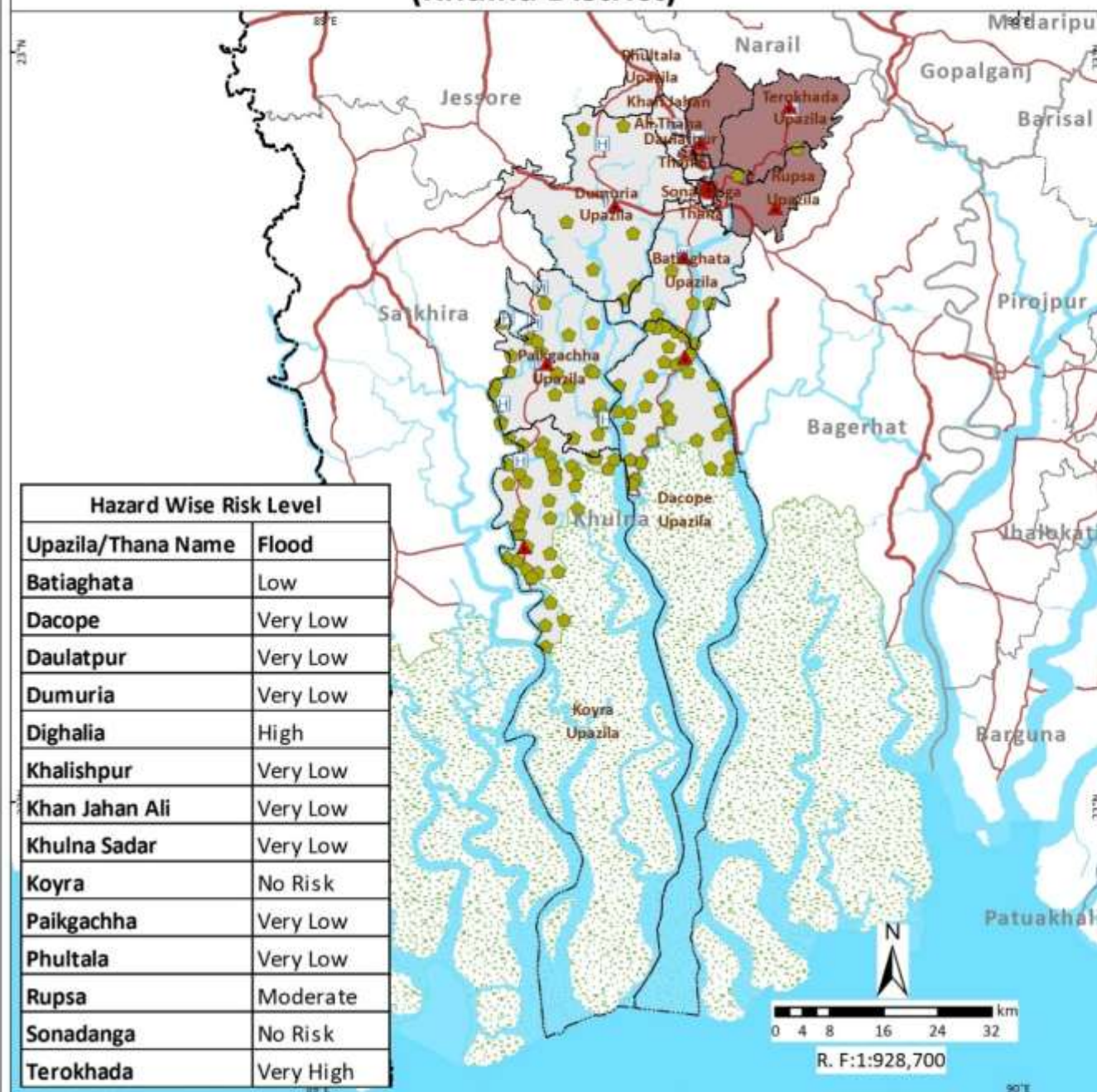
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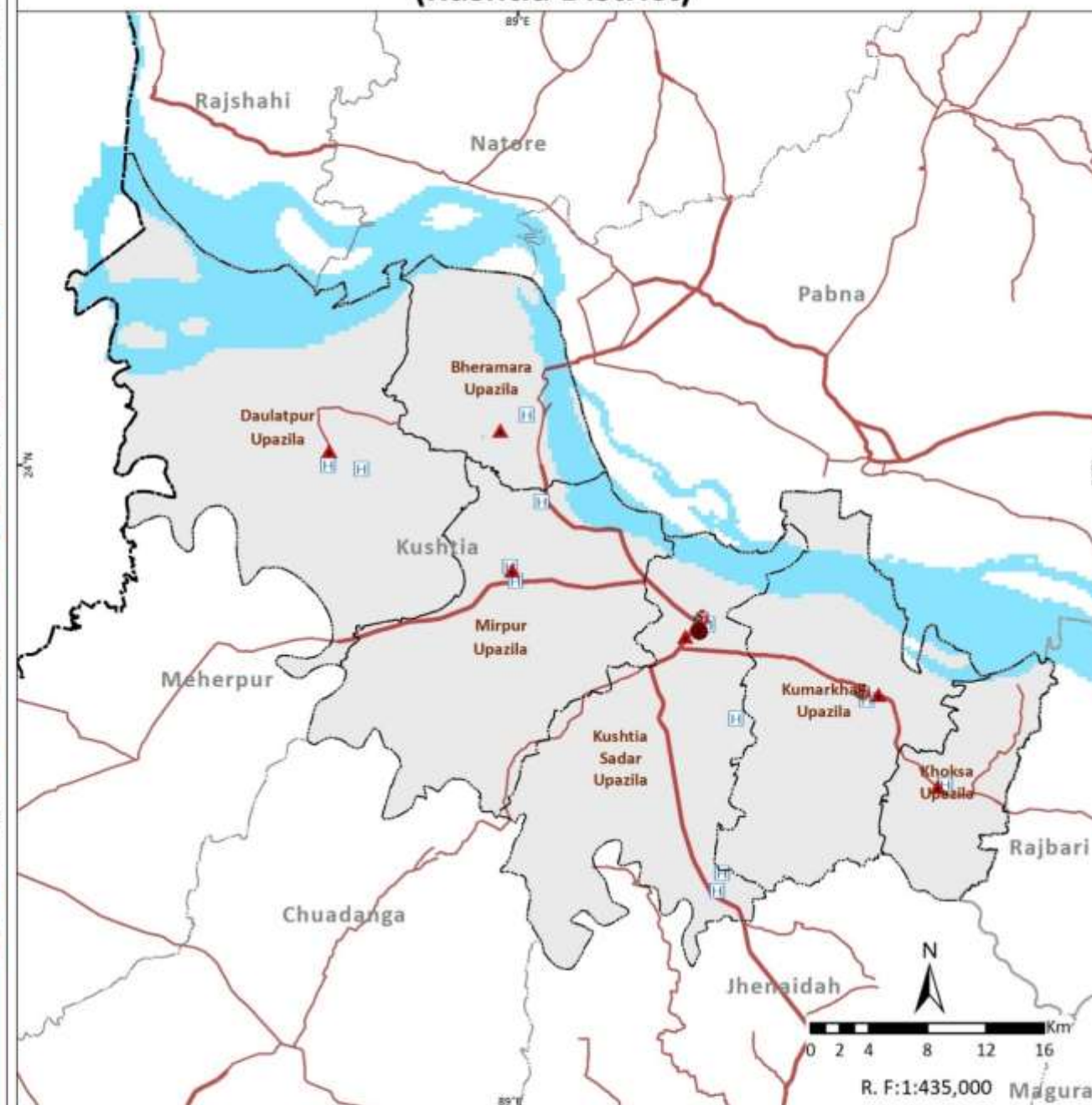
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Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Khulna District)



Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Kushtia District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila_Boundary
- National High Way
- Regional High Way
- Division Head Quarter
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level of Housing for Moderate and above Category
- Flood
- Risk level below moderate

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

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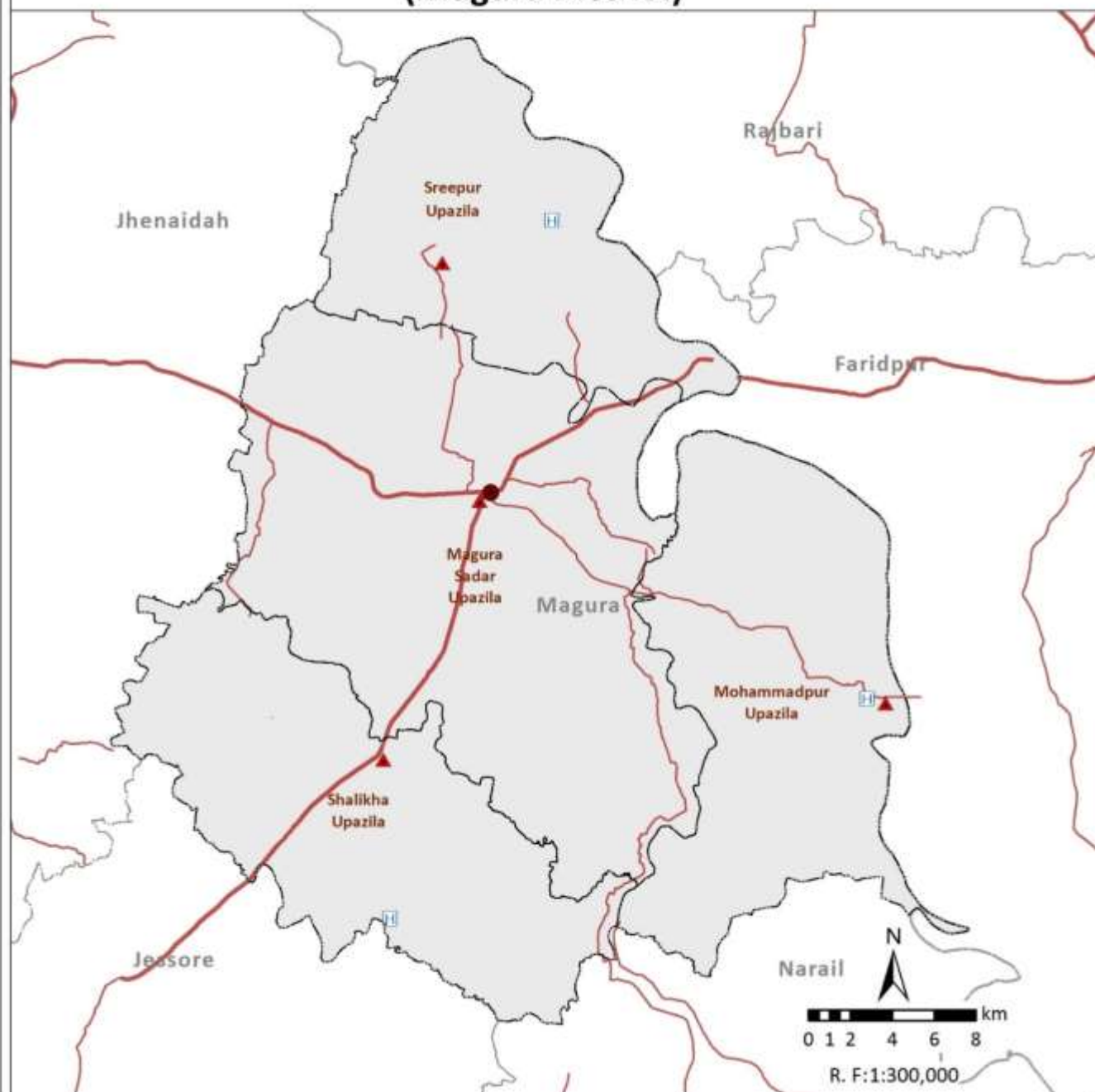
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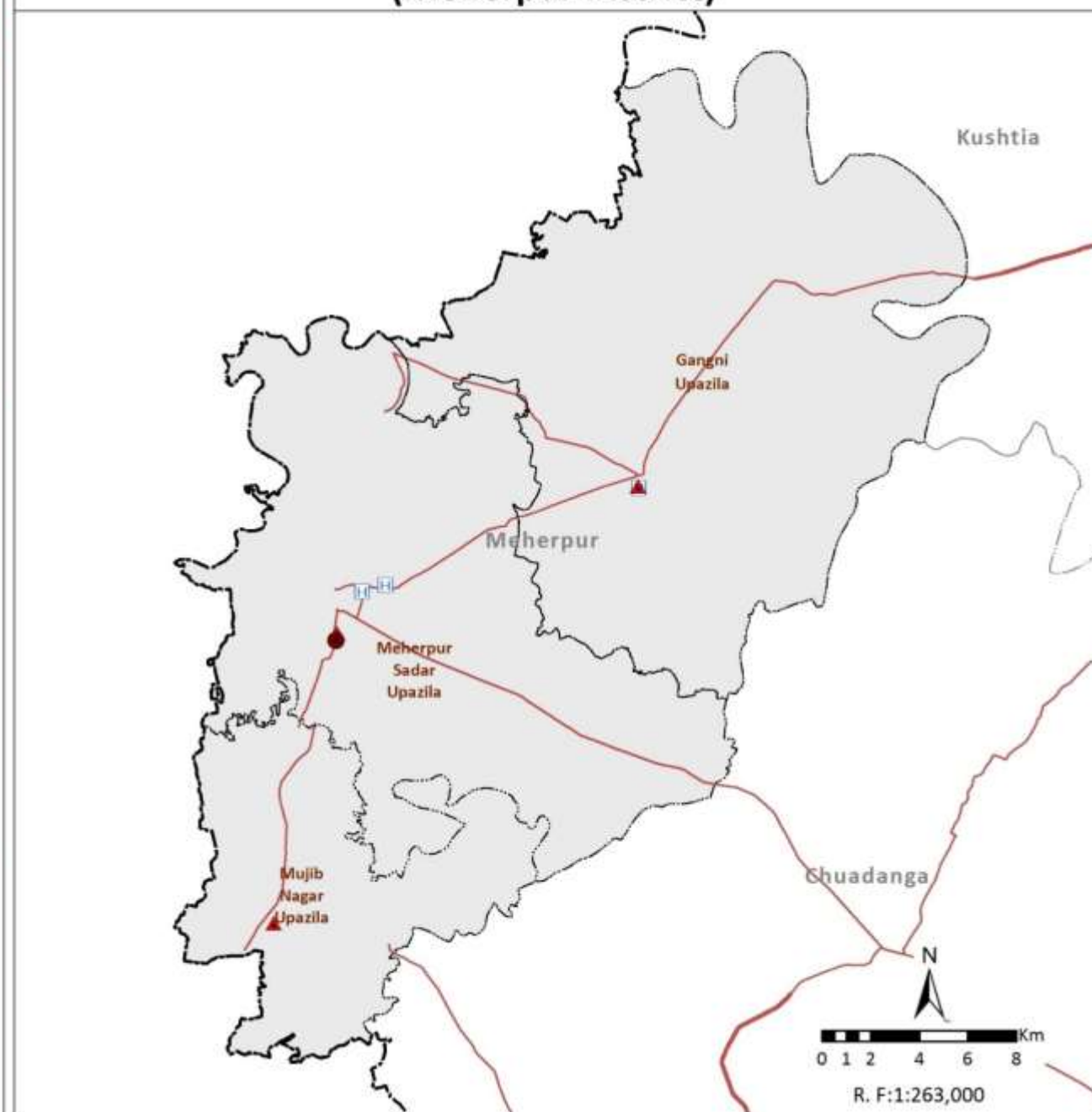
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Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Magura District)



Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Meherpur District)



Legend

- | | | |
|-------------------|-----------------------|---|
| Country Boundary | District Head Quarter | Multi- Hazard Risk Level of Housing for Moderate and above Category |
| Division Boundary | Upazila Head Quarter | |
| District Boundary | Fire Station | Risk level below moderate |
| Upazila Boundary | Hospital | |
| National High Way | Cyclone Shelter | |
| Regional High Way | River/Sea/Lake | |
| | Sundarbans | |

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMR-I & II (MODMR), GSB, IWM and WARPO

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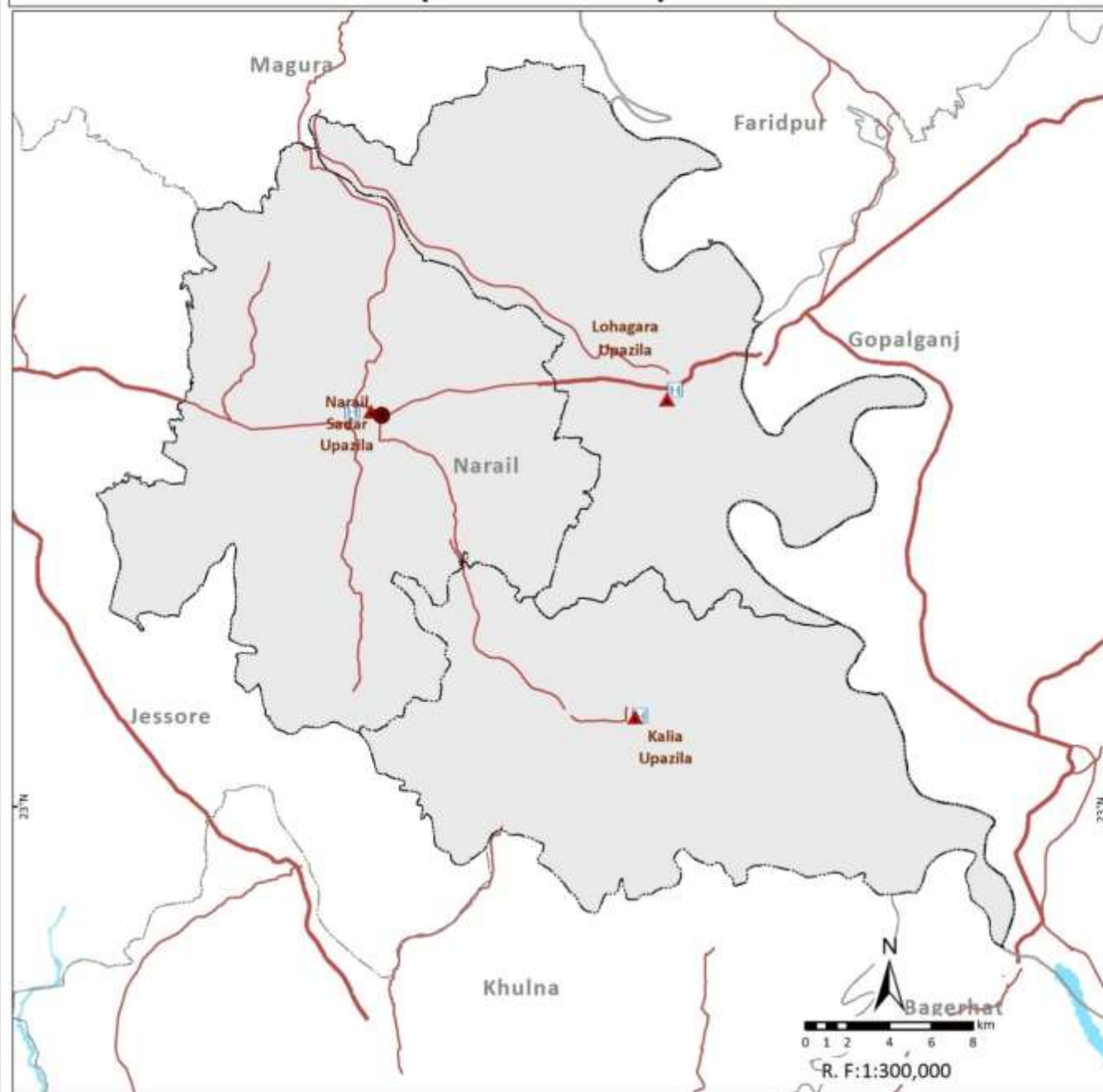
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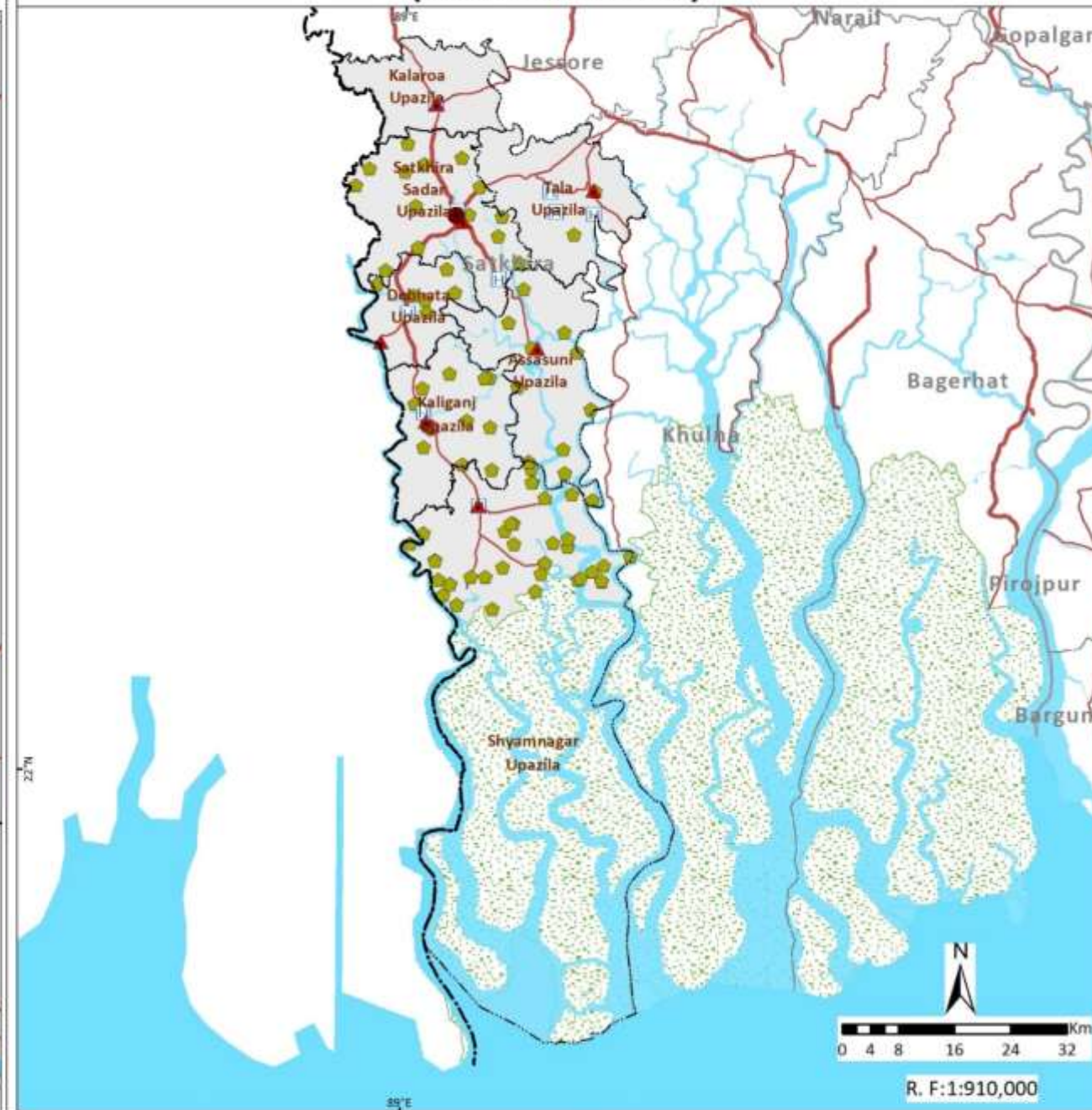
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Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Narail District)



Risk Levels of Housing (Kutcha and Jhupri) to Multi- Hazard (Satkhira District)



Legend

- | | | |
|-----------------------|-------------------------|---|
| — Country Boundary | ● District Head Quarter | Multi- Hazard Risk Level of Housing for Moderate and above Category |
| --- Division Boundary | ▲ Upazila Head Quarter | |
| --- District Boundary | 🚒 Fire Station | ■ Risk level below moderate |
| --- Upazila Boundary | 🏥 Hospital | |
| — National High Way | 🟡 Cyclone Shelter | |
| — Regional High Way | 🌊 River/Sea/Lake | |
| | 🌿 Sundarbans | |

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

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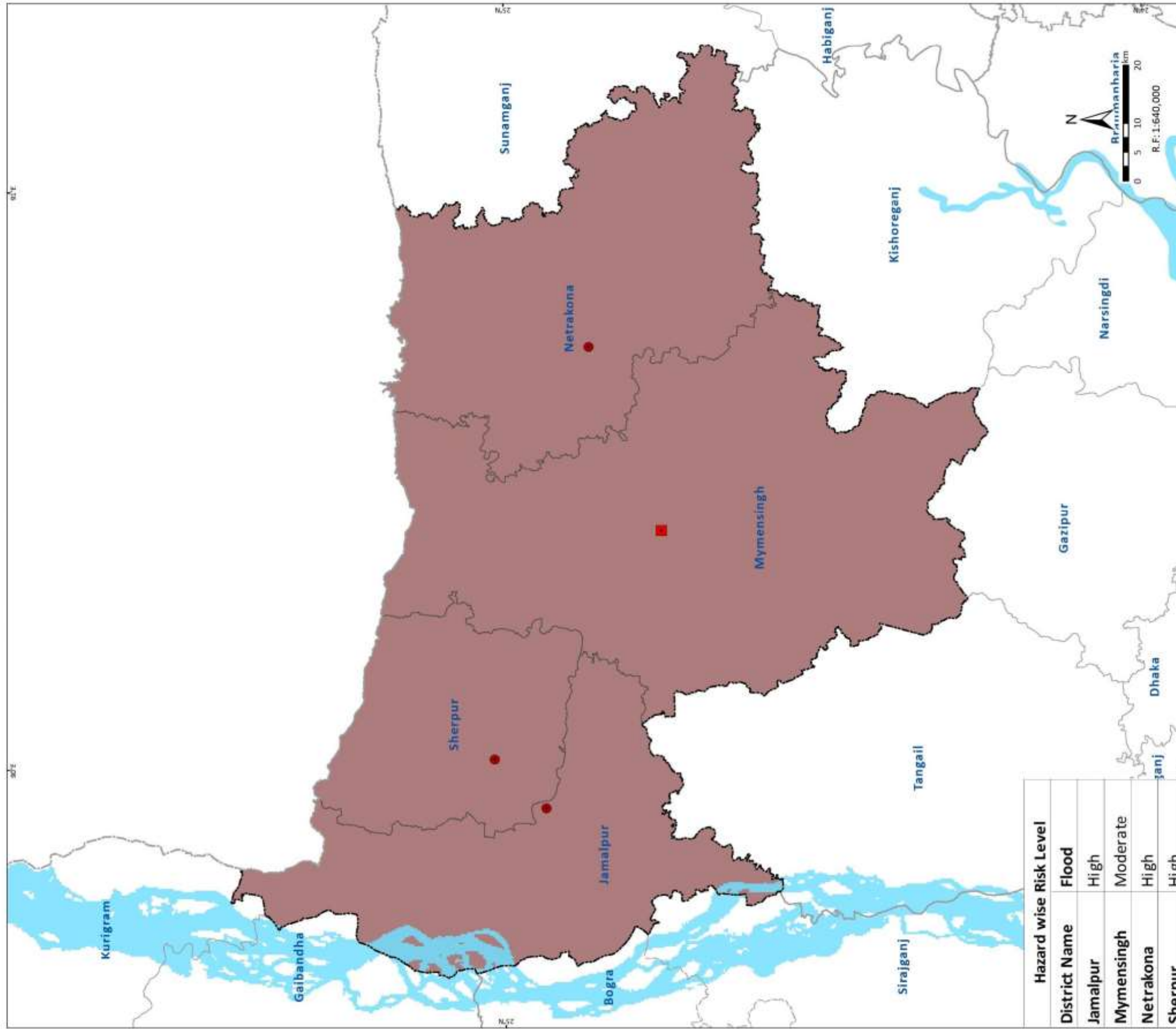


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Risk Levels of Housing (Kutcha and Jhupri) to Multi-Hazard (Mymensingh Division)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Division Head Quarter
- District Headquarter
- River/Sea/Lake
- Sundarbans

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

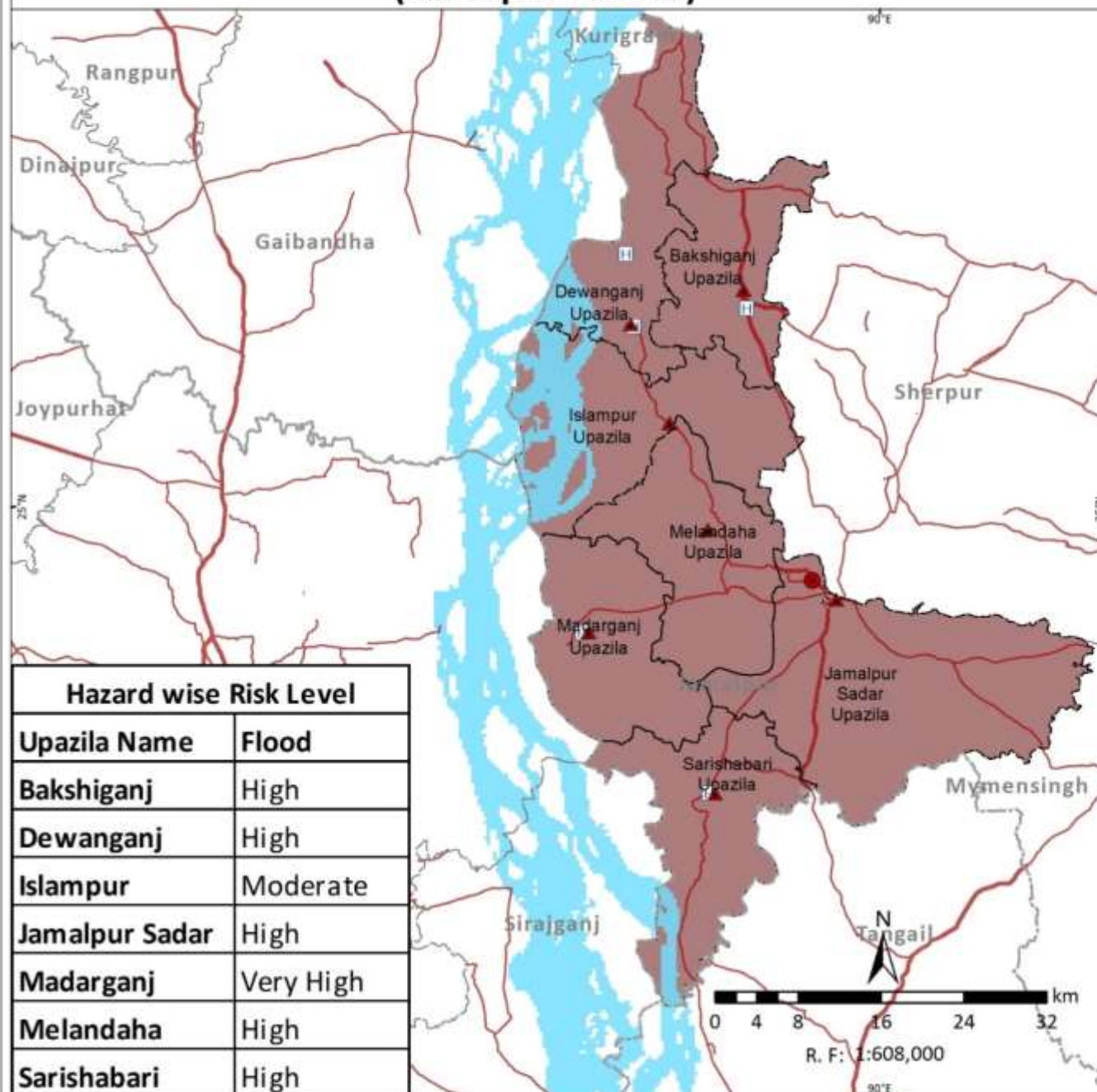
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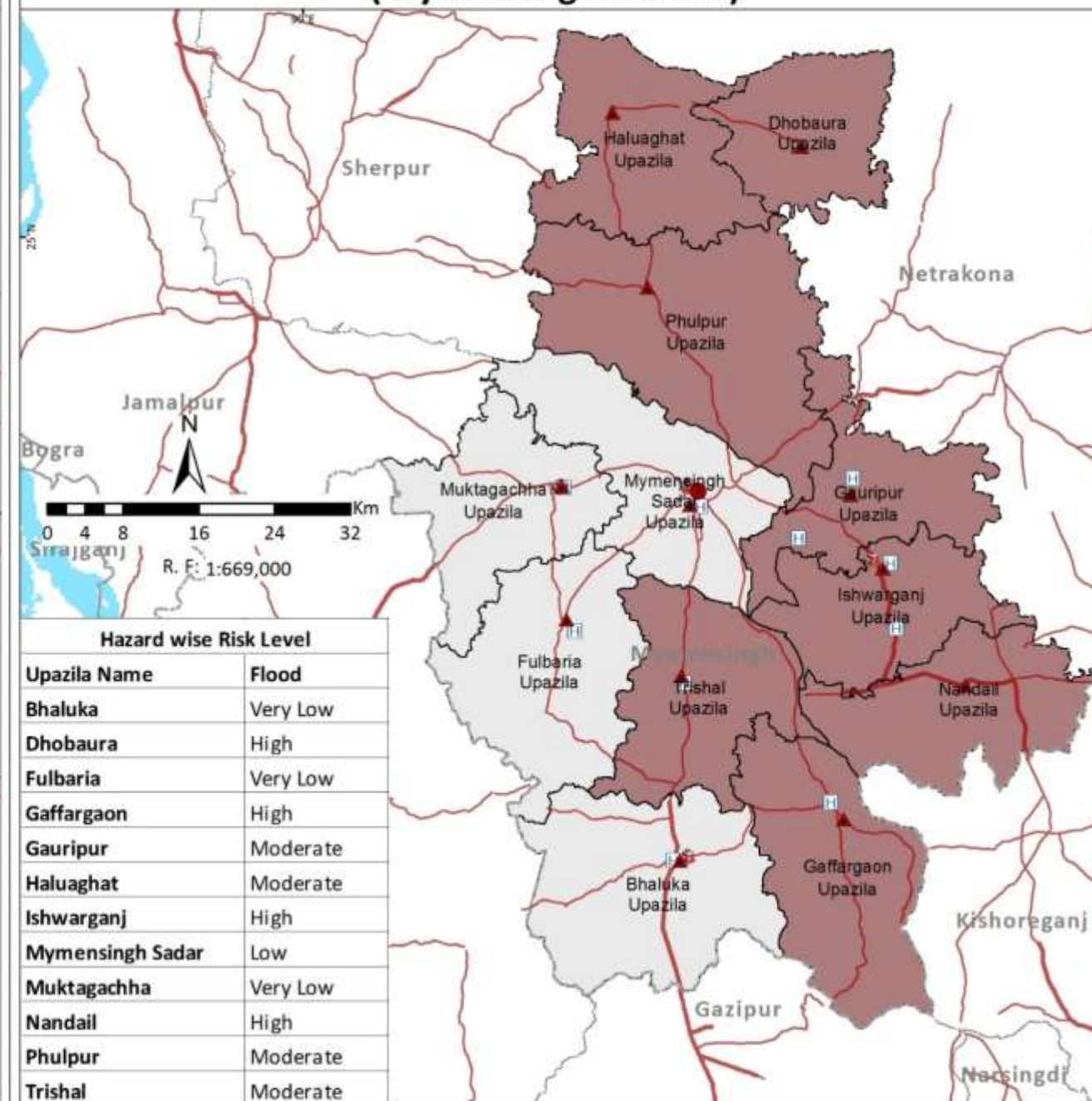
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Risk Levels of Housing (Kutcha and Jhupri) to Multi hazard (Jamalpur District)



Risk Levels of Housing (Kutcha and Jhupri) to Multi hazard (Mymensingh District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
- Flood
- Risk level below moderate

Note

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

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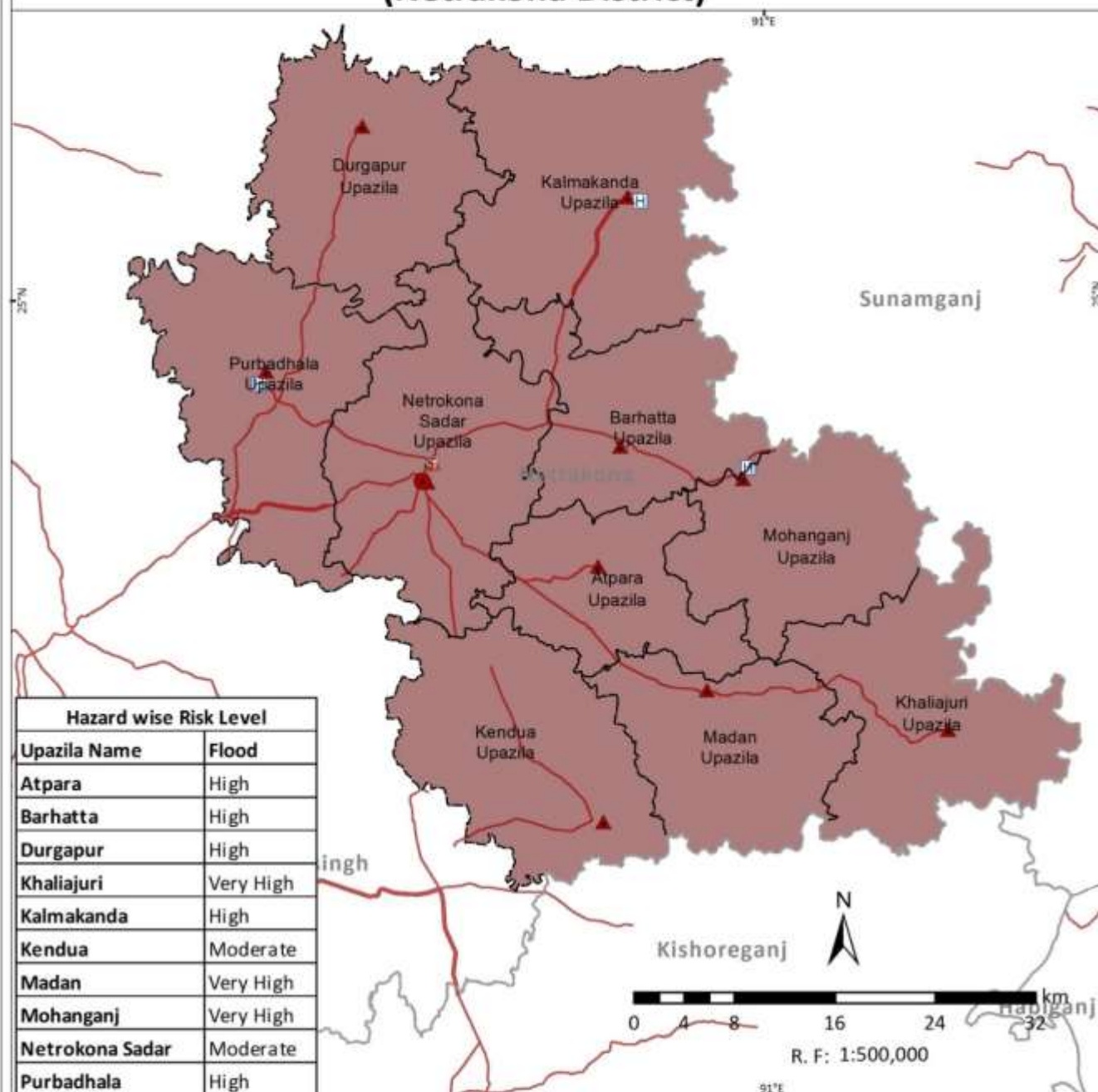
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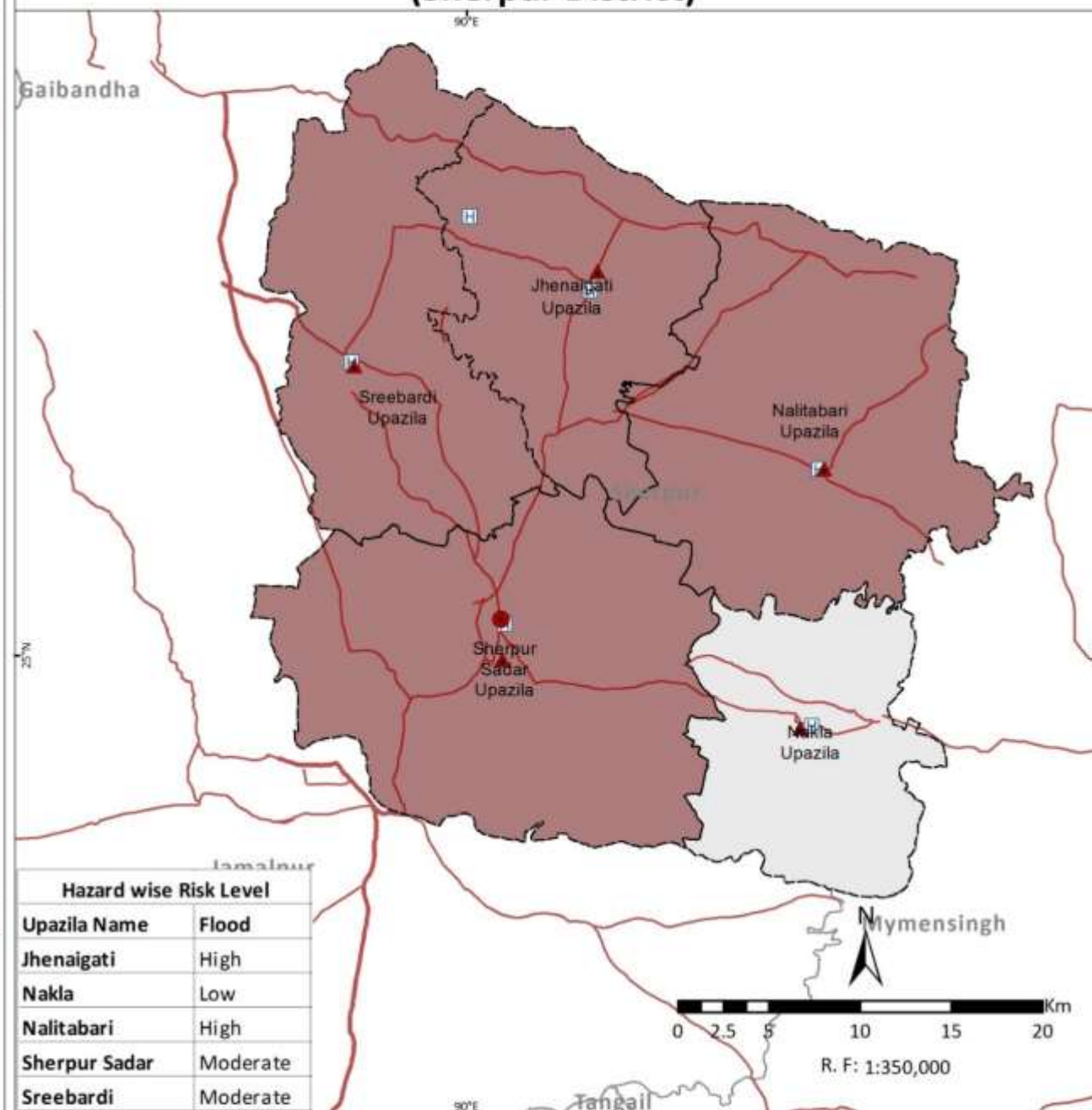
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Risk Levels of Housing (Kutcha and Jhupri) to Multi hazard (Netrakona District)



Risk Levels of Housing (Kutcha and Jhupri) to Multi hazard (Sherpur District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
- Flood
- Risk level below moderate

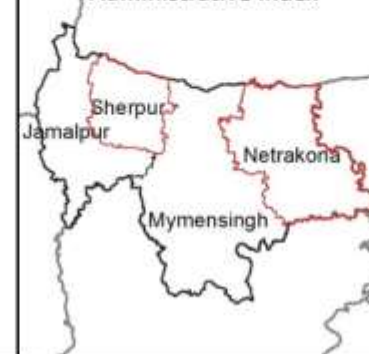
Note

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

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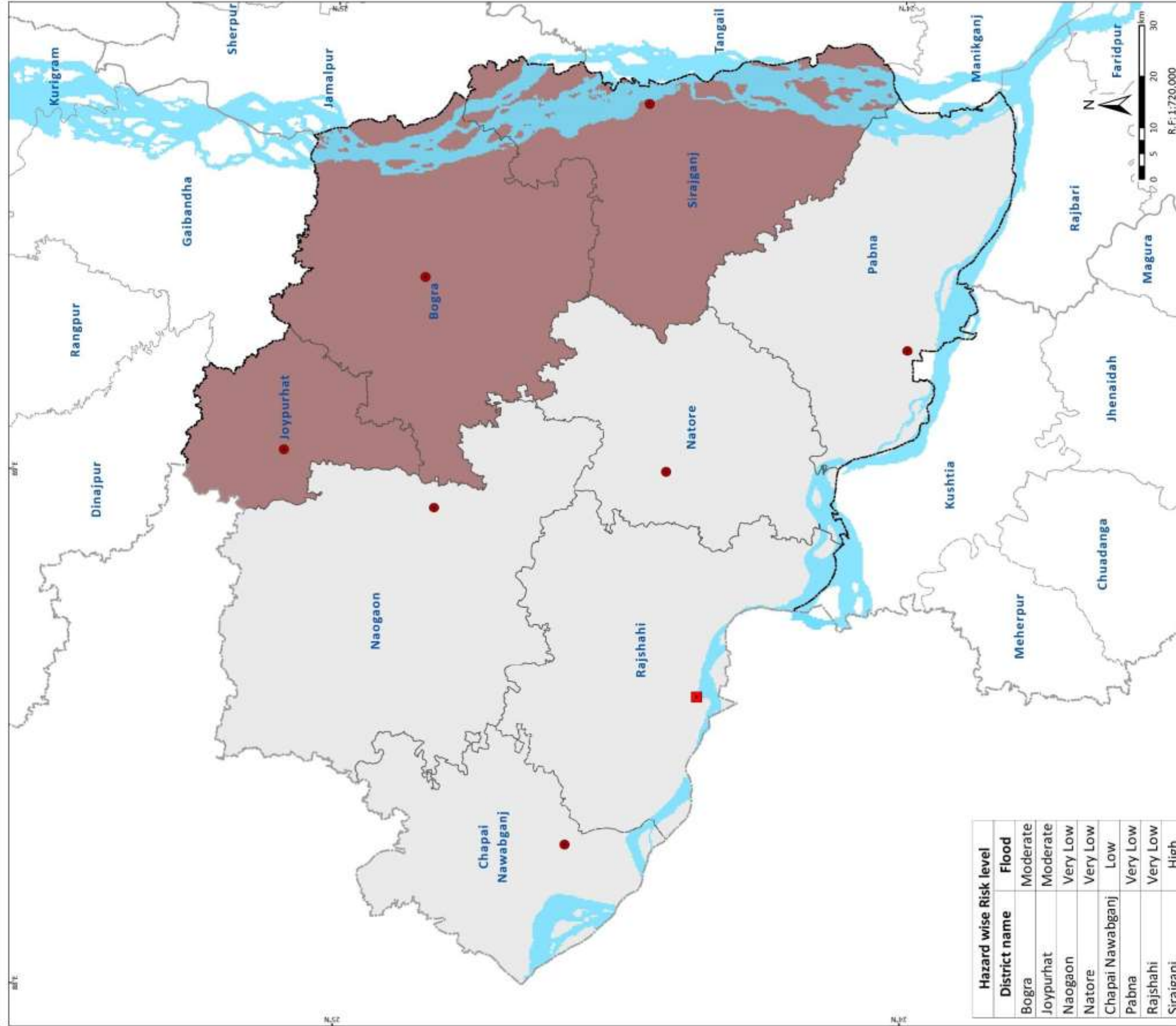


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Risk Levels of Housing (Kutcha and Jhupri) to Multi-Hazard (Rajshahi Division)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Division Head Quarter
- River/Sea/Lake
- Sundarbans

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMRI), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

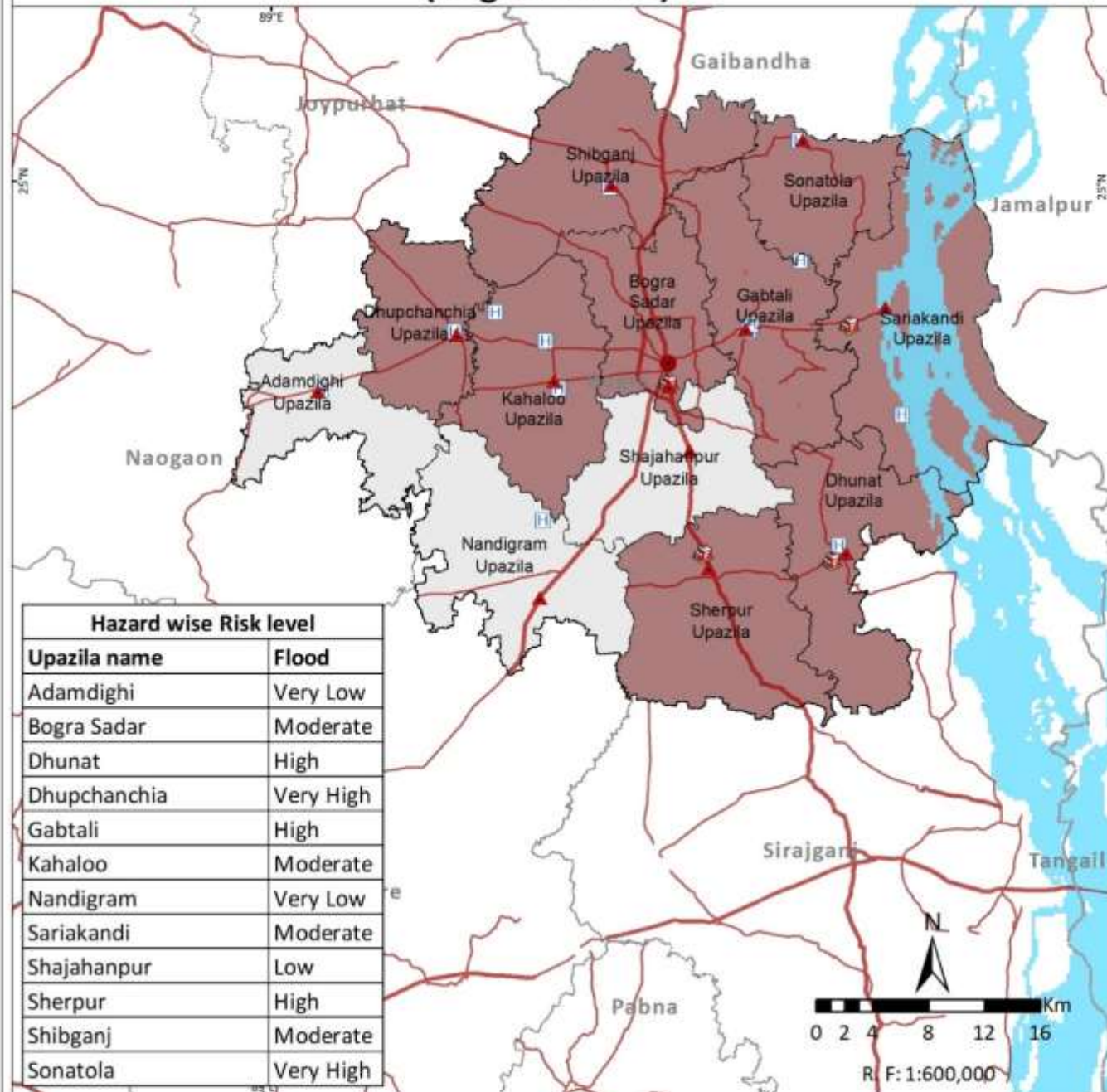
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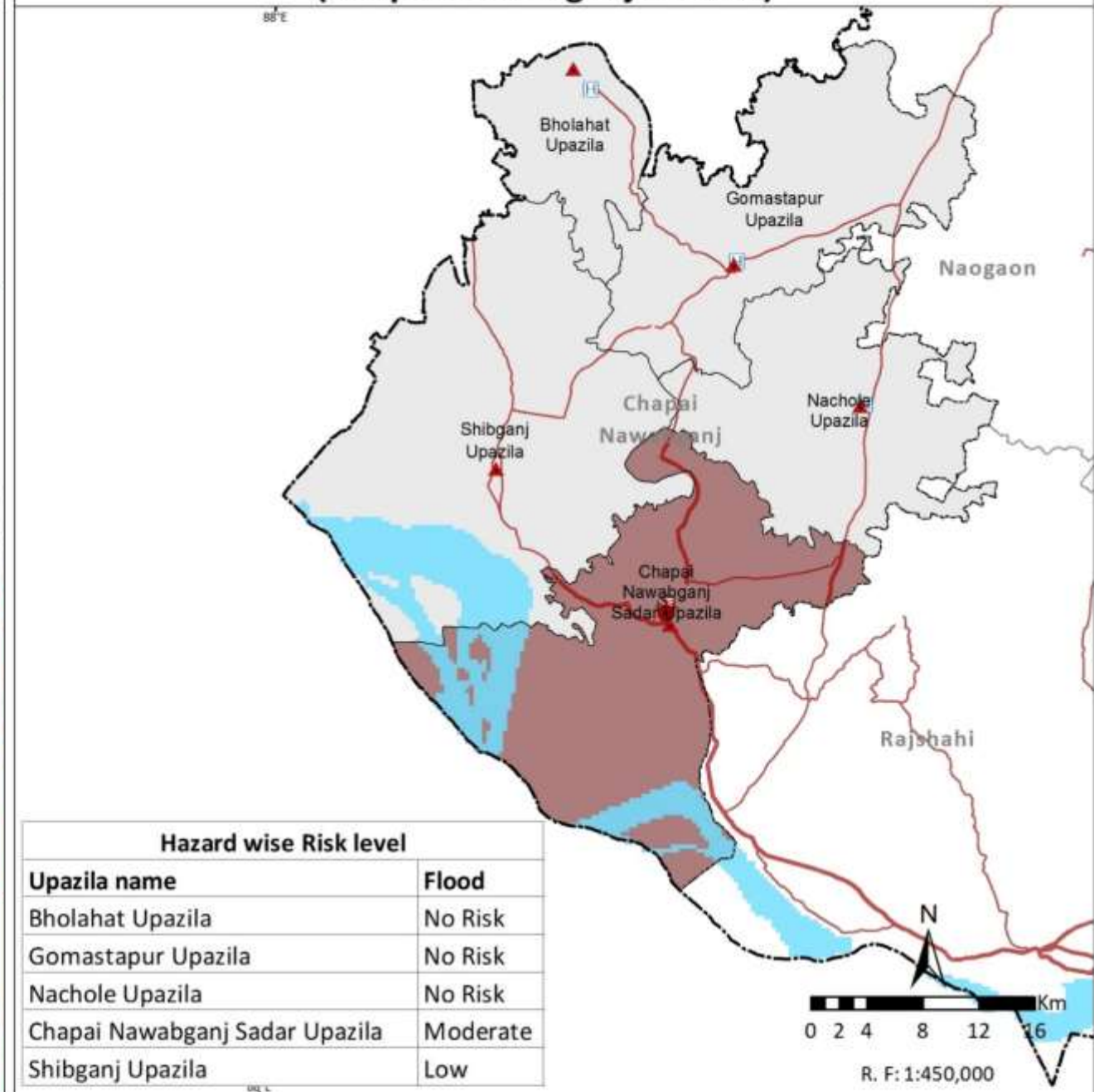
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Housing (Kutcha & Jhupri) Risk to Multi-Hazard (Bogra District)



Housing (Kutcha & Jhupri) Risk to Multi-Hazard (Chapai Nawabganj District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Health Facilities
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood
- Risk level below moderate

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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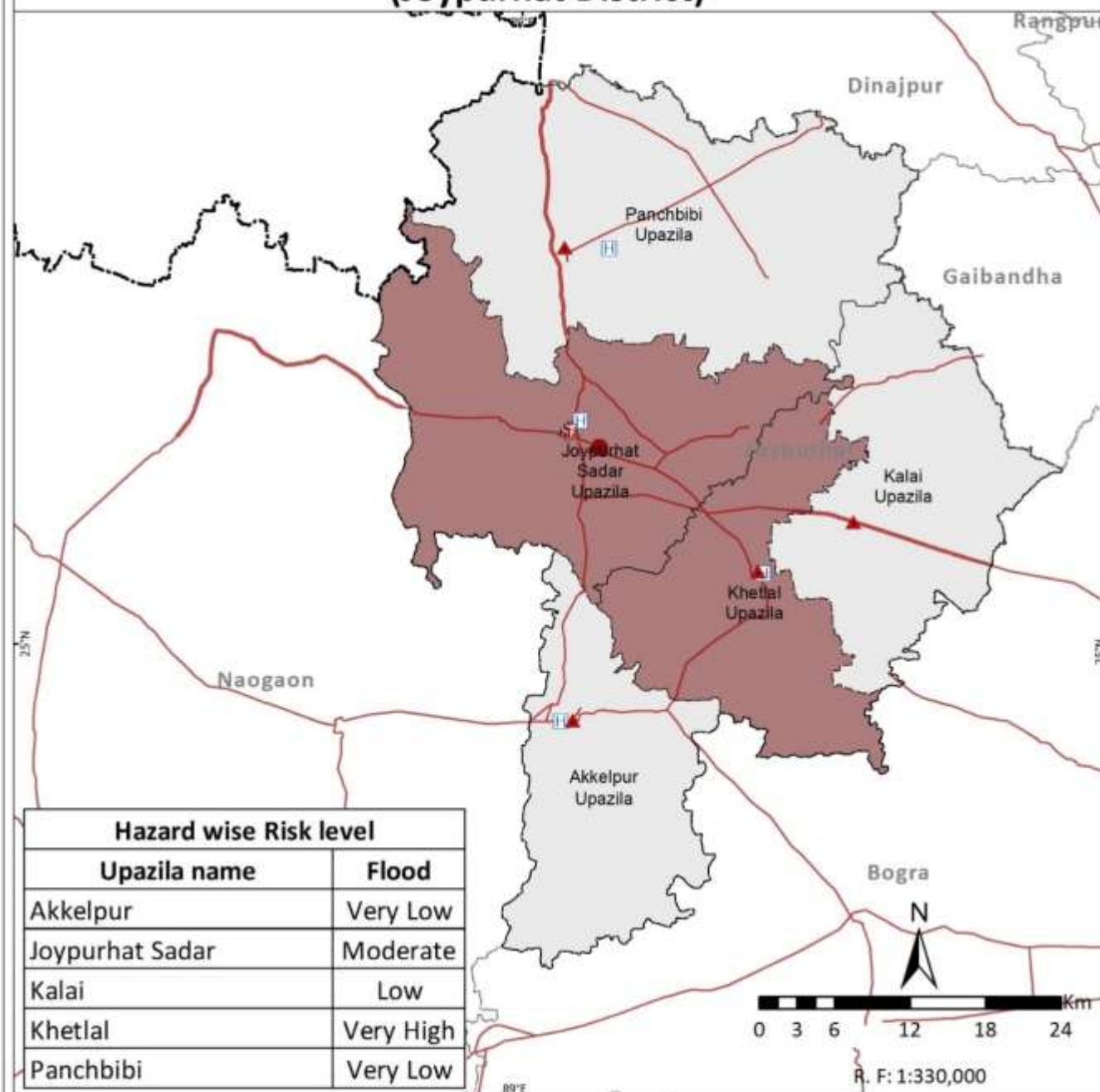
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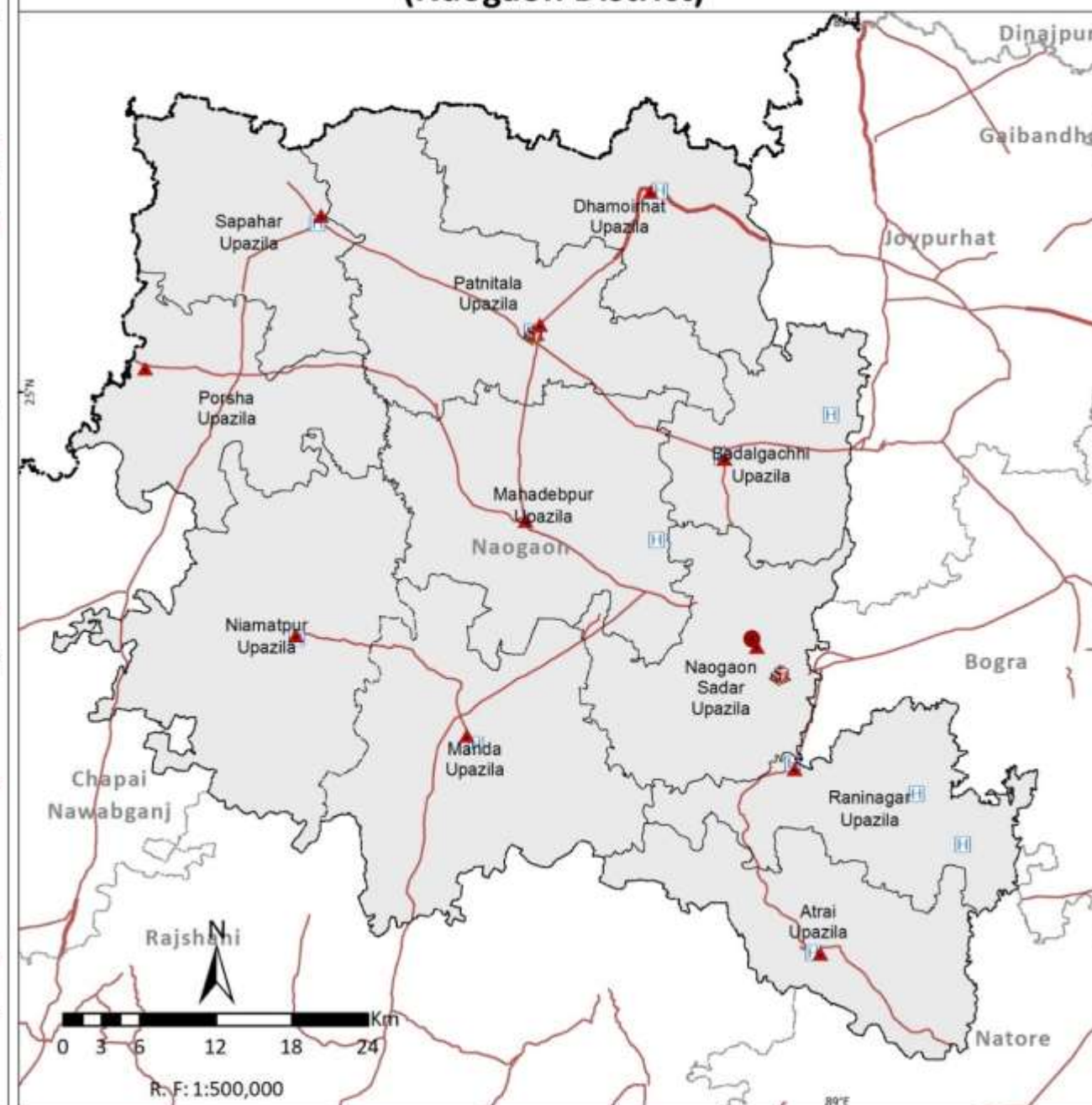
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Housing (Kutcha & Jhupri) Risk to Multi-Hazard (Joypurhat District)



Housing (Kutcha & Jhupri) Risk to Multi-Hazard (Naogaon District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood
- Risk level below moderate

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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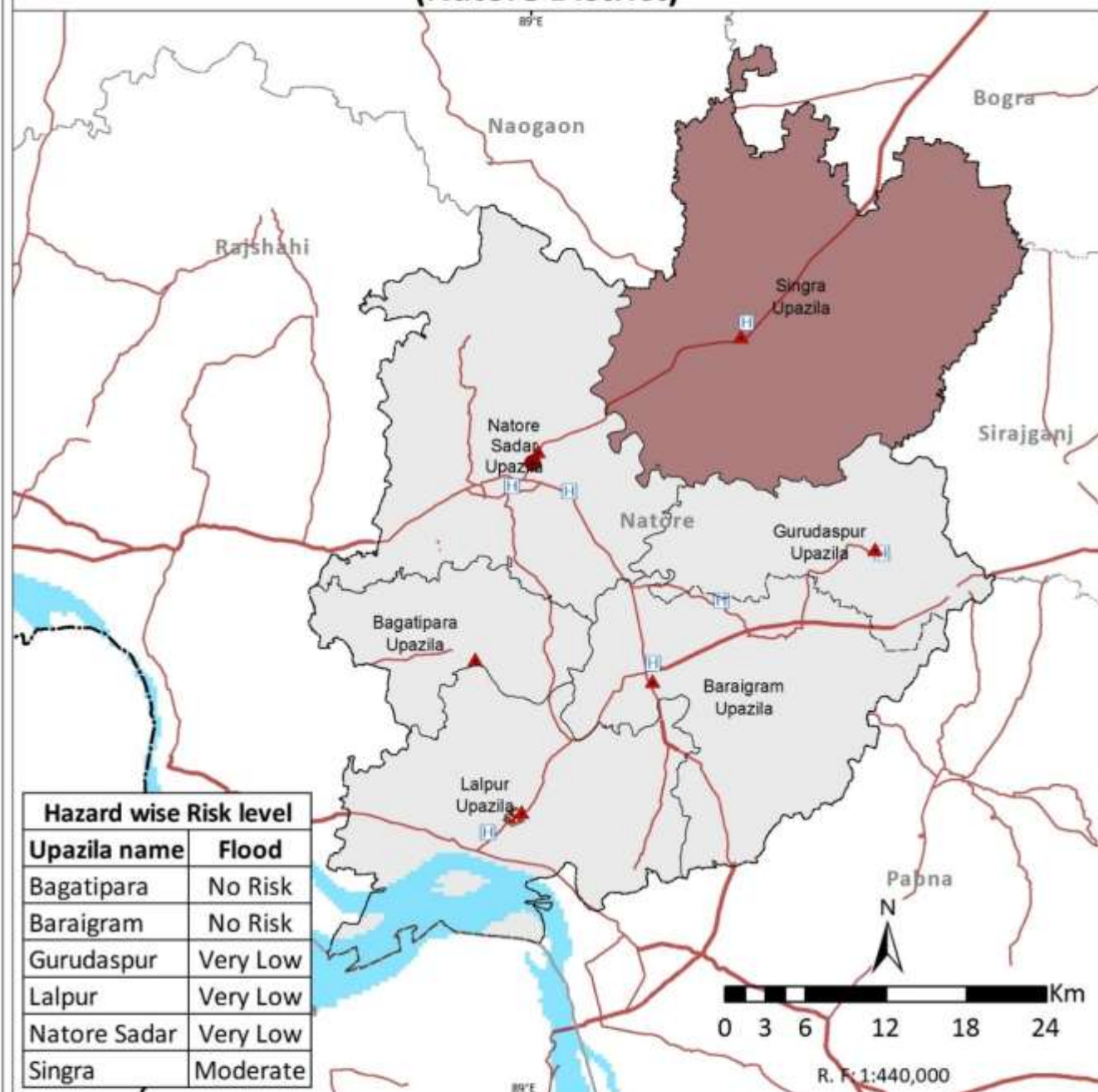
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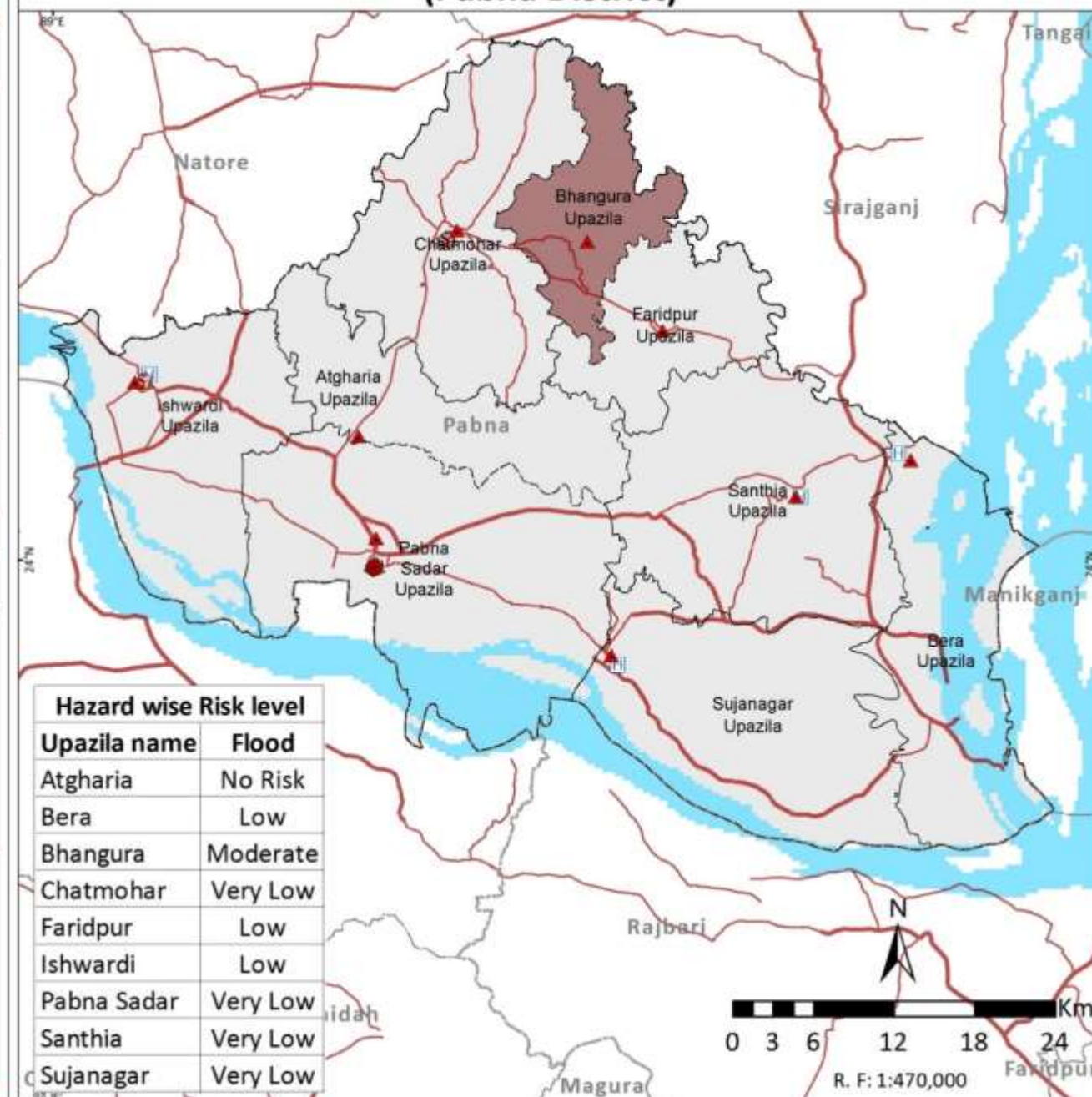
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Housing (Kutcha and Jhupri) Risk to Multi-Hazard (Natore District)



Housing (Kutcha and Jhupri) Risk to Multi-Hazard (Pabna District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood
- Risk level below moderate

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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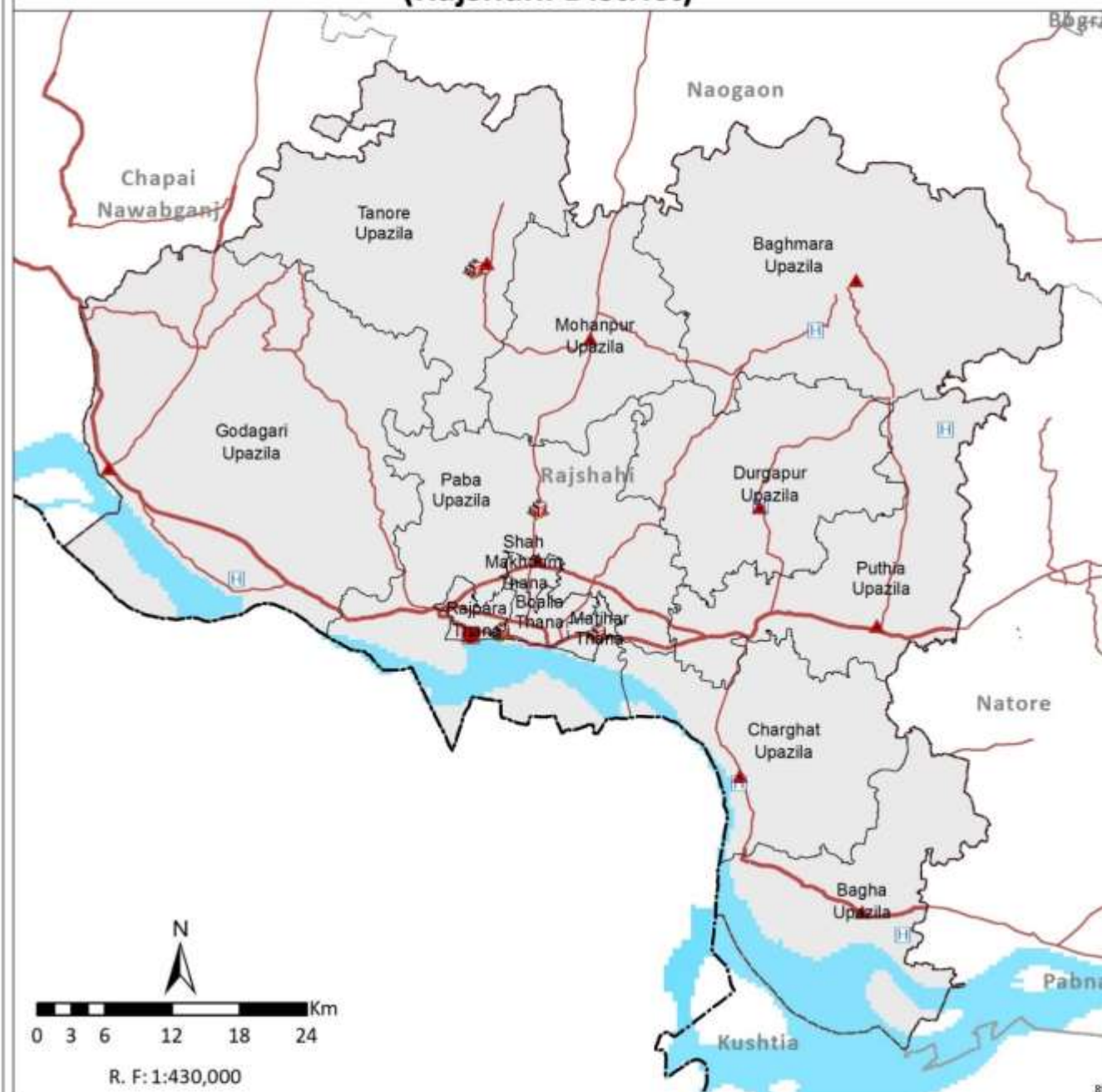
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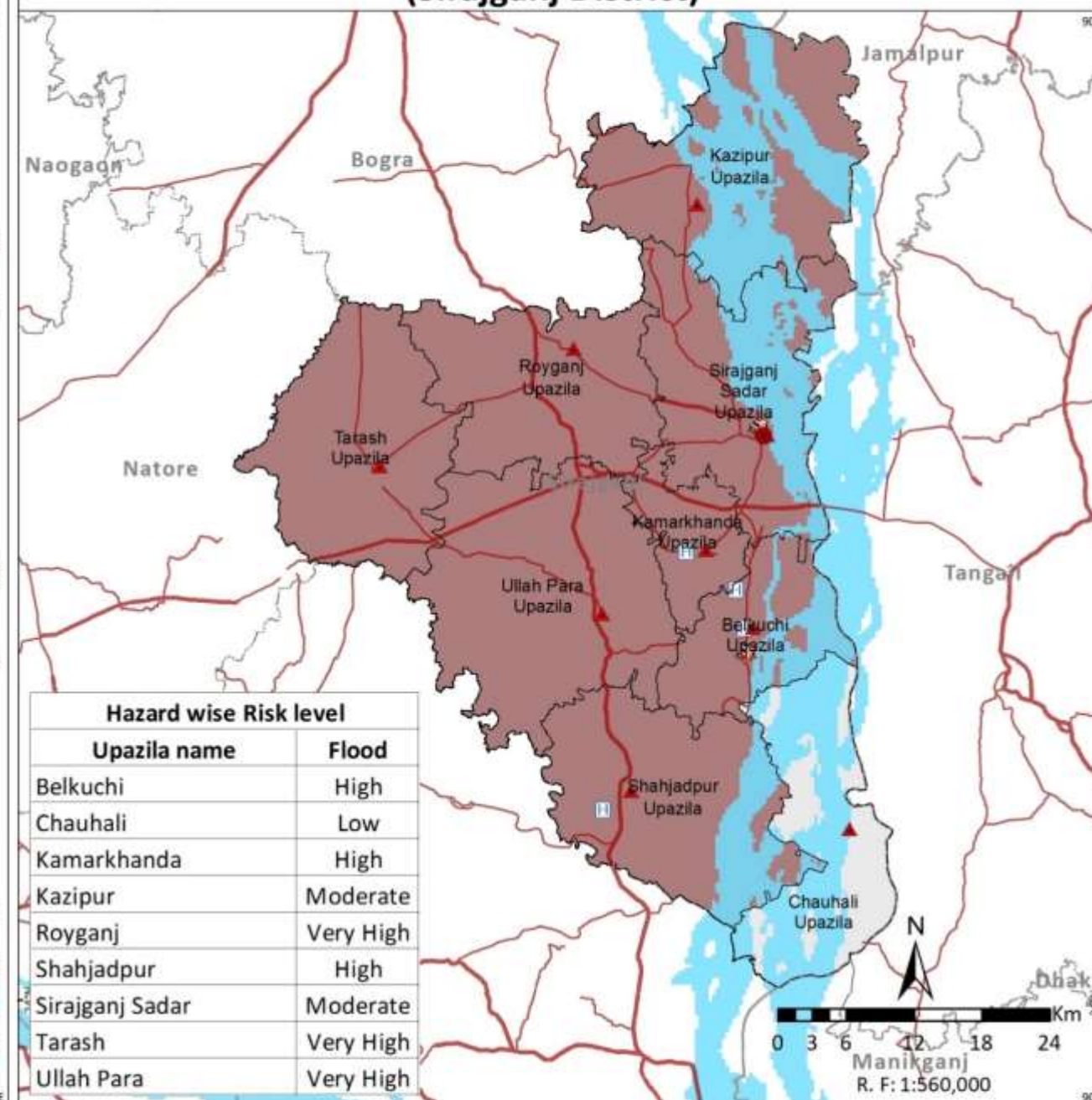
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Housing (Kutcha and Jhupri) Risk to Multi-Hazard (Rajshahi District)



Housing (Kutcha and Jhupri) Risk to Multi-Hazard (Sirajganj District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- Division Head Quarter
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood
- Risk level below moderate

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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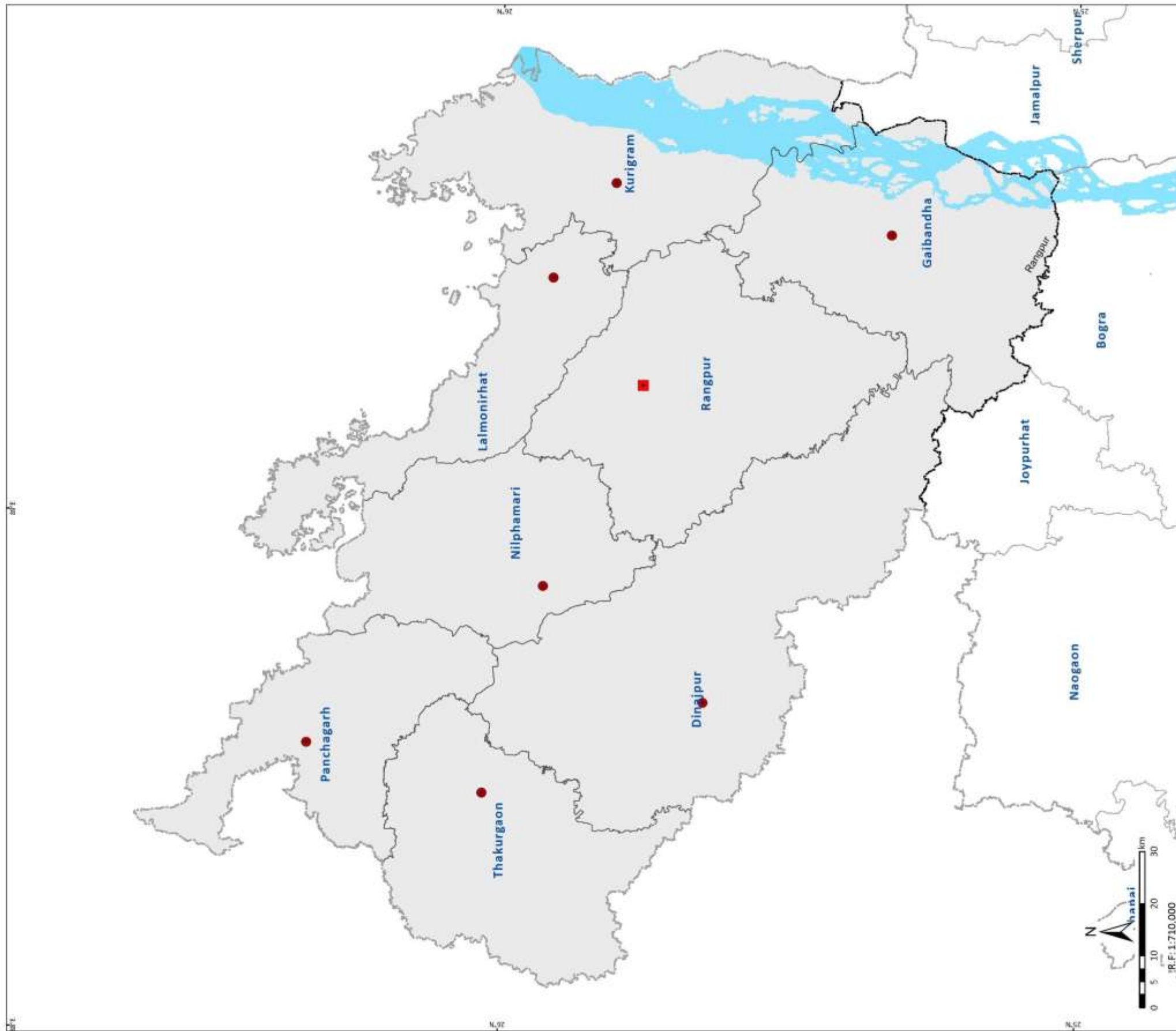
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Risk Levels of Housing (Kutcha and Jhupri) to Multi-Hazard (Rangpur Division)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- District Head Quarter
- River/Sea/Lake
- Sundarbans

Multi-Hazard Risk level for Moderate and above category

Risk level below moderate

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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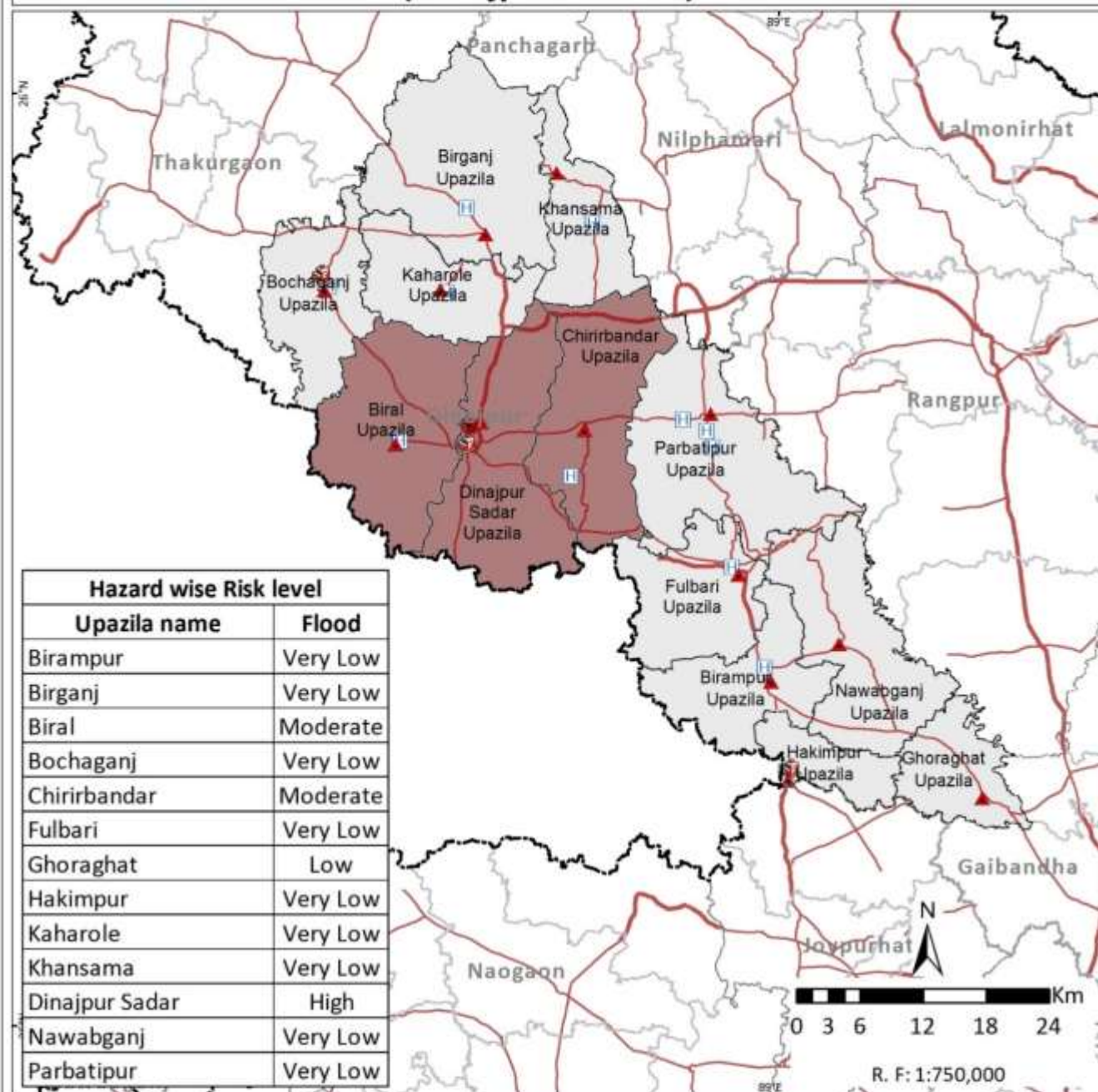
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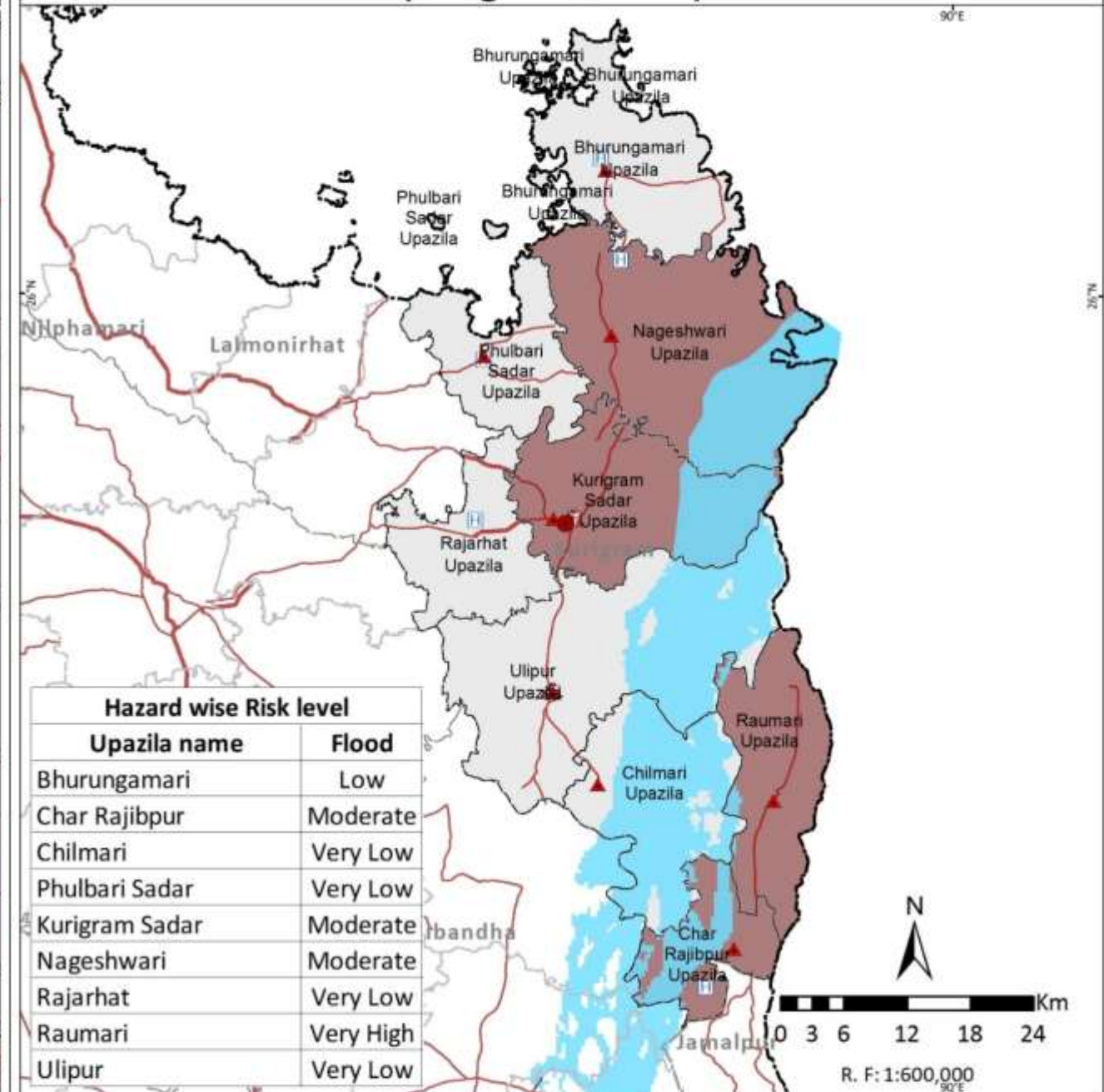
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Housing (Kutcha and Jhupri) Risk to Multi-Hazard (Dinajpur District)



Housing (Kutcha and Jhupri) Risk to Multi-Hazard (Kurigram District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood
- Risk level below moderate

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, COMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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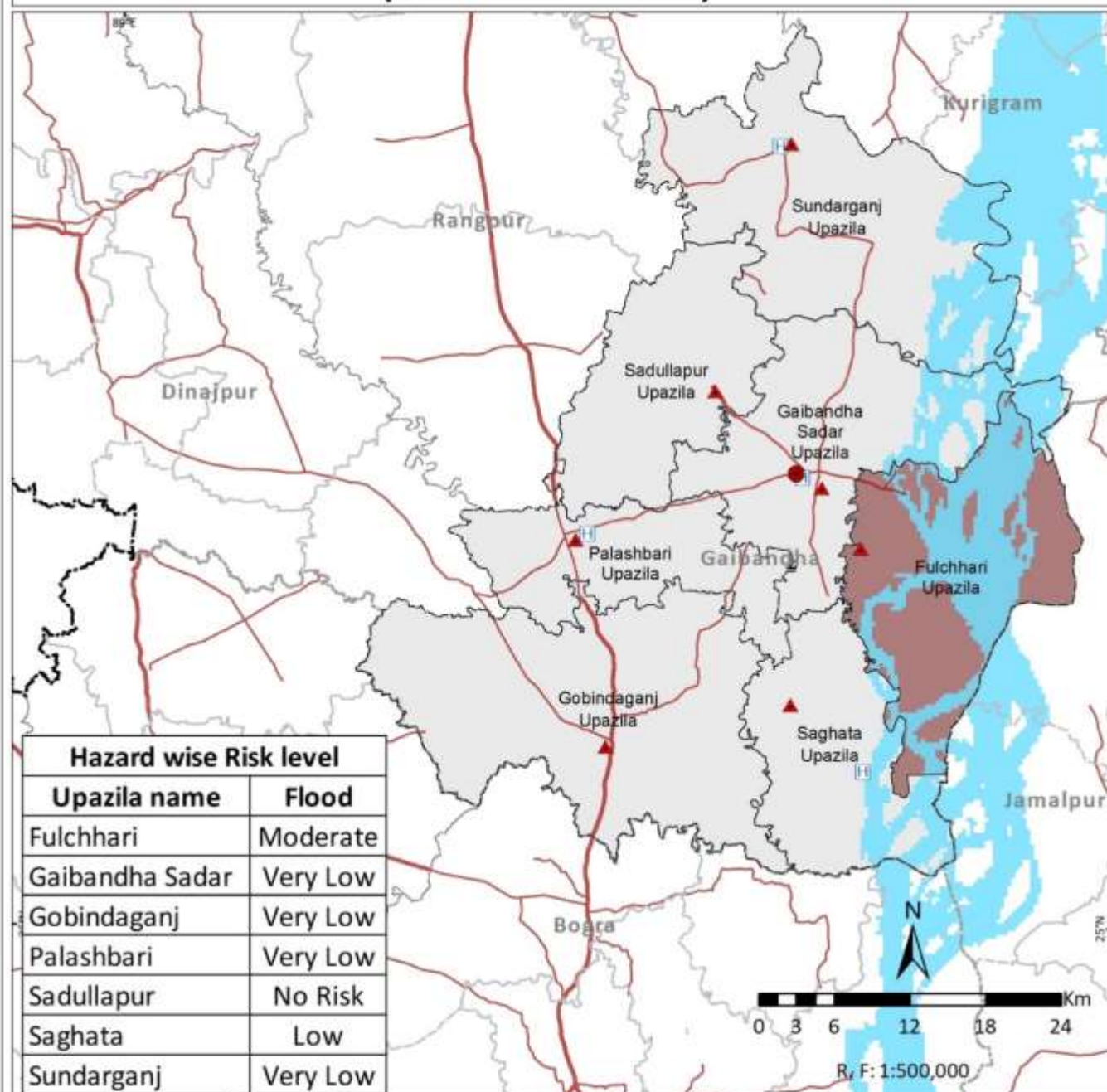
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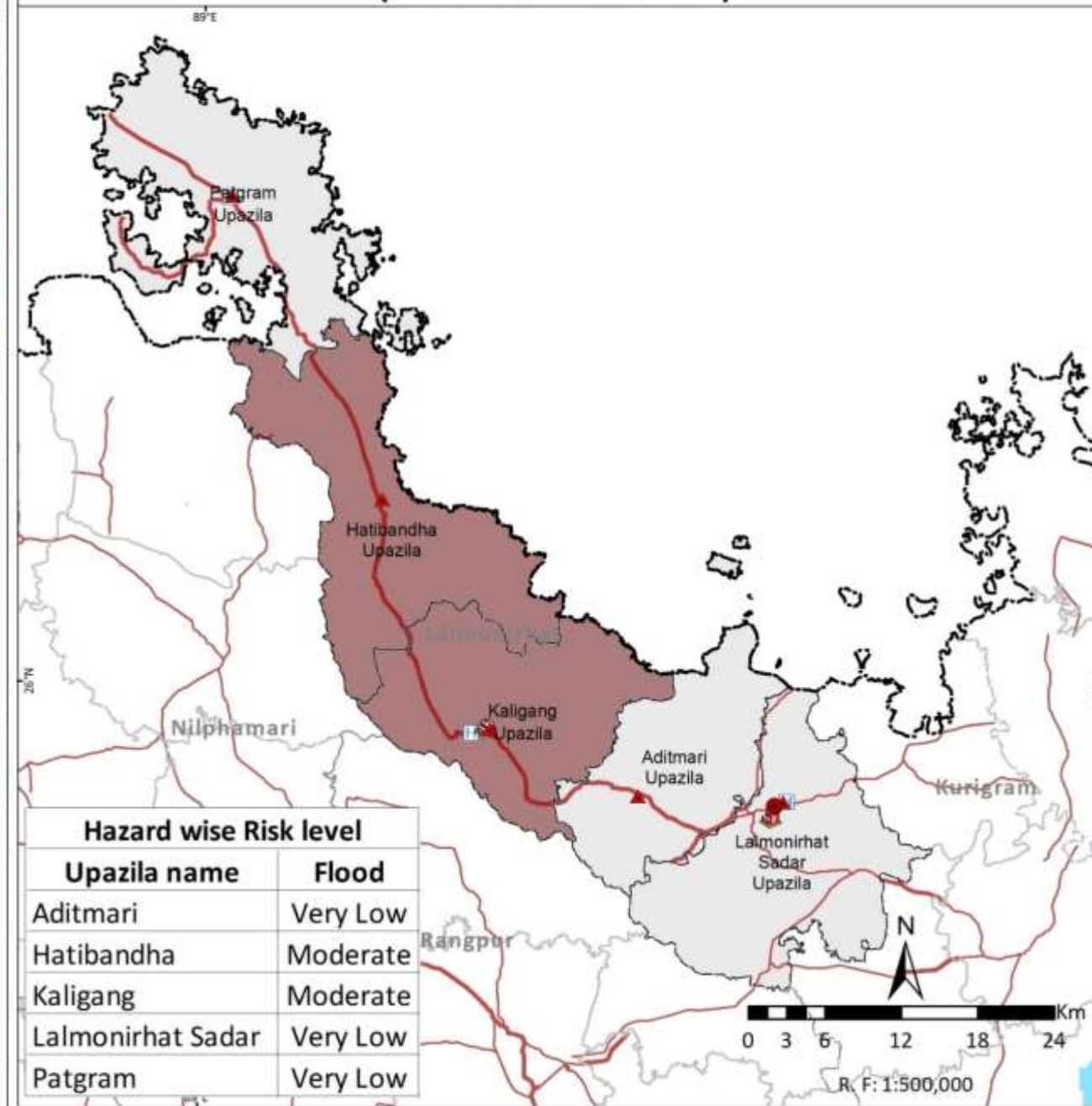
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Housing (Kutcha and Jhupri) Risk to Multi-Hazard (Gaibandha District)



Housing (Kutcha and Jhupri) Risk to Multi-Hazard (Lalmonirhat District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood
- Risk level below moderate

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDM-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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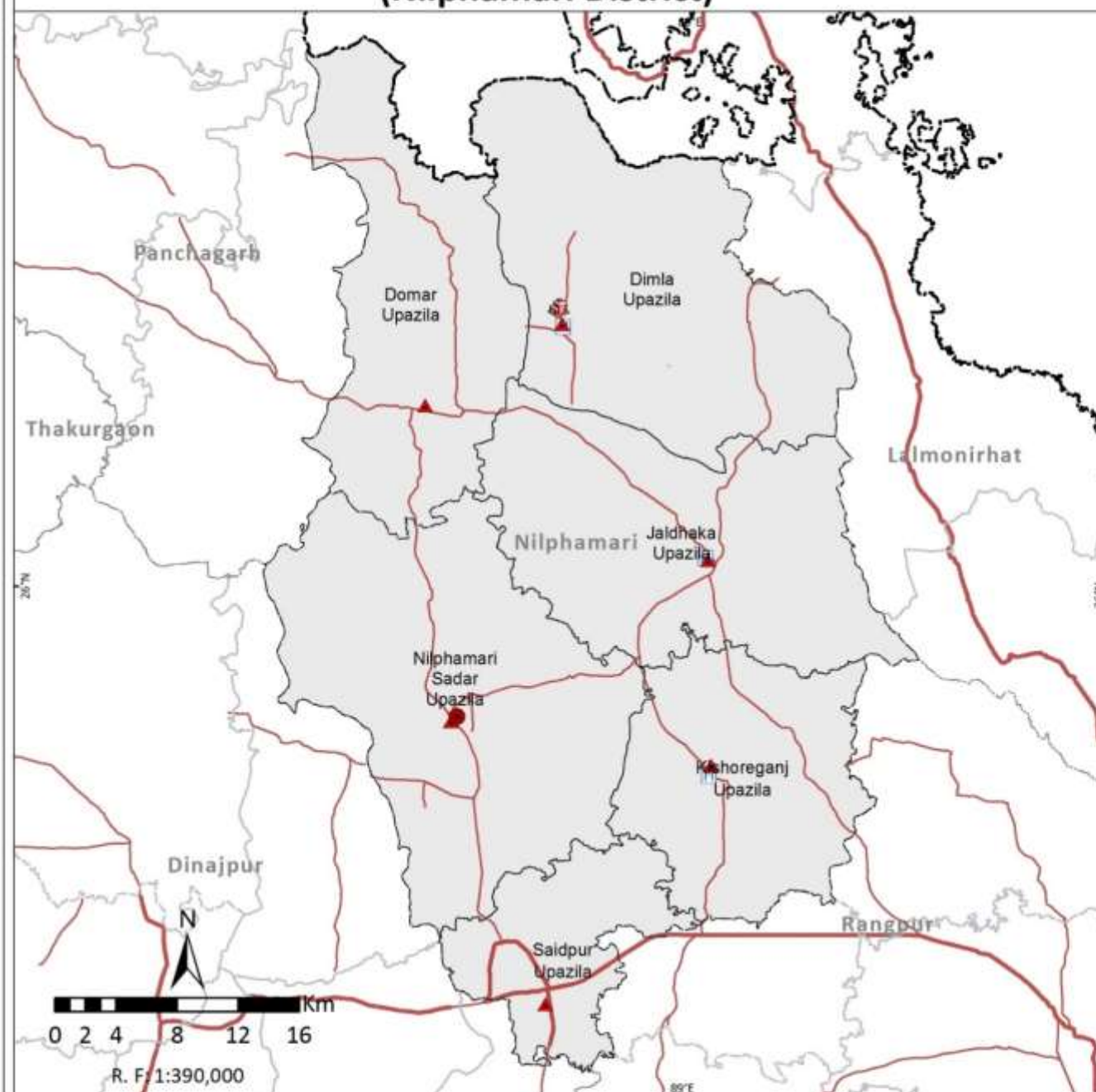
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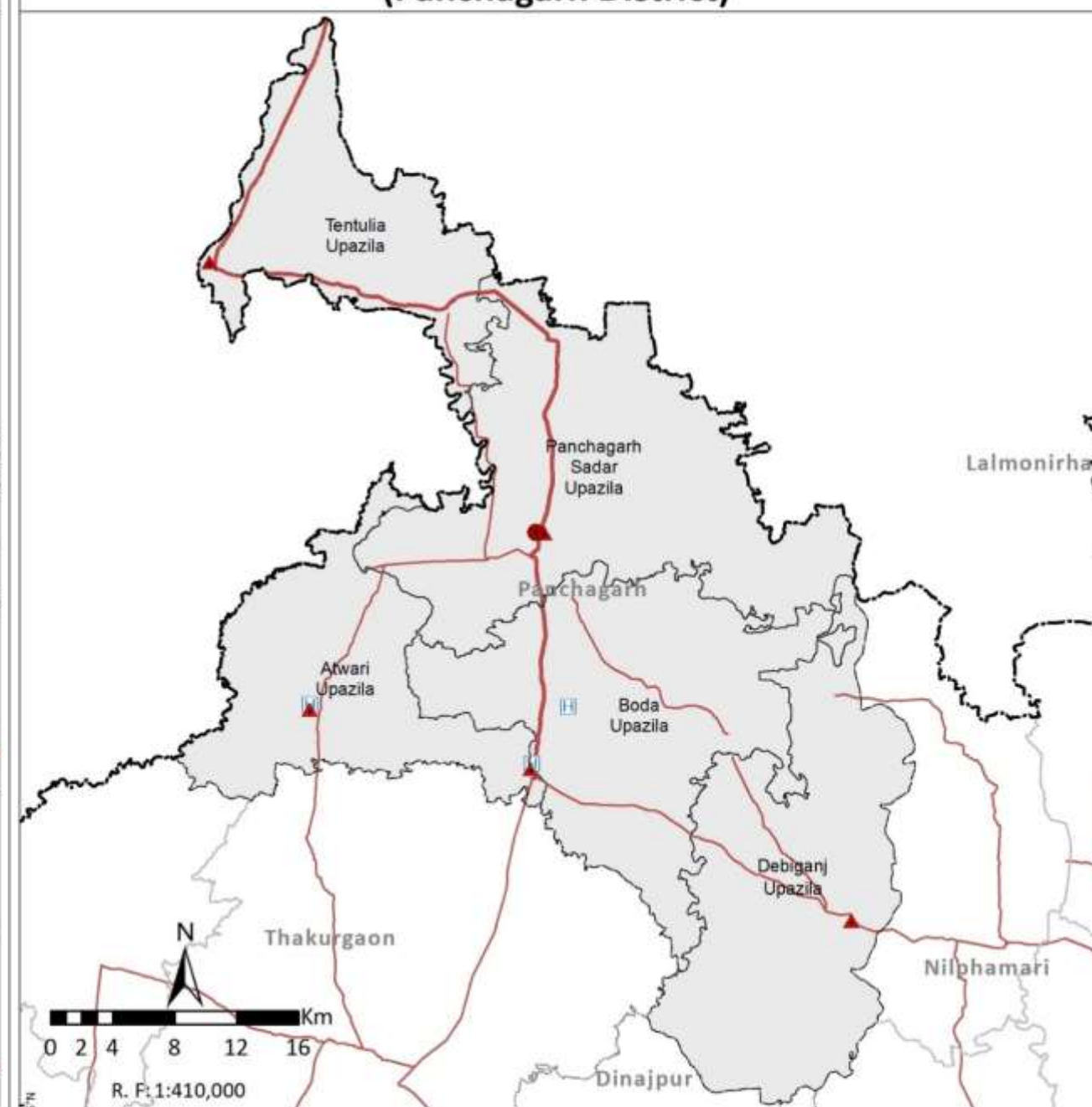
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Housing (Kutcha and Jhupri) Risk to Multi-Hazard (Nilphamari District)



Housing (Kutcha and Jhupri) Risk to Multi-Hazard (Panchagarh District)



Legend

- | | | |
|-----------------------|-------------------------|---|
| — Country Boundary | ● District Head Quarter | Multi-Hazard Risk level for Moderate and above category |
| --- Division Boundary | ▲ Upazila Head Quarter | |
| --- District Boundary | 🚒 Fire stations | Risk level below moderate |
| --- Upazila Boundary | 🏥 Hospital | |
| — National High Way | 🏠 Cyclone Shelter | |
| — Regional High Way | 🌊 River/Sea/Lake | |
| | 🌿 Sundarbans | |

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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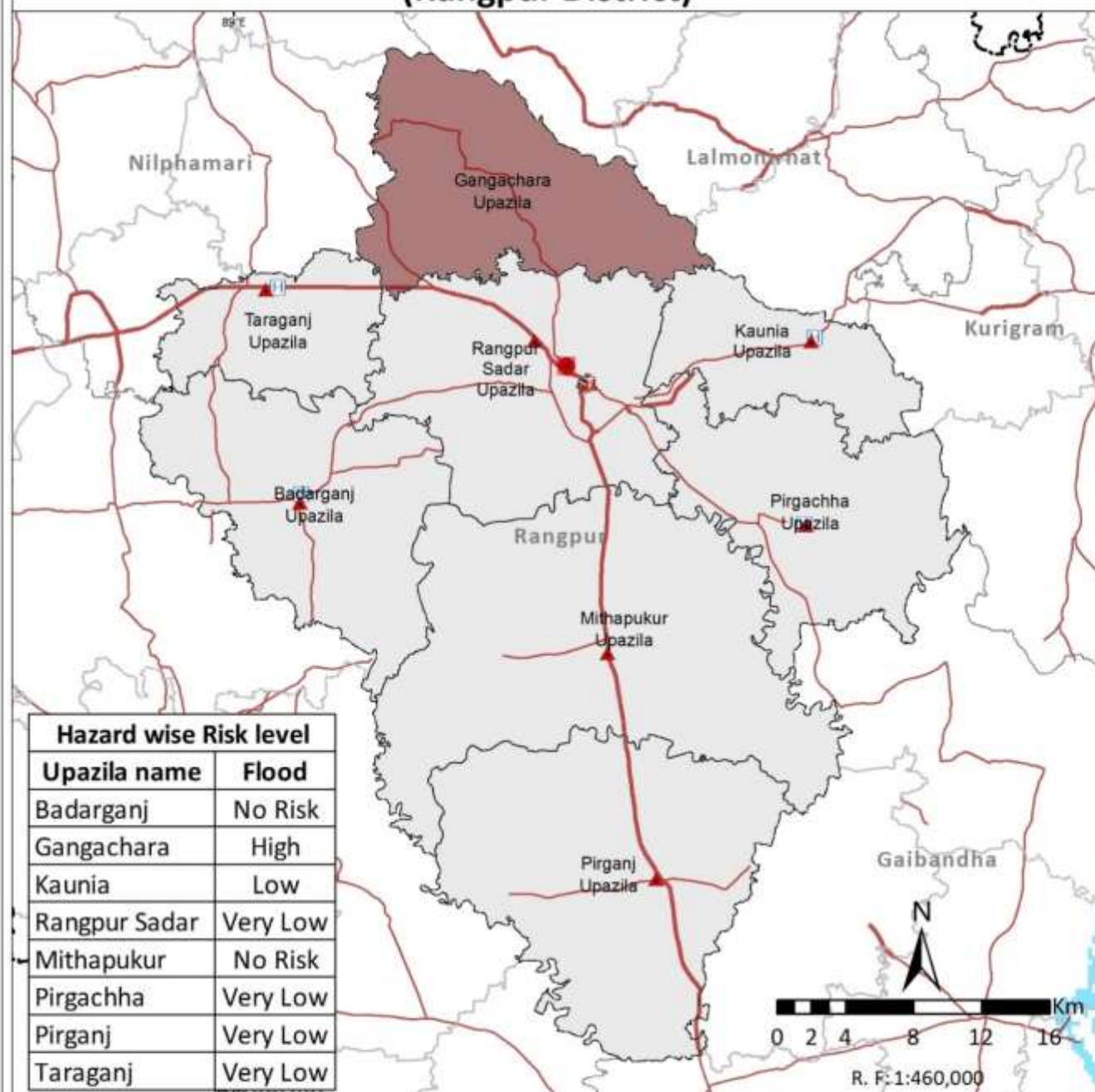
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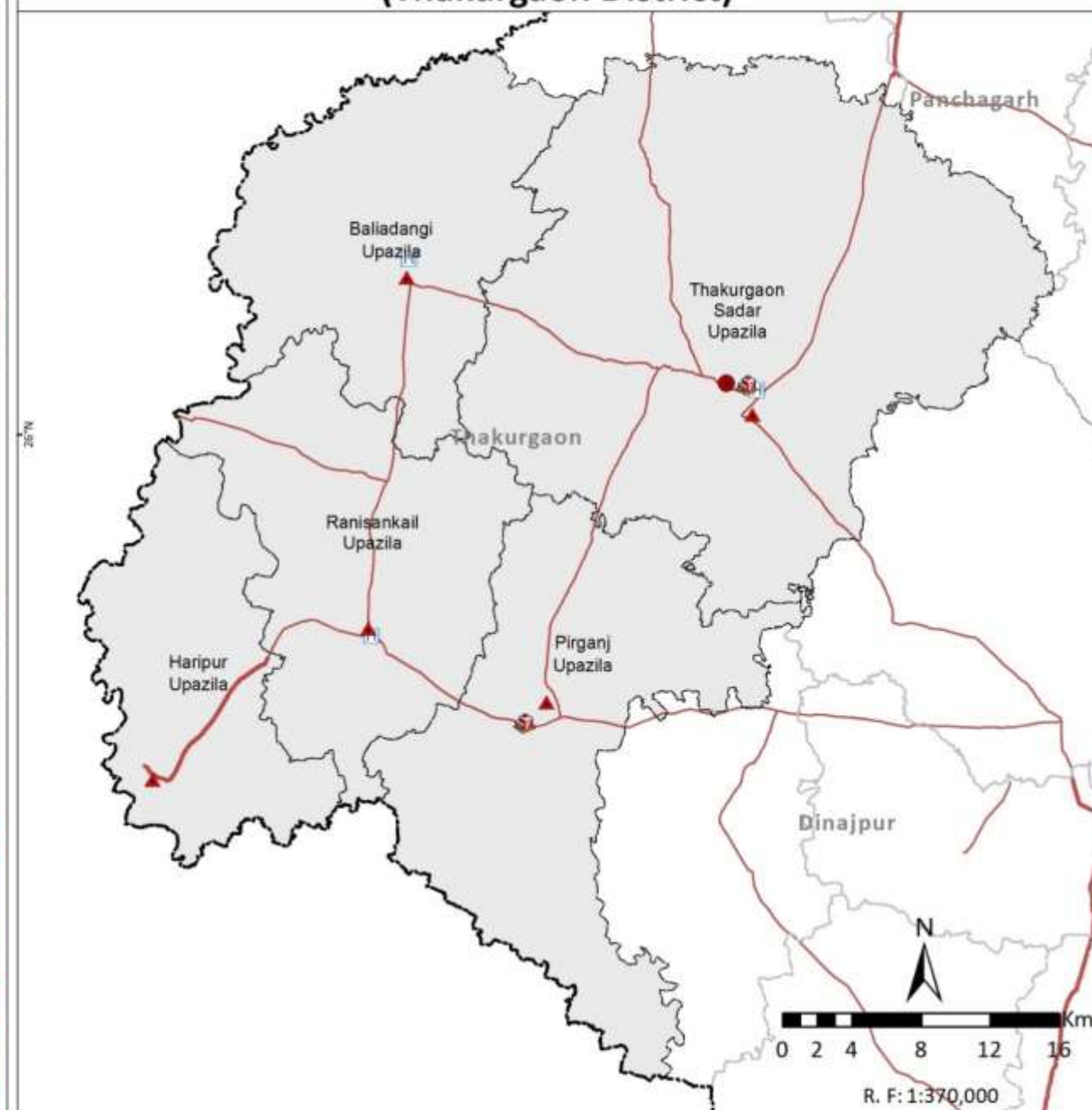
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Housing (Kutcha and Jhupri) Risk to Multi-Hazard (Rangpur District)



Housing (Kutcha and Jhupri) Risk to Multi-Hazard (Thakurgaon District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- Division Head Quarter
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood
- Risk level below moderate

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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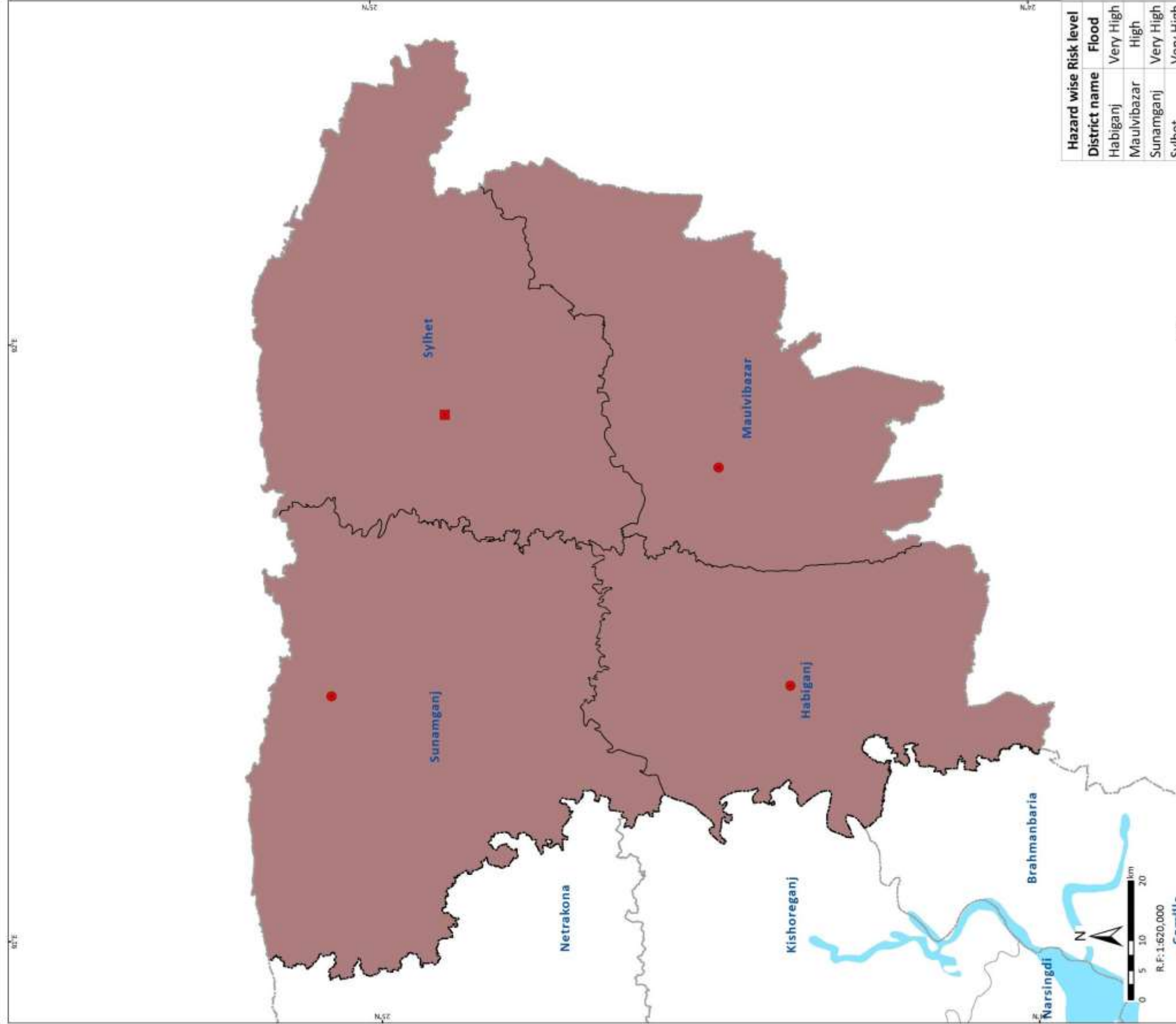


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Risk Levels of Housing (Kutcha and Jhupri) to Multi-Hazard (Sylhet Division)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Division Head Quarter
- District Head Quarter
- River/Sea/Lake
- Sundarbans

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMRI), GSB, IWM and WARPO.

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

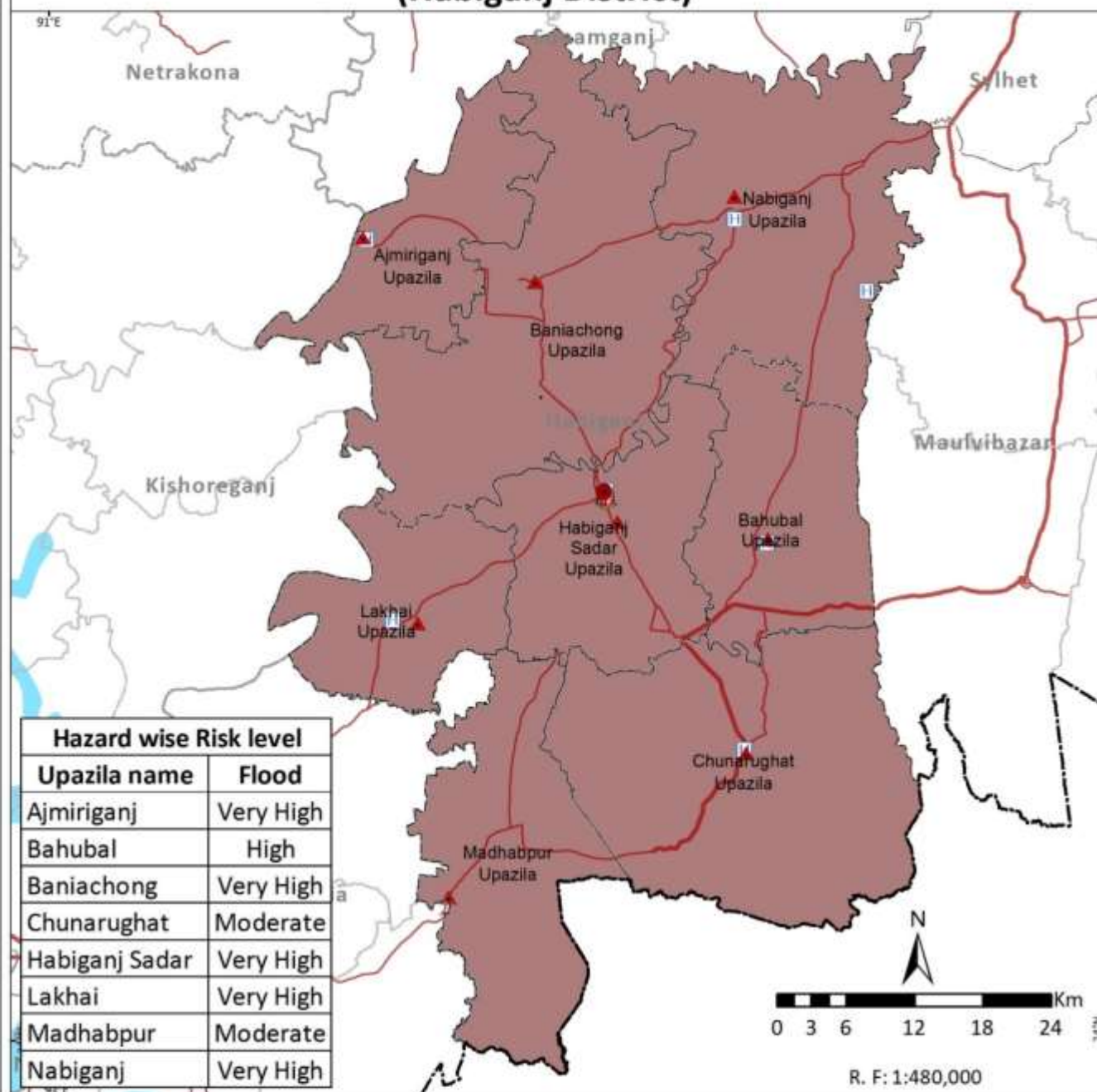
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Hazard wise Risk level	
District name	Flood
Habiganj	Very High
Maulvibazar	High
Sunamganj	Very High
Sylhet	Very High

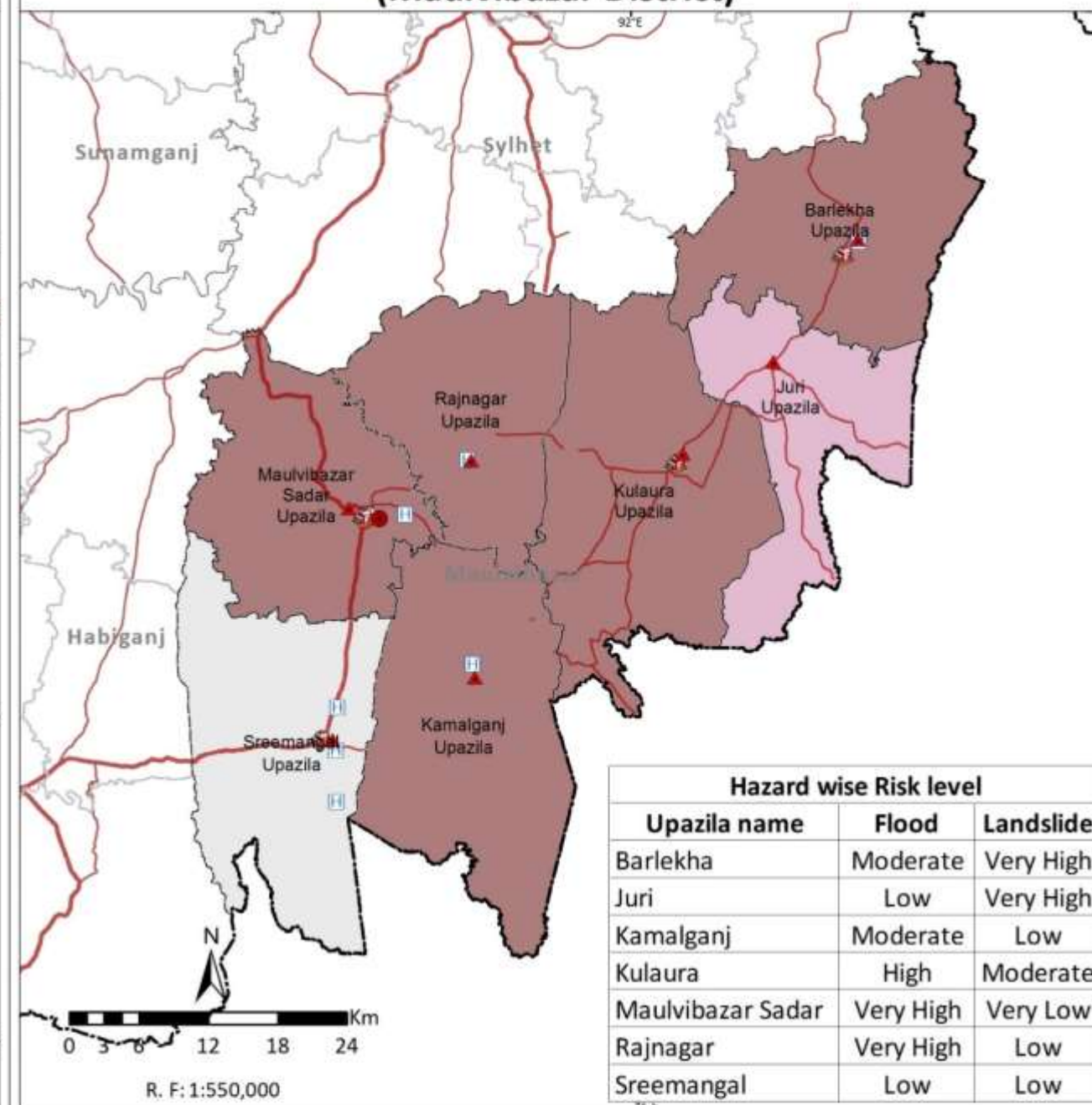




Housing (Kutcha and Jhupri) Risk to Multi-Hazard (Habiganj District)



Housing (Kutcha and Jhupri) Risk to Multi-Hazard (Maulvibazar District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood
- Landslide
- Risk level below moderate

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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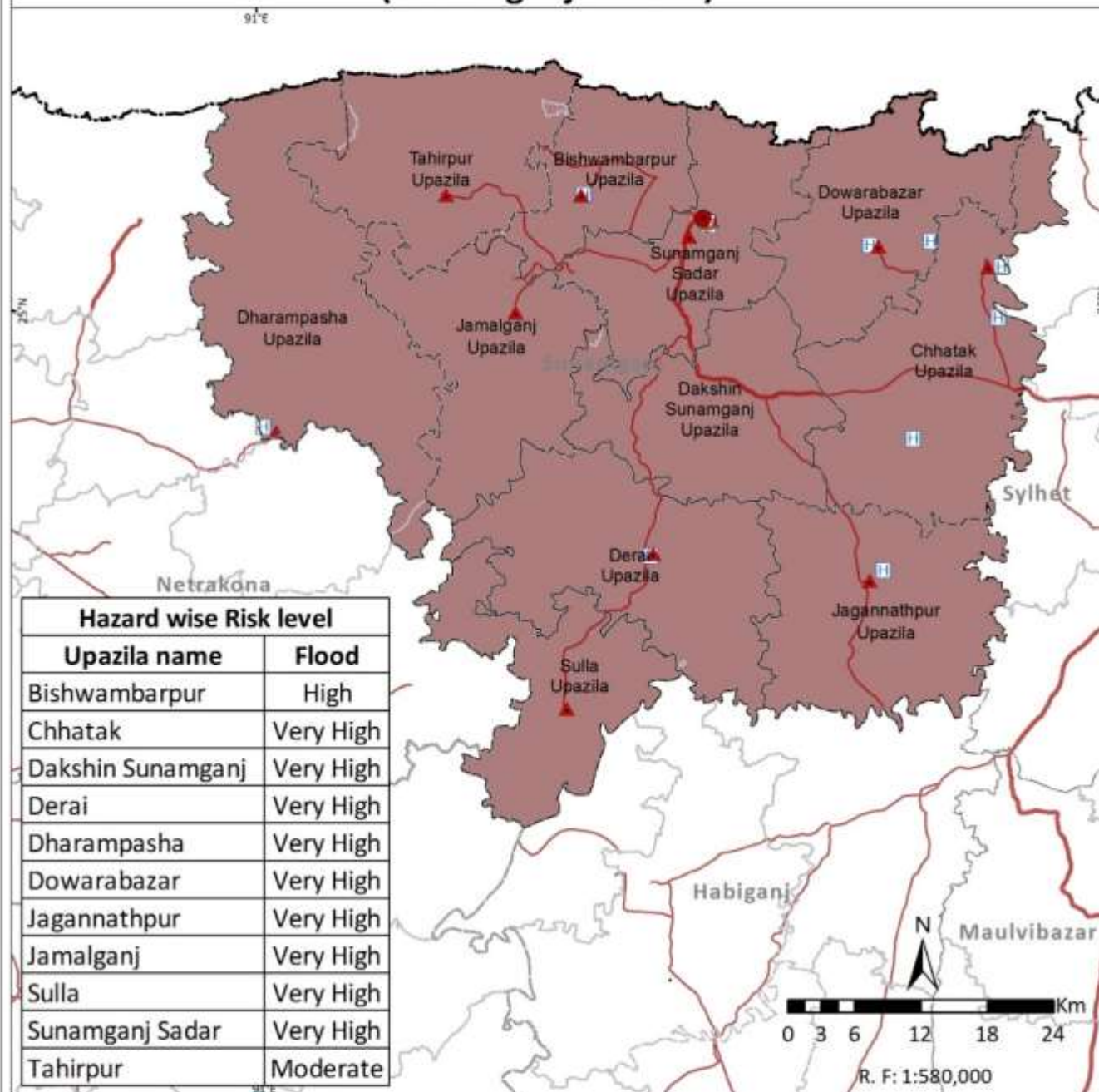
Multi-Hazard Risk and Vulnerability Assessment, Modelling and Mapping in Bangladesh



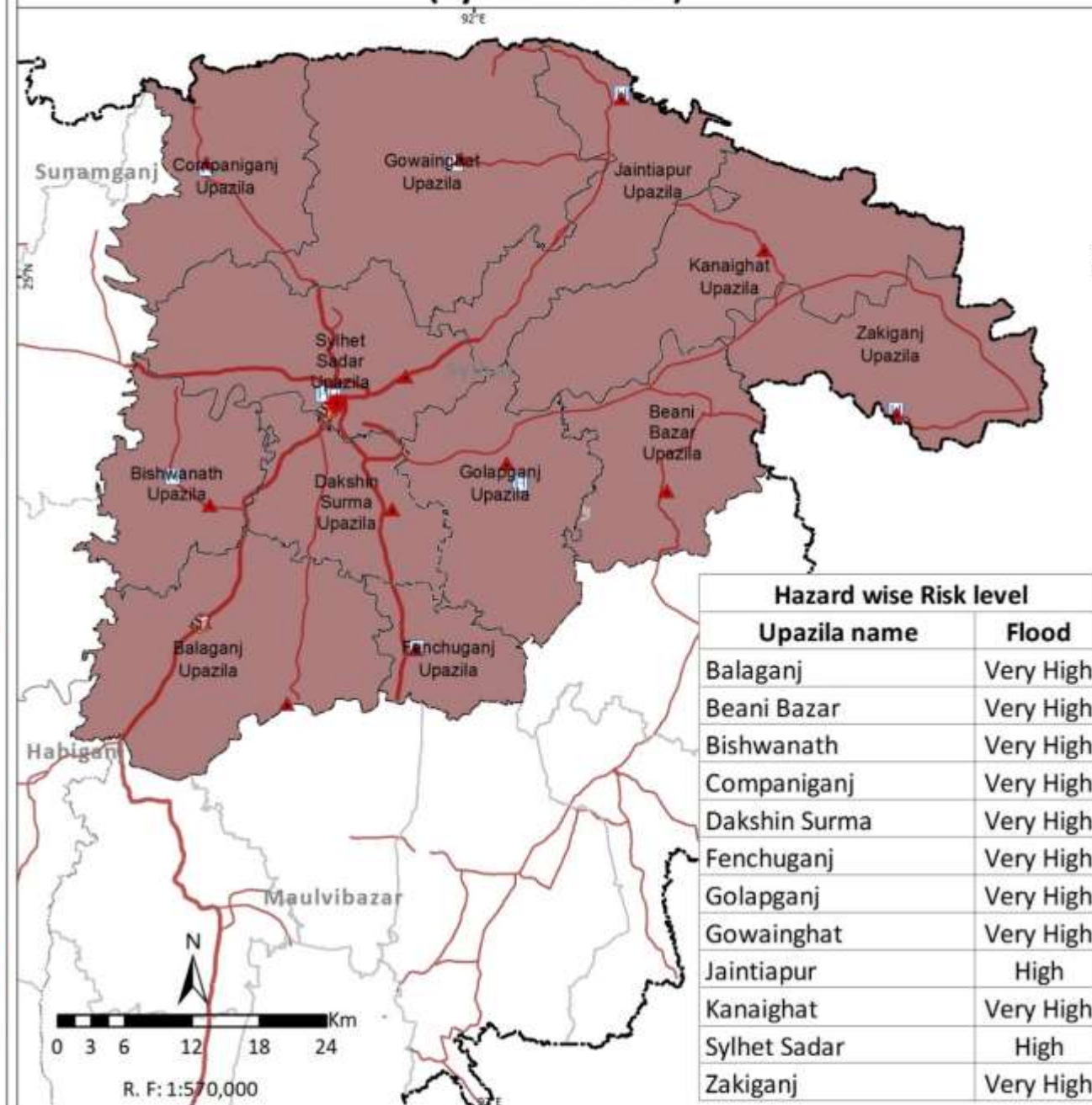
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Housing (Kutcha and Jhupri) Risk to Multi-Hazard (Sunamganj District)



Housing (Kutcha and Jhupri) Risk to Multi-Hazard (Sylhet District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- Division Head Quarter
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood

Note:

Housing (Kutcha and Jhupri) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, landslide, earthquake and tsunami are combined and number of hazards co-existing at upazila level are indicated.

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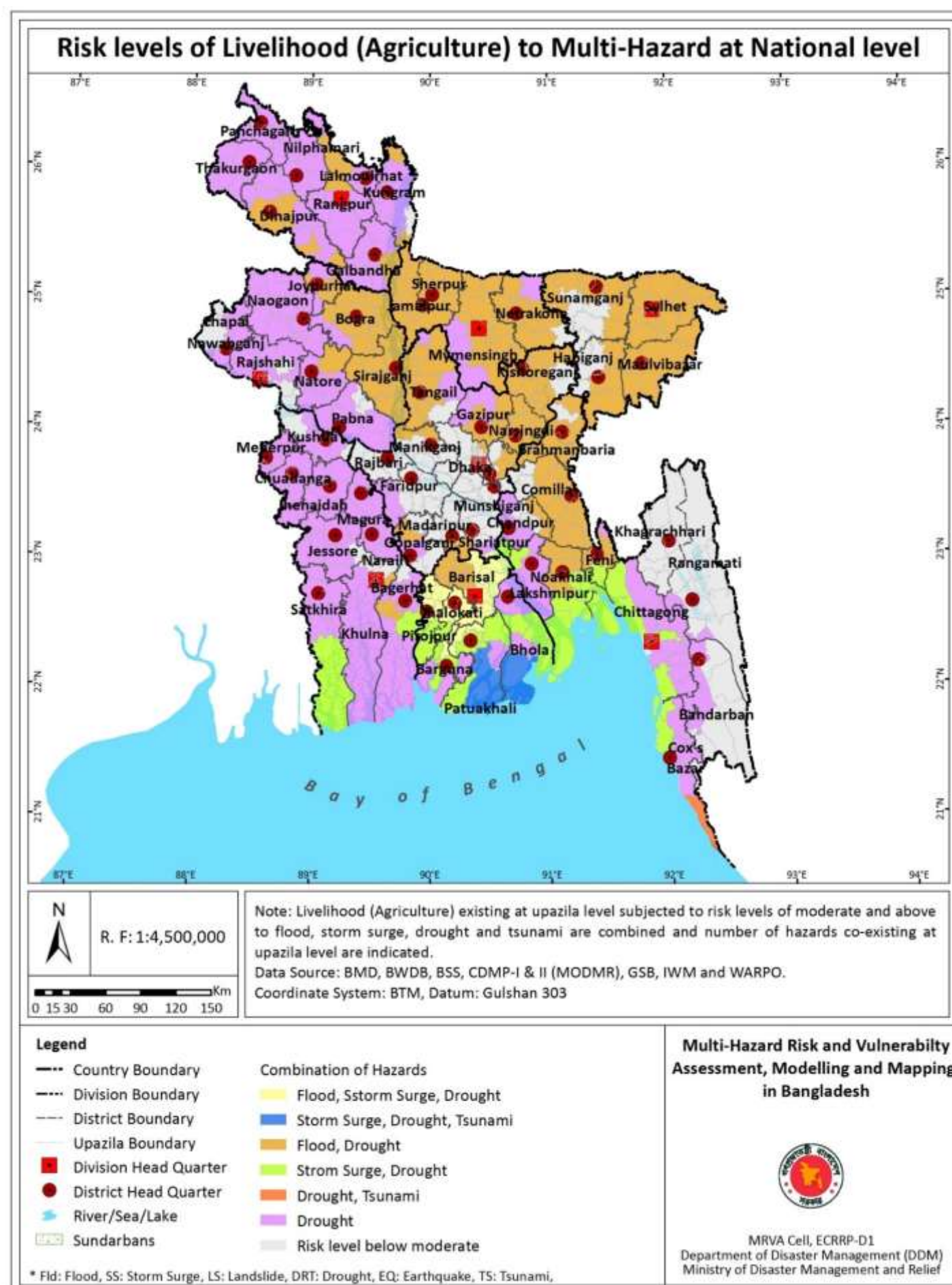
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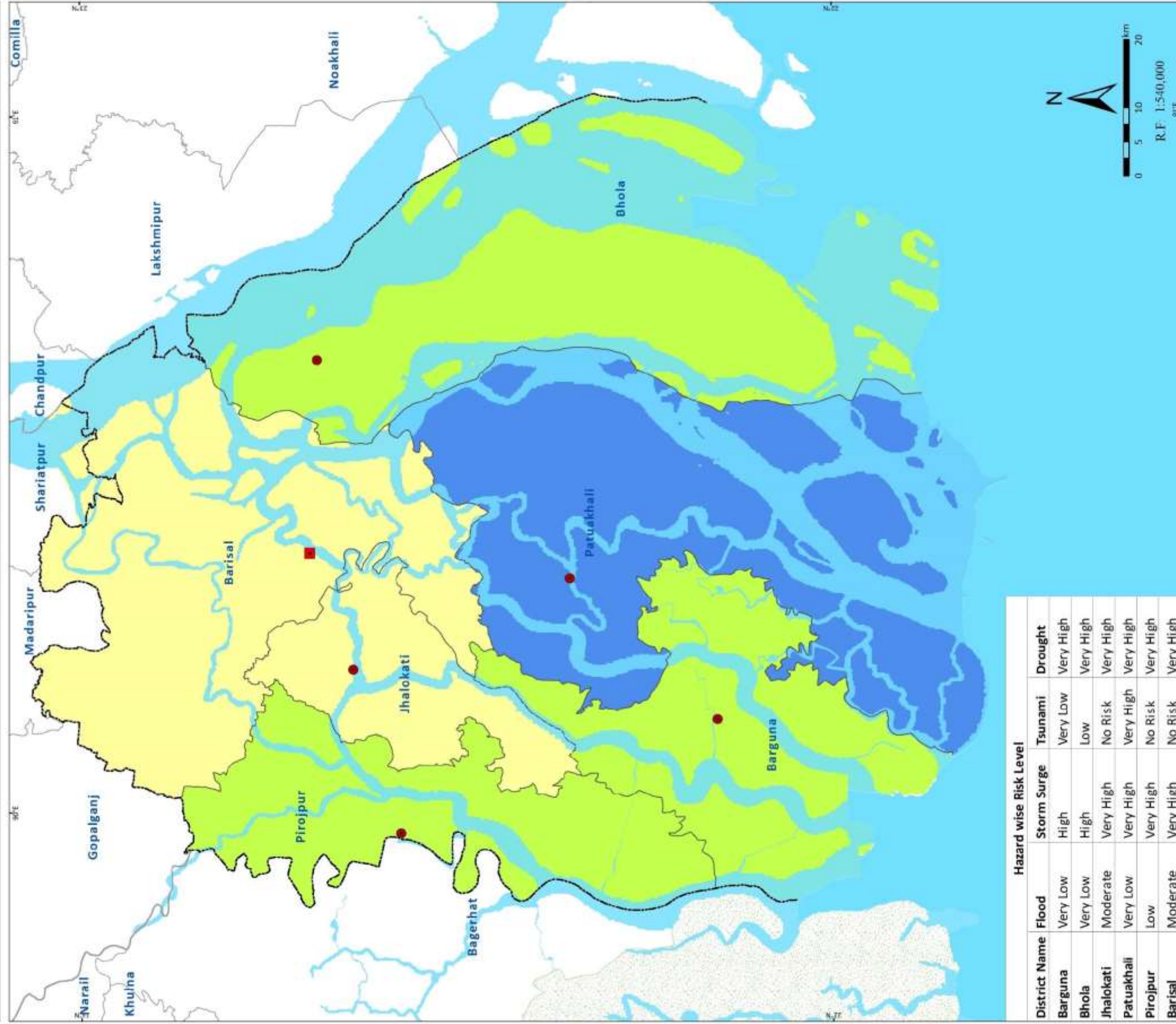
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Risk Levels of Livelihood (Agriculture) to Multi-Hazard (Barisal Division)



Hazard wise Risk Level				
District Name	Flood	Storm Surge	Tsunami	Drought
Barguna	Very Low	High	Very Low	Very High
Bhola	Very Low	High	Low	Very High
Jhalokati	Moderate	Very High	No Risk	Very High
Patuakhali	Very Low	Very High	Very High	Very High
Pirojpur	Low	Very High	No Risk	Very High
Barisal	Moderate	Very High	No Risk	Very High

Legend

- Country Boundary
- Division Boundary
- District Boundary
- Division Head Quarter
- District Head Quarter
- River/Sea/Lake
- Sundarbans

Multi-Hazard Risk Level for Moderate and Above Category

- Flood, Storm Surge, Drought
- Storm Surge, Drought, Tsunami
- Storm Surge, Drought

Note:
Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.



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

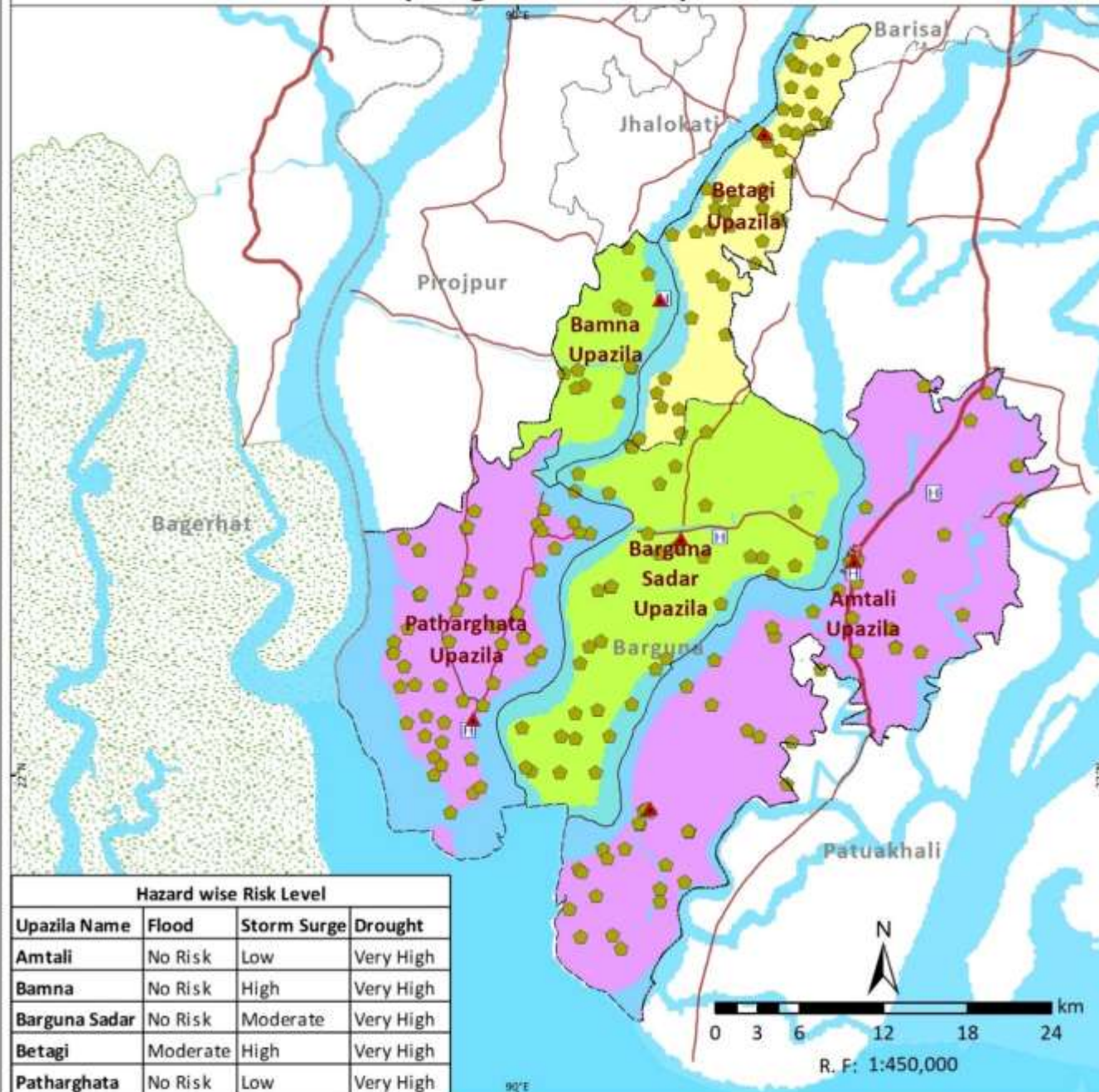


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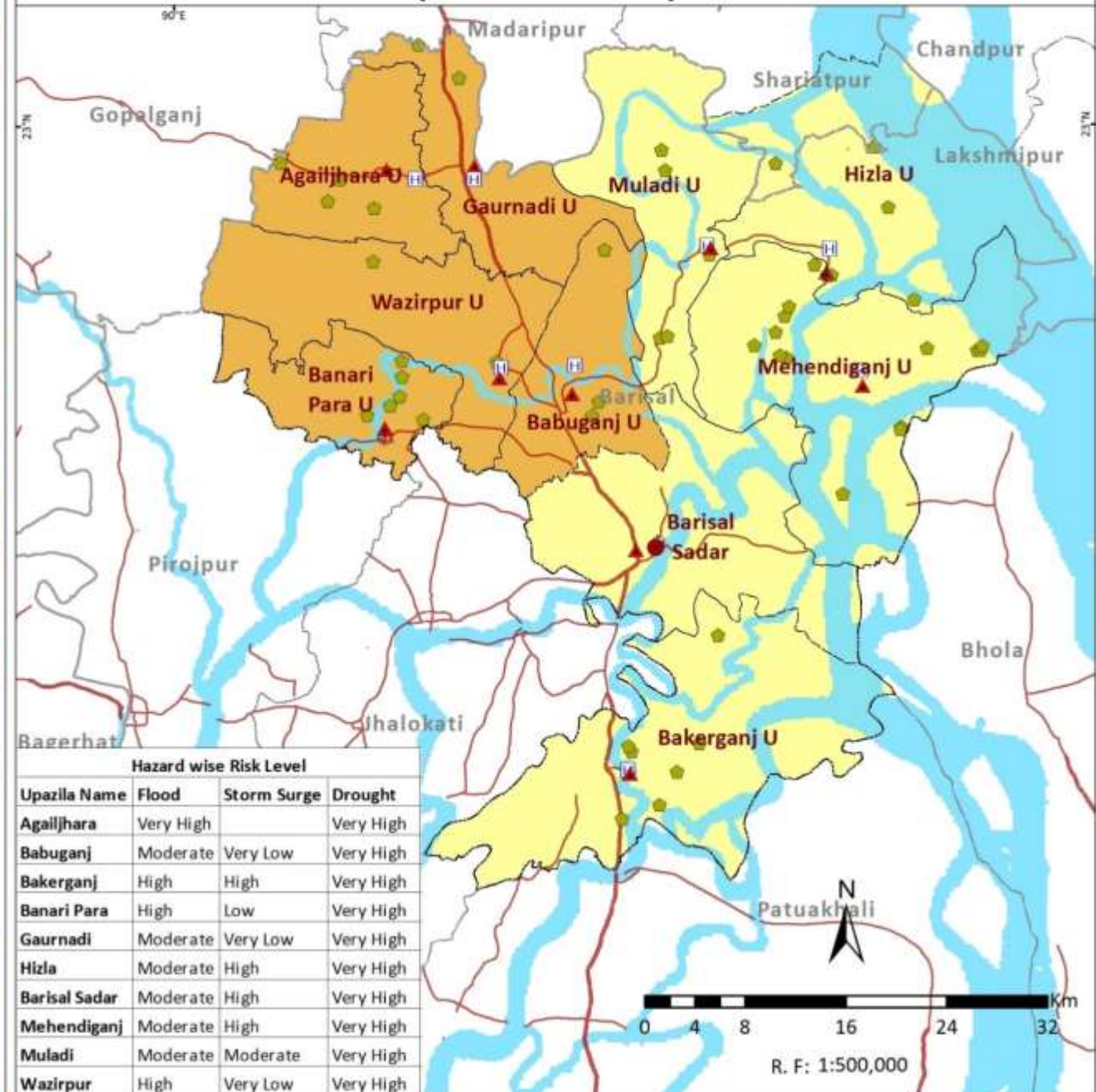




Risk Levels of Livelihood (Agriculture) to Multi hazard (Barguna District)



Risk Levels of Livelihood (Agriculture) to Multi hazard (Barisal District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila_Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
- Flood, Storm Surge, Drought
- Flood, Drought
- Storm Surge, Drought
- Drought

Note

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

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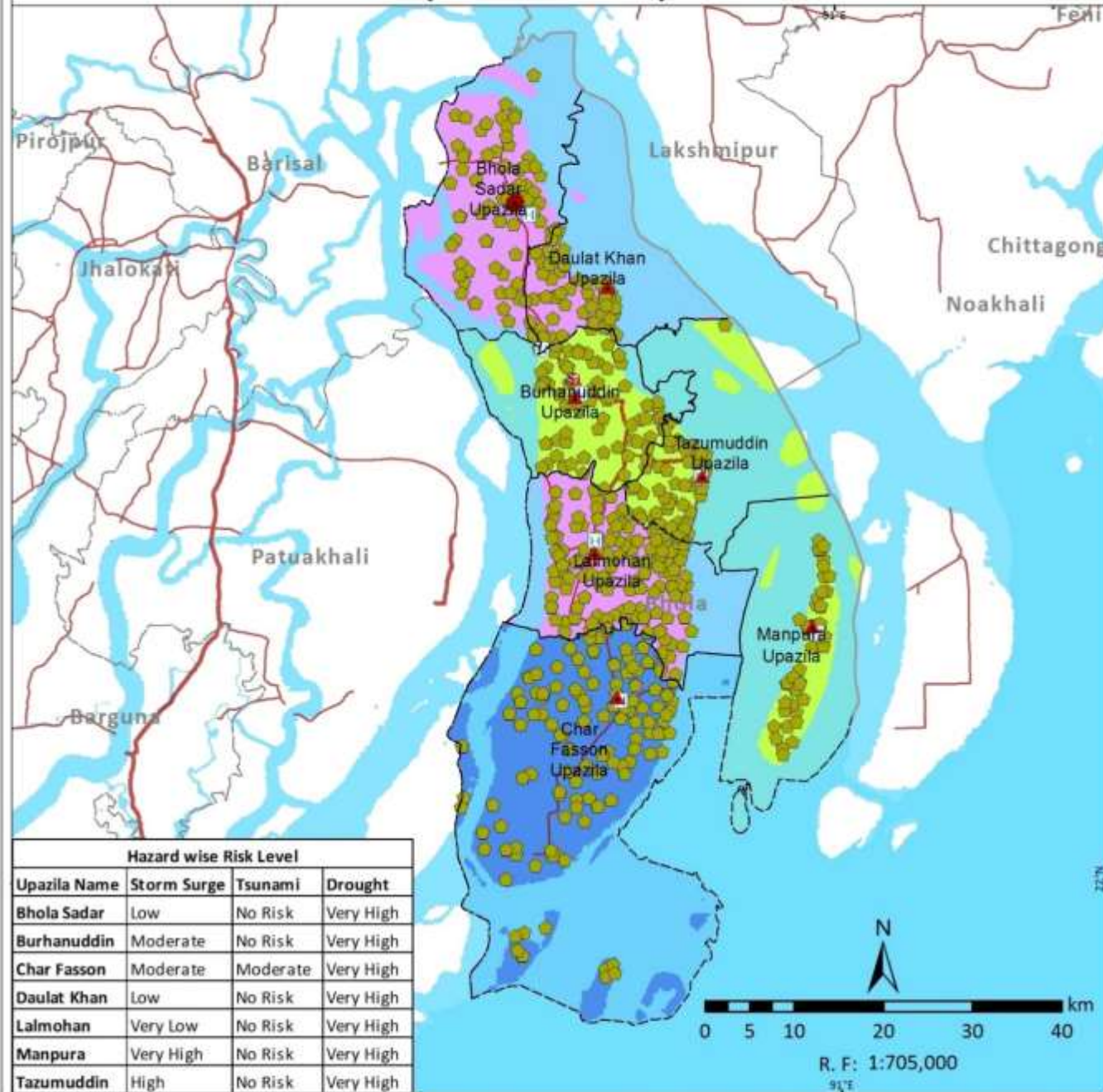
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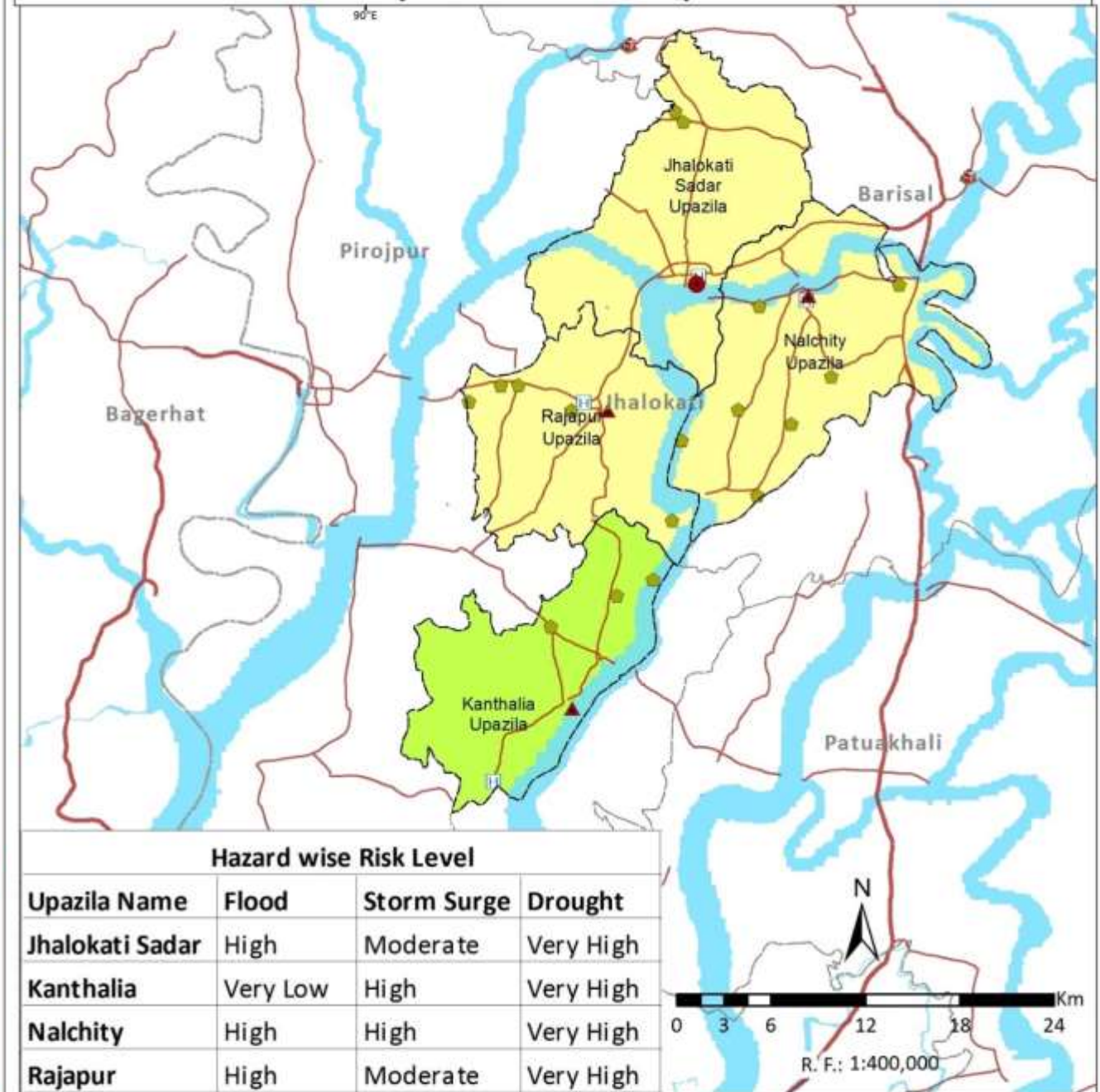
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Risk Levels of Livelihood (Agriculture) to Multi hazard (Bhola District)



Risk Levels of Livelihood (Agriculture) to Multi hazard (Jhalokati District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- Disrict Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
 - Flood, Sstorm Surge, Drought
 - Storm Surge, Drought, Tsunami
 - Strom Surge, Drought
 - Drought

Note

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

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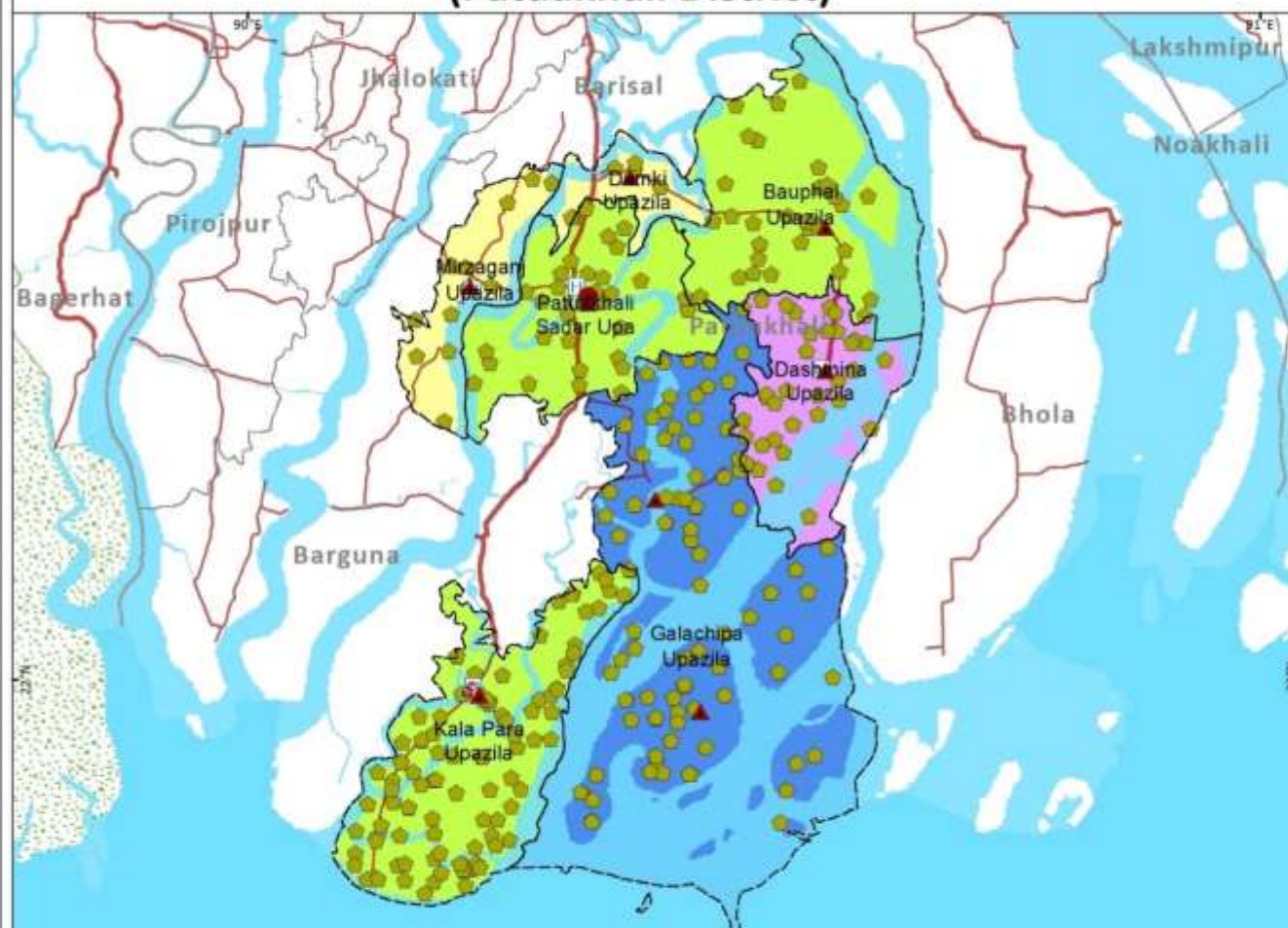
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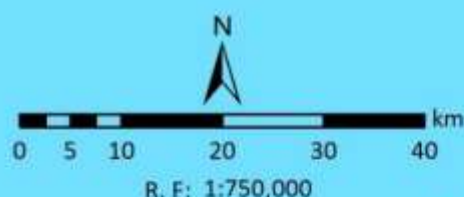


Risk Levels of Livelihood (Agriculture) to Multi hazard (Patuakhali District)

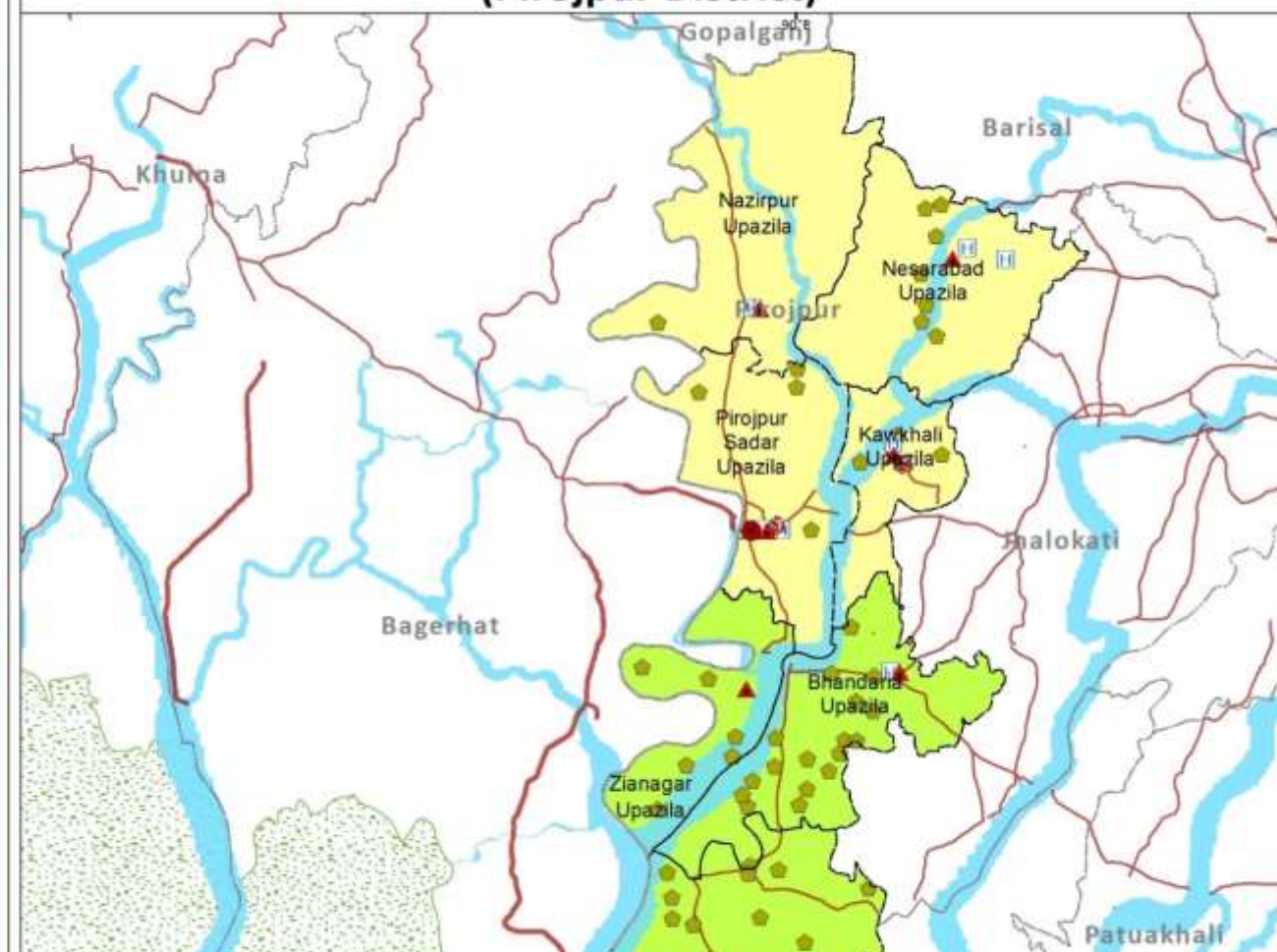


Hazard wise Risk Level

Upazila Name	Flood	Storm Surge	Drought	Tsunami
Bauphal	Low	Moderate	Very High	No Risk
Dashmina	No Risk	Very Low	Very High	No Risk
Dumki	High	High	Very High	No Risk
Galachipa	No Risk	Moderate	Very High	Very High
Kala Para	No Risk	High	Very High	Low
Mirzaganj	Moderate	High	Very High	No Risk
Patuakhali Sadar	Very Low	Moderate	Very High	No Risk

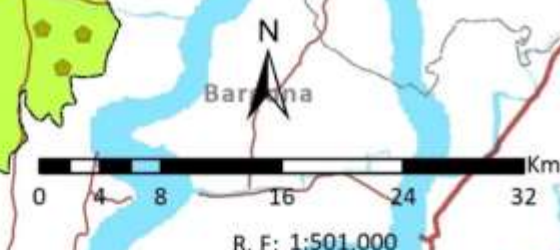


Risk Levels of Livelihood (Agriculture) to Multi hazard (Pirojpur District)



Hazard wise Risk Level

Upazila Name	Flood	Storm Surge	Drought
Bhandaria	Very Low	High	Very High
Kawkhali	High	High	Very High
Mathbaria	No Risk	Moderate	Very High
Nazirpur	High	Moderate	Very High
Pirojpur Sadar	Moderate	Moderate	Very High
Nesarabad	High	Moderate	Very High
Zianagar	No Risk	Very High	Very High



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila_Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
- Flood, Storm Surge
- Storm Surge, Tsunami
- Flood
- Storm Surge
- Tsunami
- Risk level below moderate

Note

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

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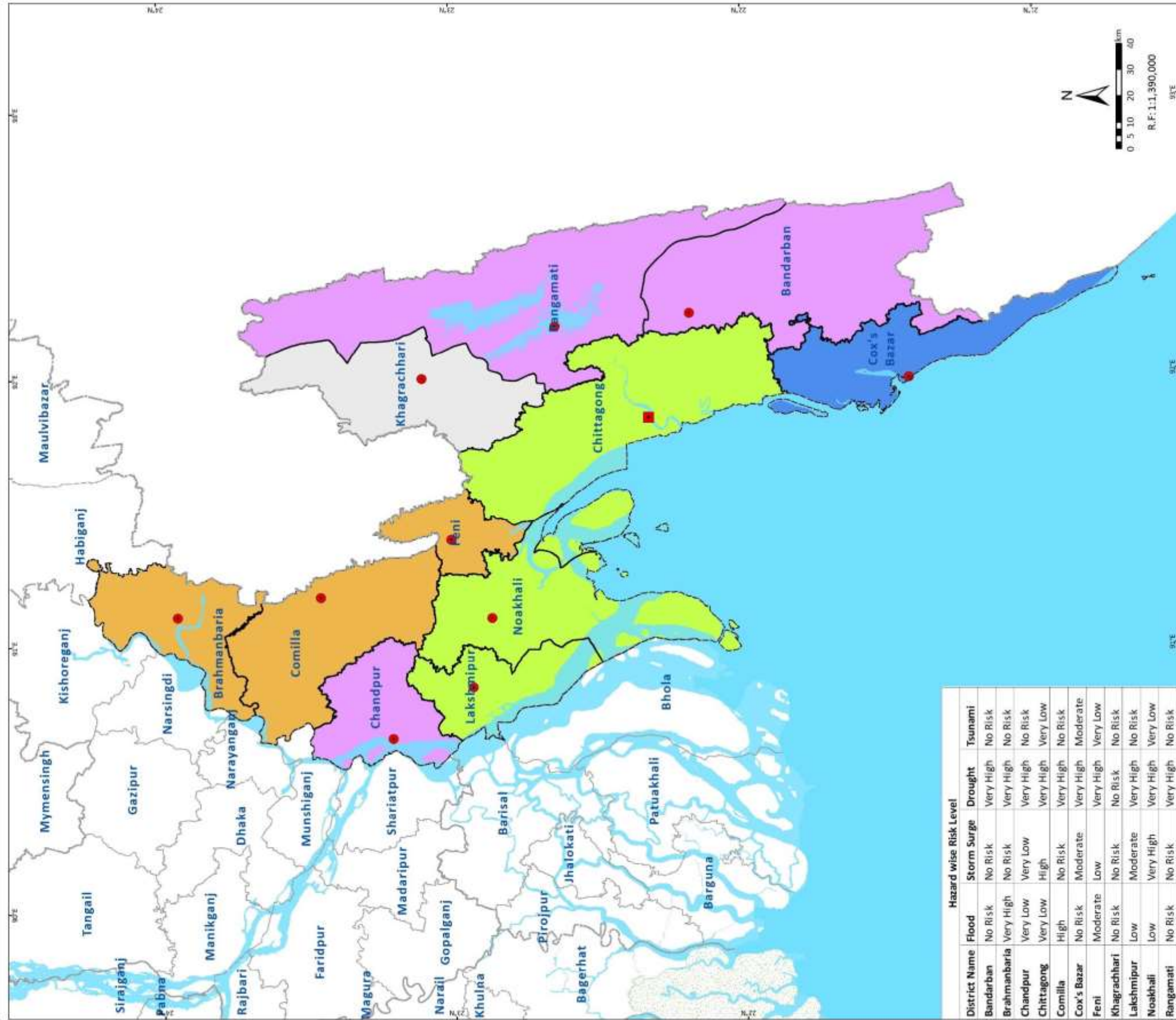


Multi-Hazard Risk and Vulnerability Assessment, Modelling and Mapping in Bangladesh



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Ministry of Disaster Management and Relief

Risk Levels of Livelihood (Agriculture) to Multi-Hazard (Chittagong Division)



District Name	Hazard wise Risk Level			
	Flood	Storm Surge	Drought	Tsunami
Bandarban	No Risk	No Risk	Very High	No Risk
Brahmanbaria	Very High	No Risk	Very High	No Risk
Chandpur	Very Low	Very Low	Very High	No Risk
Chittagong	Very Low	High	Very High	Very Low
Comilla	High	No Risk	Very High	No Risk
Cox's Bazar	No Risk	Moderate	Very High	Moderate
Feni	Moderate	Low	Very High	Very Low
Khagrachhari	No Risk	No Risk	No Risk	No Risk
Lakshmipur	Low	Moderate	Very High	No Risk
Noakhali	Low	Very High	Very High	Very Low
Rangamati	No Risk	No Risk	Very High	No Risk

Legend

- Country Boundary
- Division Boundary
- District Boundary
- District Head Quarter
- River/Sea/Lake
- Sundarbans

Multi-Hazard Risk Level for Moderate and Above Category

- Storm Surge, Drought, Tsunami
- Flood, Drought
- Storm Surge, Drought
- Drought
- Risk level below moderate

Note:

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

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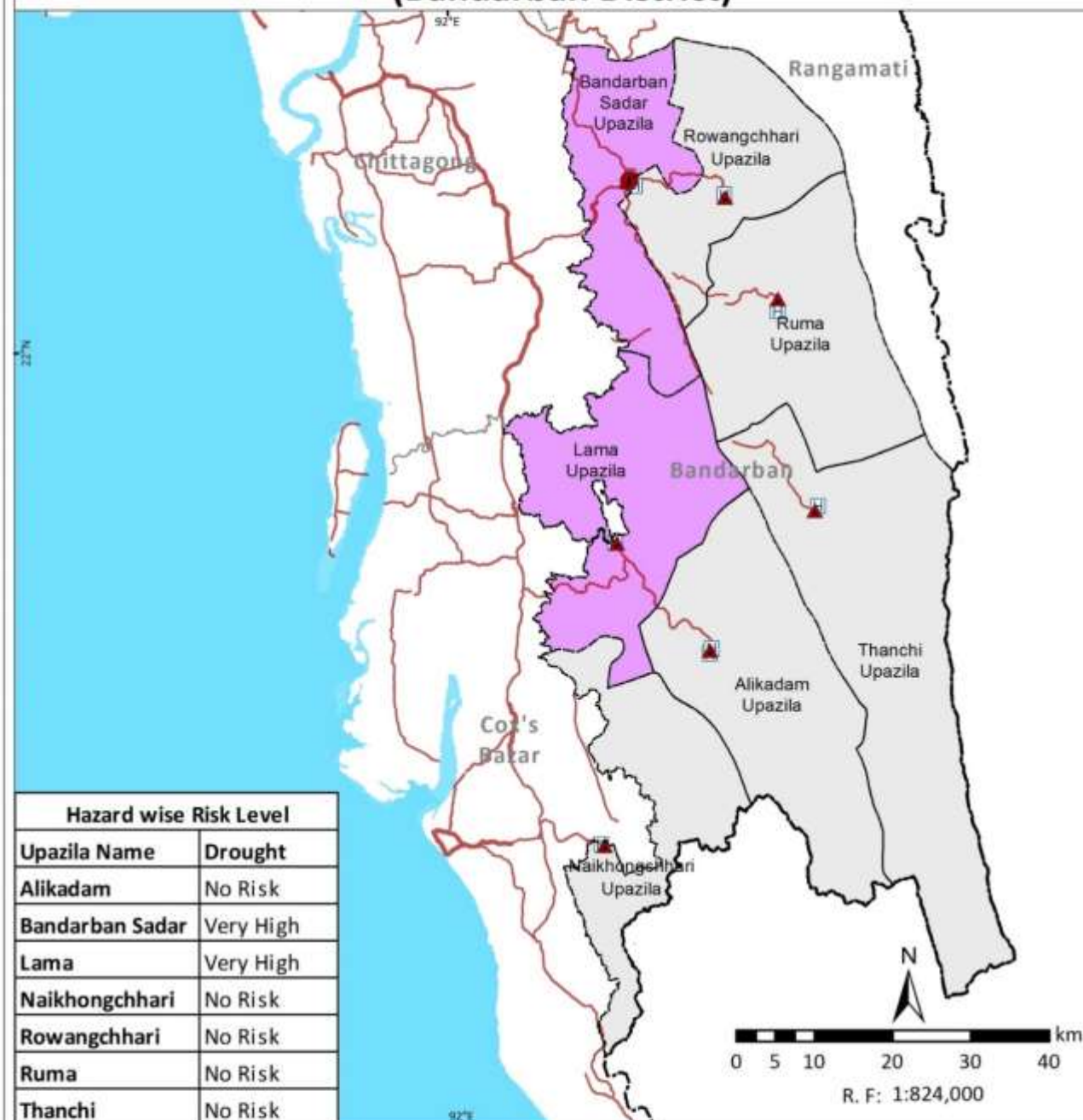


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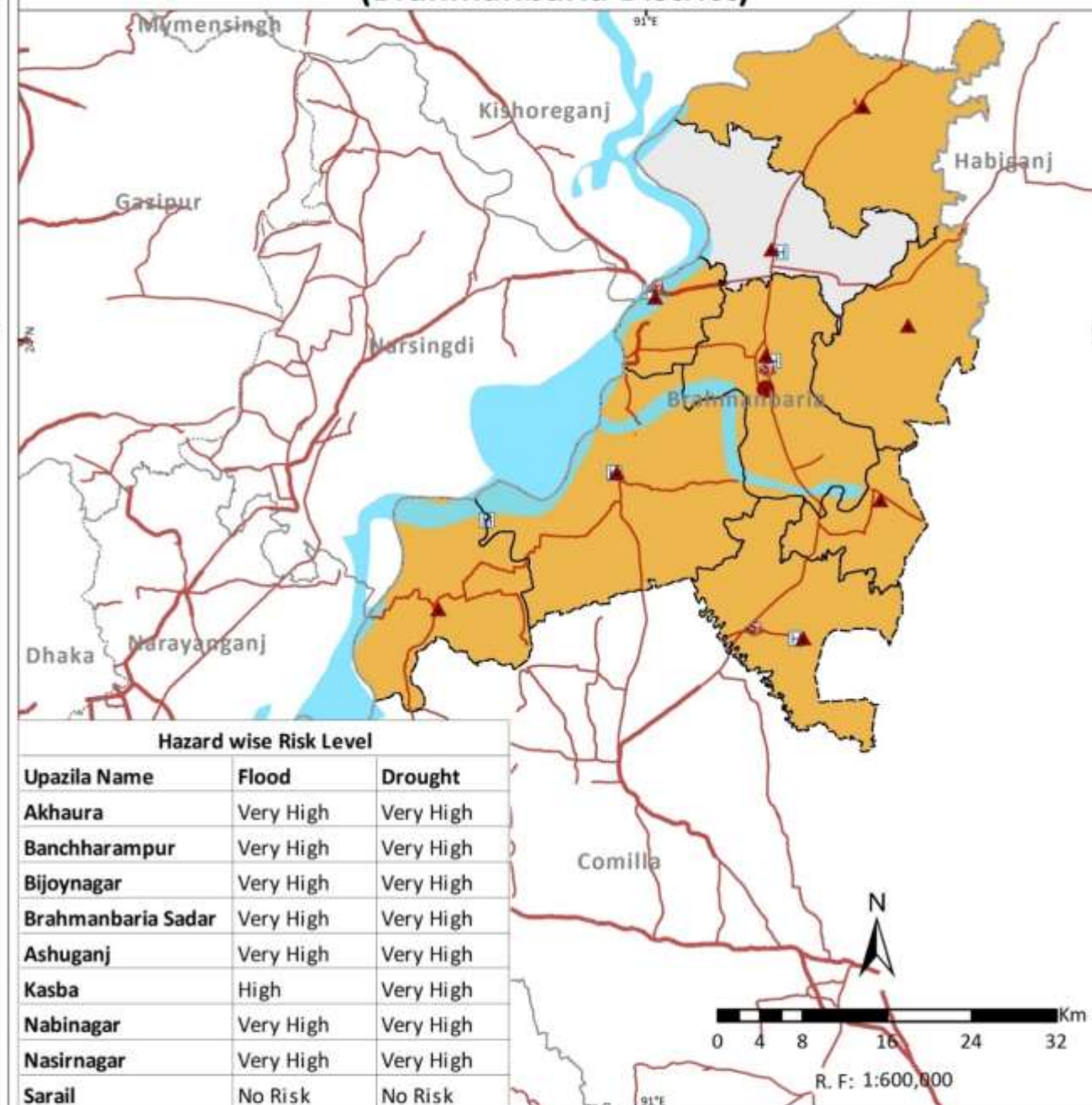




Risk Levels of Livelihood (Agriculture) to Multi hazard (Bandarban District)



Risk Levels of Livelihood (Agriculture) to Multi hazard (Brahmanbaria District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
- Flood, Drought
- Drought
- Risk level below moderate

Note

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

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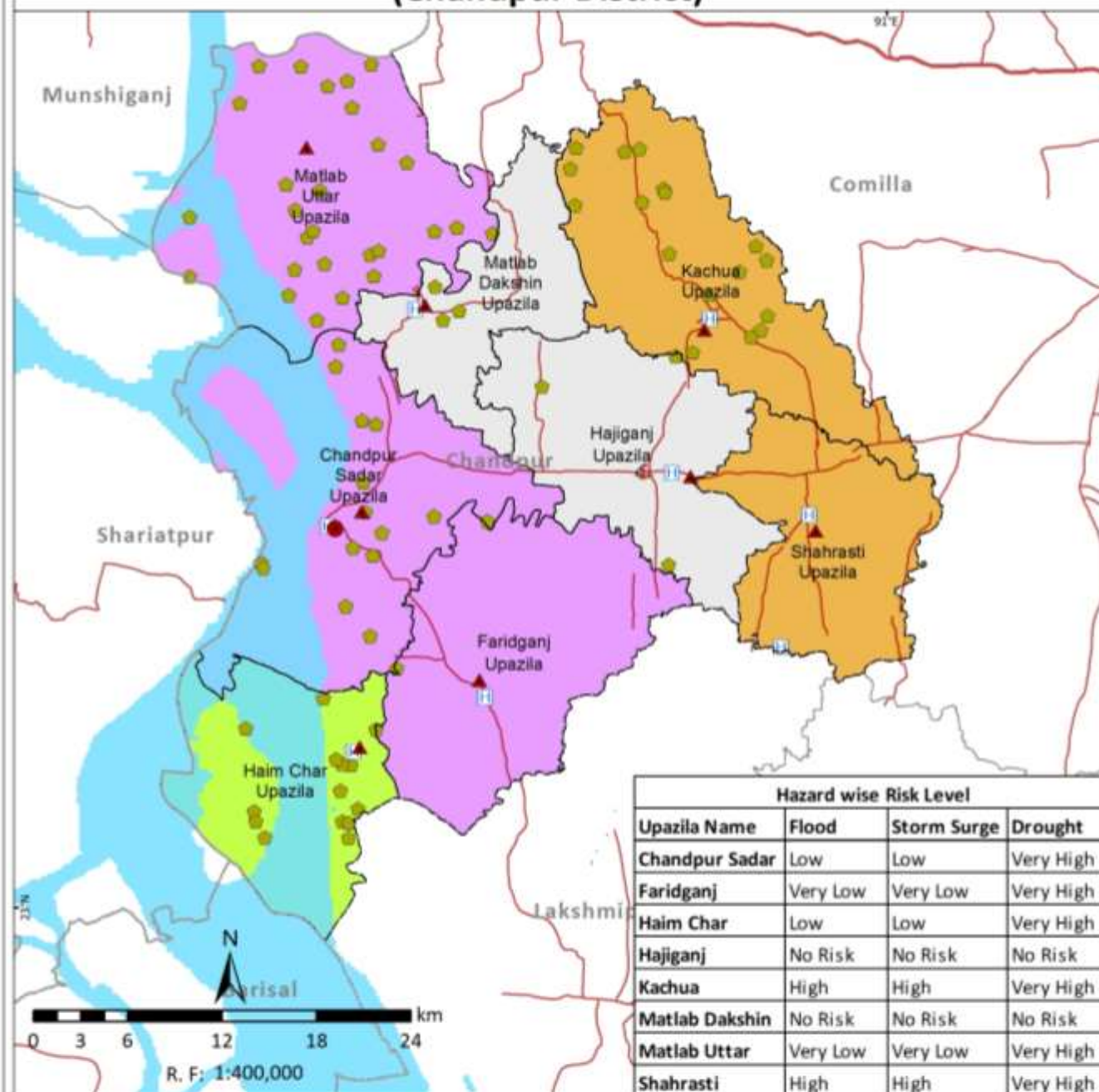
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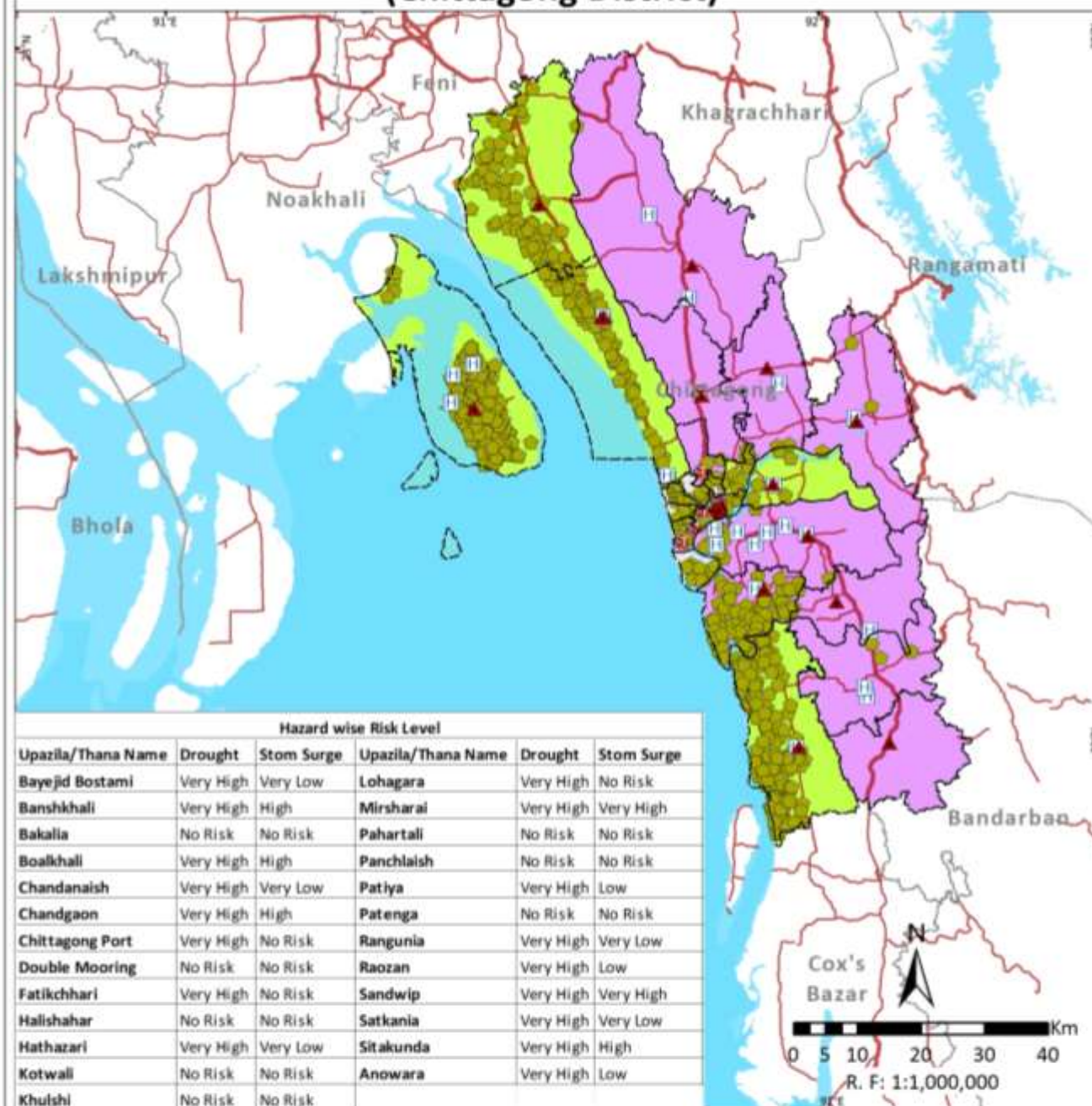


Risk Levels of Livelihood (Agriculture) to Multi hazard (Chandpur District)



Hazard wise Risk Level			
Upazila Name	Flood	Storm Surge	Drought
Chandpur Sadar	Low	Low	Very High
Faridganj	Very Low	Very Low	Very High
Haim Char	Low	Low	Very High
Hajiganj	No Risk	No Risk	No Risk
Kachua	High	High	Very High
Matlab Dakshin	No Risk	No Risk	No Risk
Matlab Uttar	Very Low	Very Low	Very High
Shahrasti	High	High	Very High

Risk Levels of Livelihood (Agriculture) to Multi hazard (Chittagong District)



Hazard wise Risk Level					
Upazila/Thana Name	Drought	Storm Surge	Upazila/Thana Name	Drought	Storm Surge
Bayejid Bostami	Very High	Very Low	Lohagara	Very High	No Risk
Banshkhal	Very High	High	Mirsharai	Very High	Very High
Bakalia	No Risk	No Risk	Pahartali	No Risk	No Risk
Boalkhal	Very High	High	Panchlaish	No Risk	No Risk
Chandanaish	Very High	Very Low	Patiya	Very High	Low
Chandgaon	Very High	High	Patenga	No Risk	No Risk
Chittagong Port	Very High	No Risk	Rangunia	Very High	Very Low
Double Mooring	No Risk	No Risk	Raozan	Very High	Low
Fatikchhari	Very High	No Risk	Sandwip	Very High	Very High
Halishahar	No Risk	No Risk	Satkania	Very High	Very Low
Hathazari	Very High	Very Low	Sitakunda	Very High	High
Kotwali	No Risk	No Risk	Anowara	Very High	Low
Khulshi	No Risk	No Risk			

Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
- Flood, Drought
- Storm Surge, Drought
- Drought
- Risk level below moderate

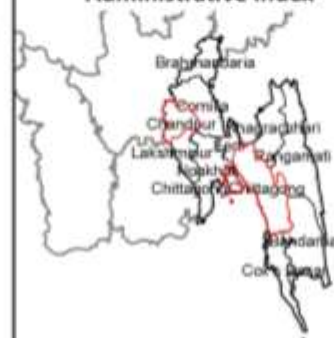
Note

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

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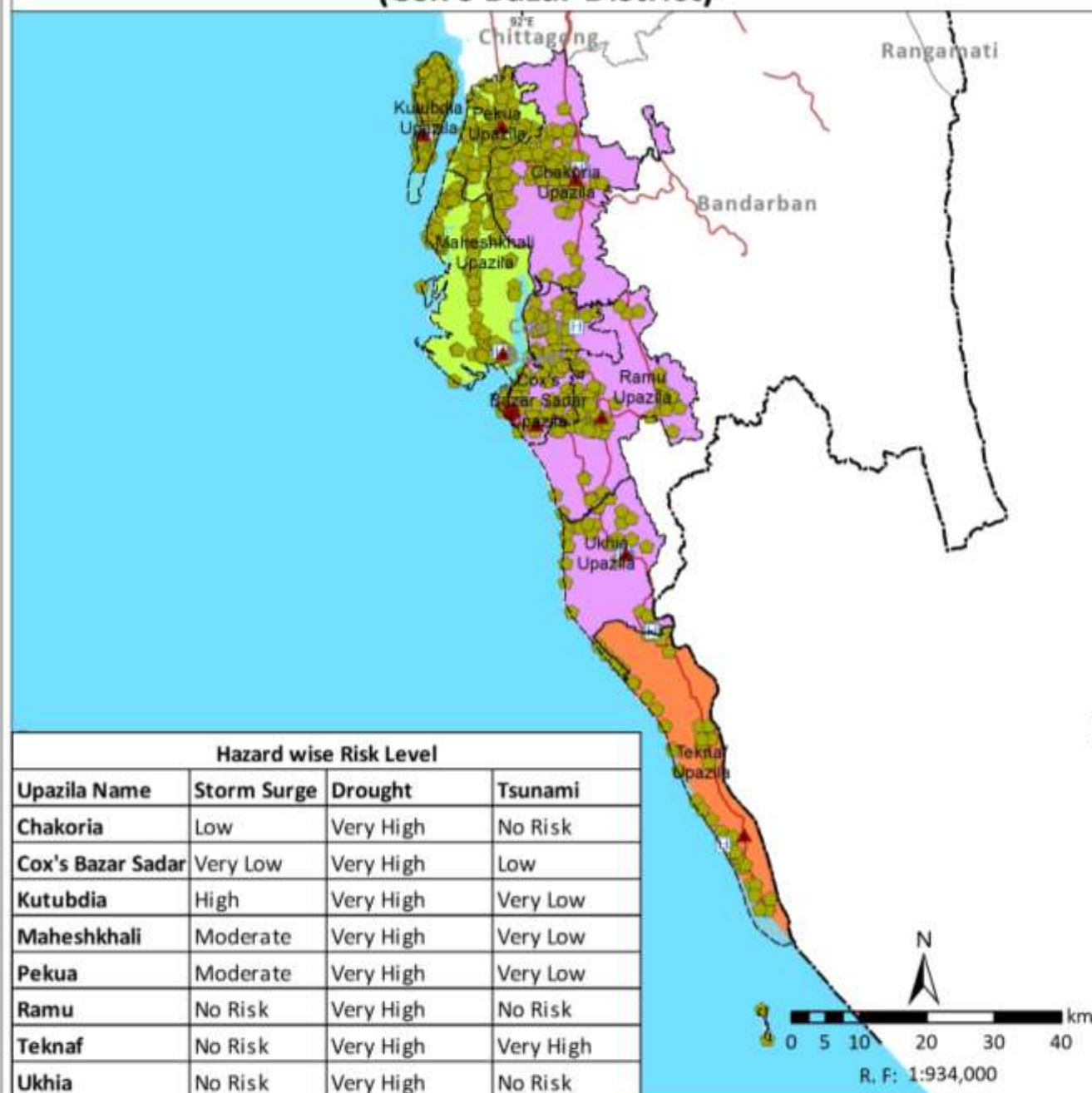
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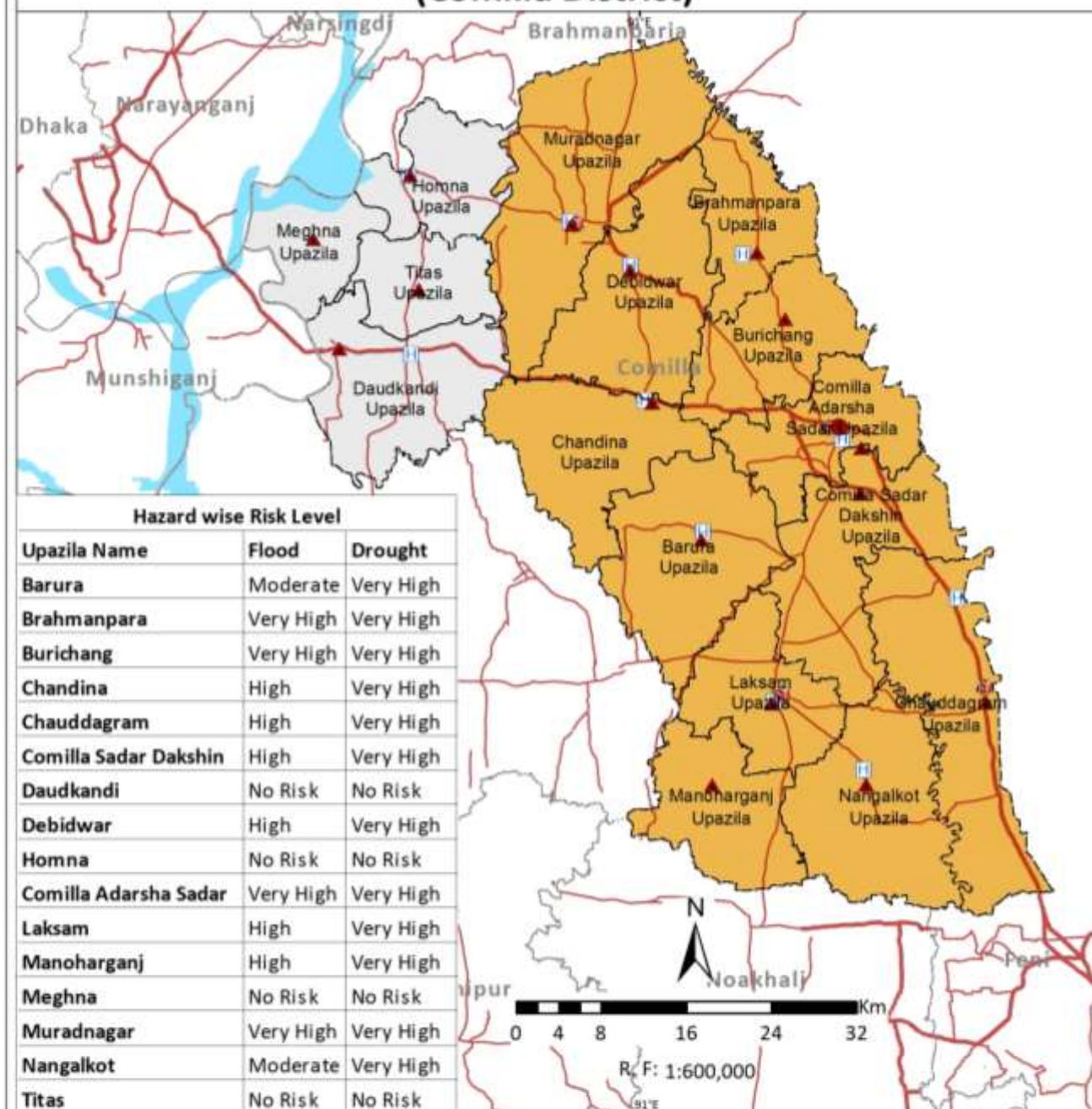
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Risk Levels of Livelihood (Agriculture) to Multi hazard (Cox's Bazar District)



Risk Levels of Livelihood (Agriculture) to Multi hazard (Comilla District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
- Flood, Drought
- Storm Surge, Drought
- Drought, Tsunami
- Drought
- Risk level below moderate

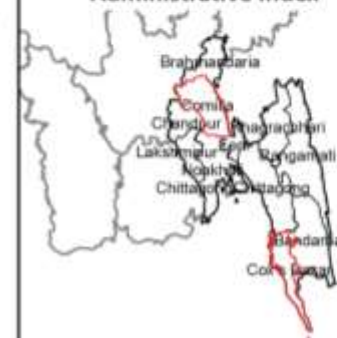
Note

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

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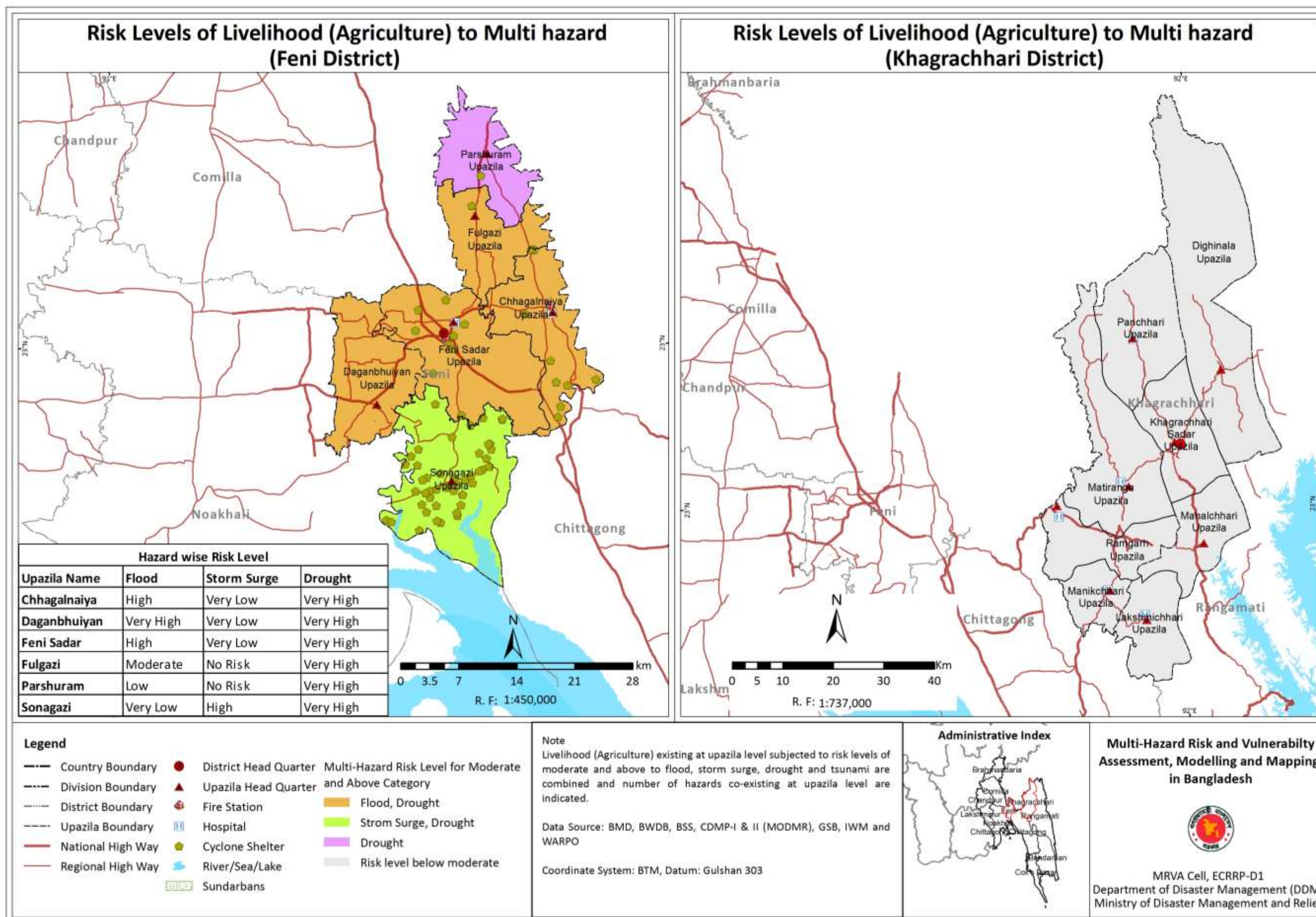
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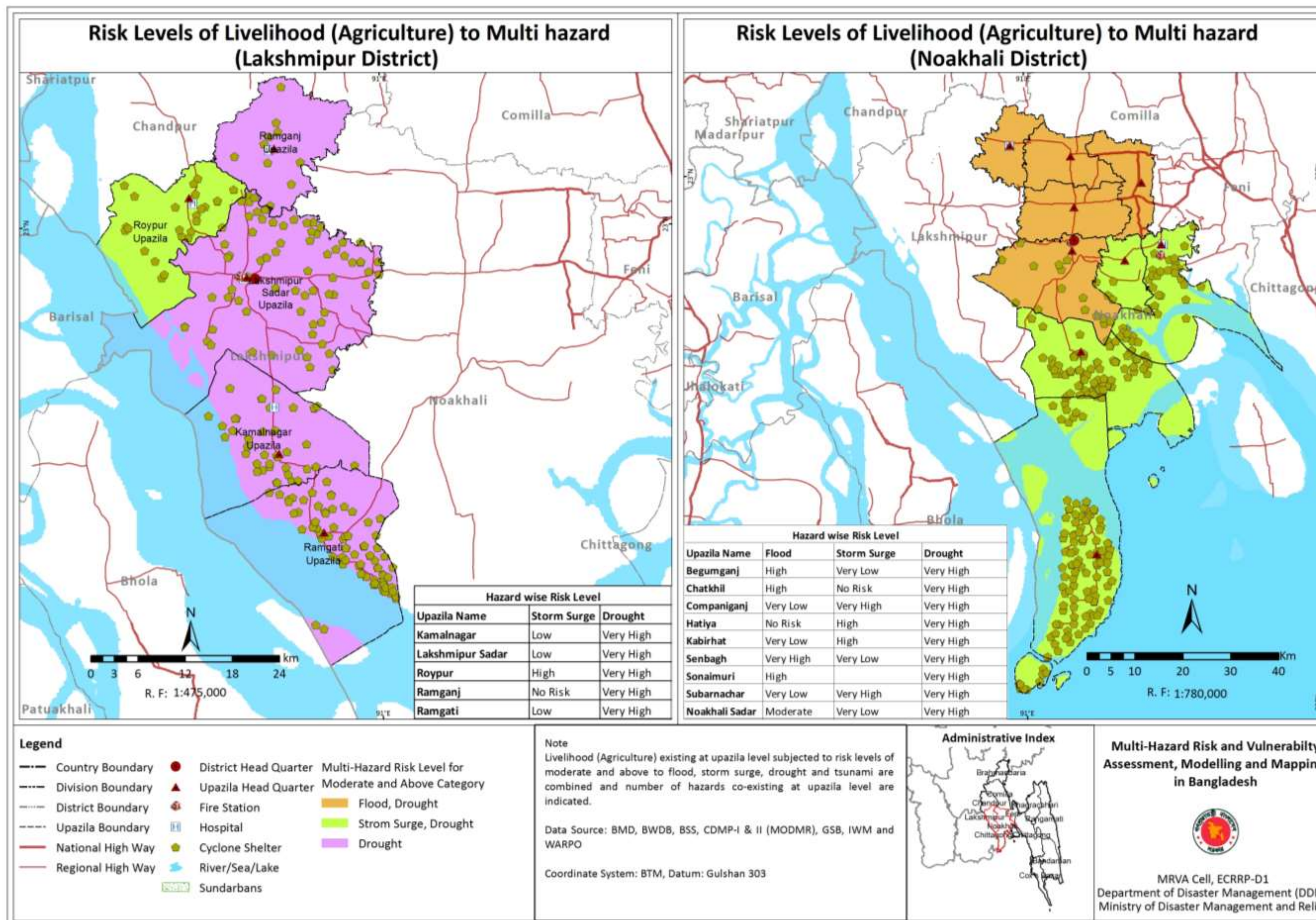


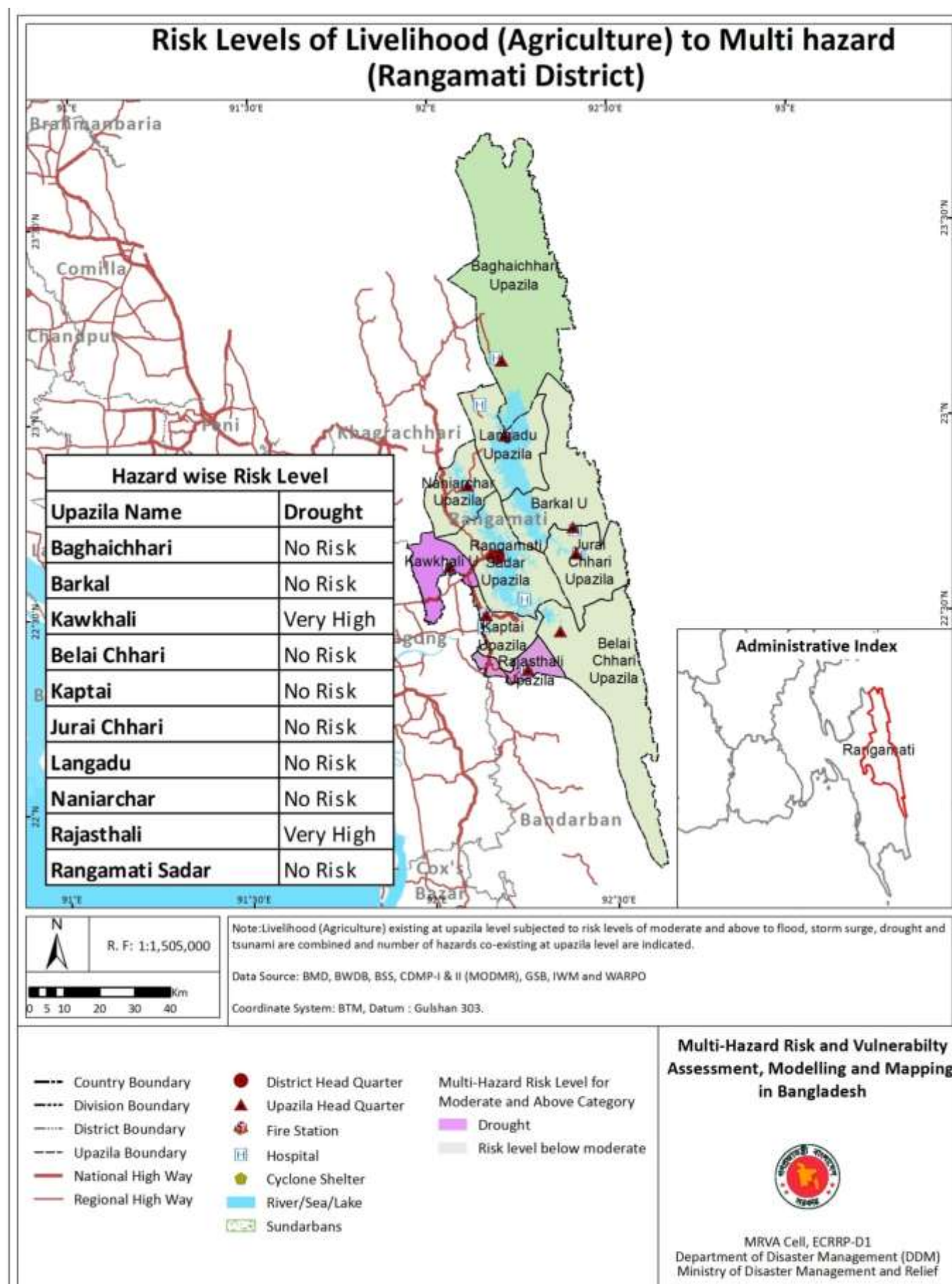
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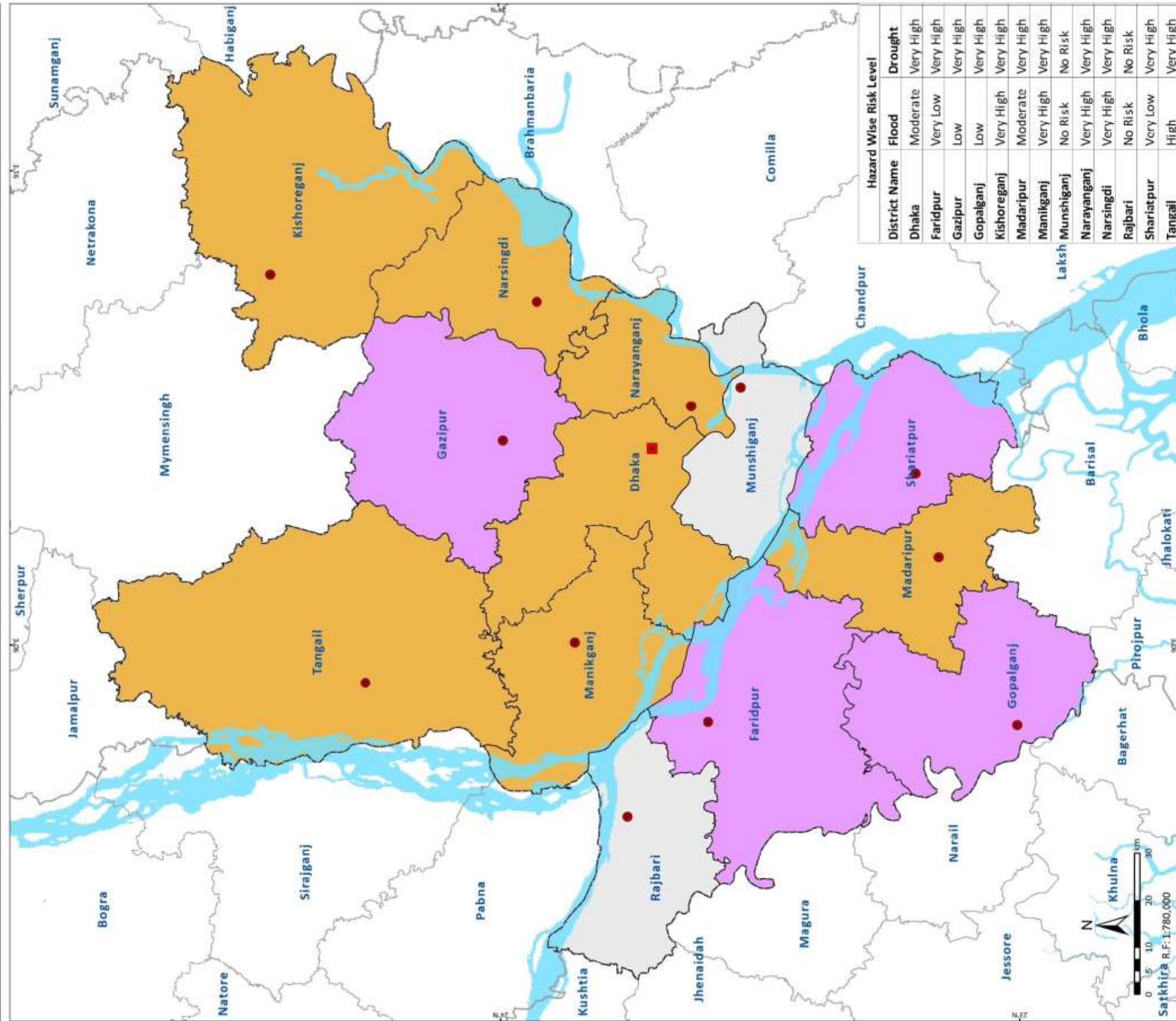
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Risk Levels of Livelihood (Agriculture) to Multi- Hazard (Dhaka Division)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Division Head Quarter
- District Head Quarter
- River/Sea/Lake
- Sundarbans

Multi- Hazard Risk Level for Moderate and above Category

- Flood, Drought
- Drought
- Risk level below moderate

Note:

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

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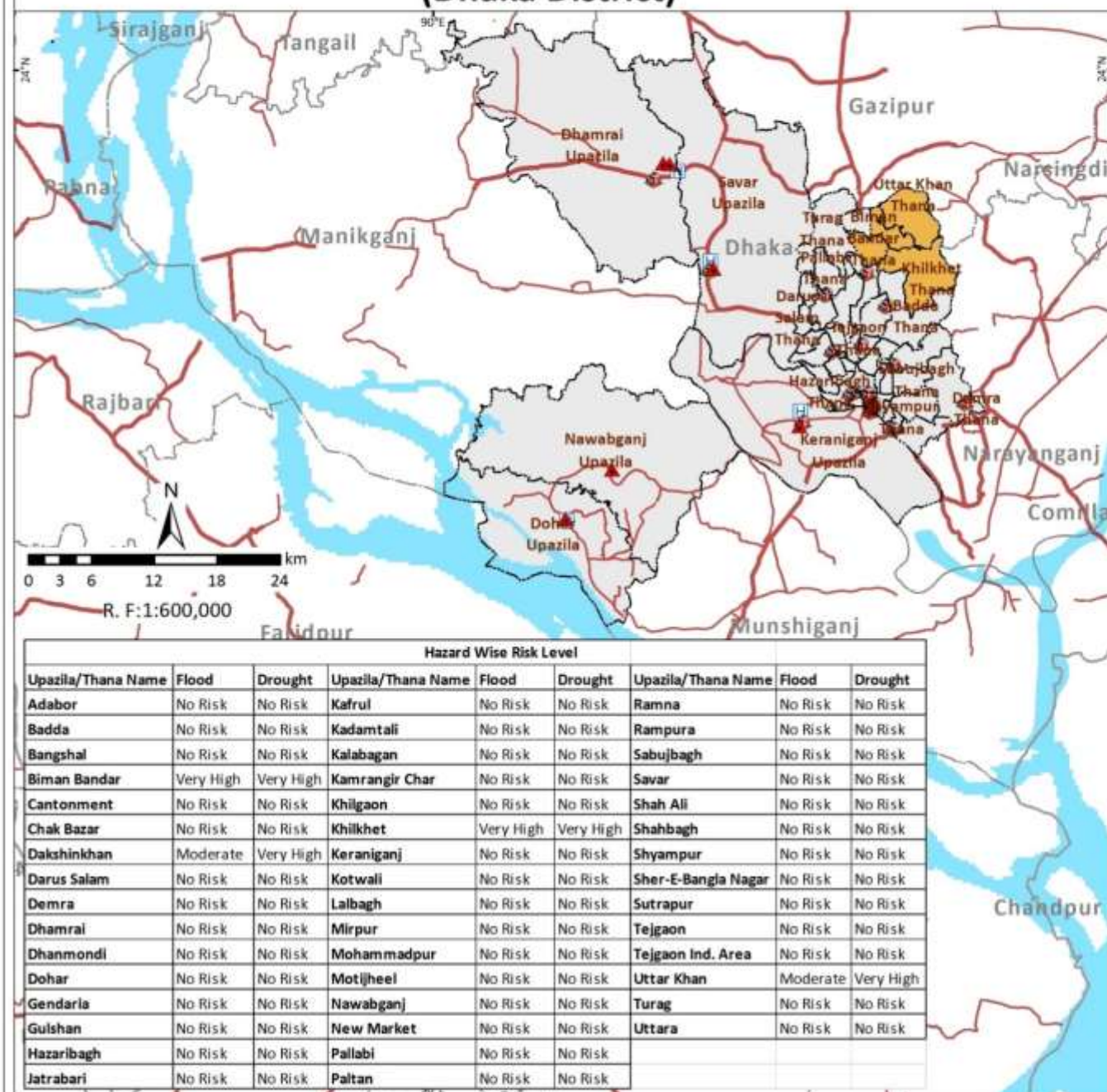


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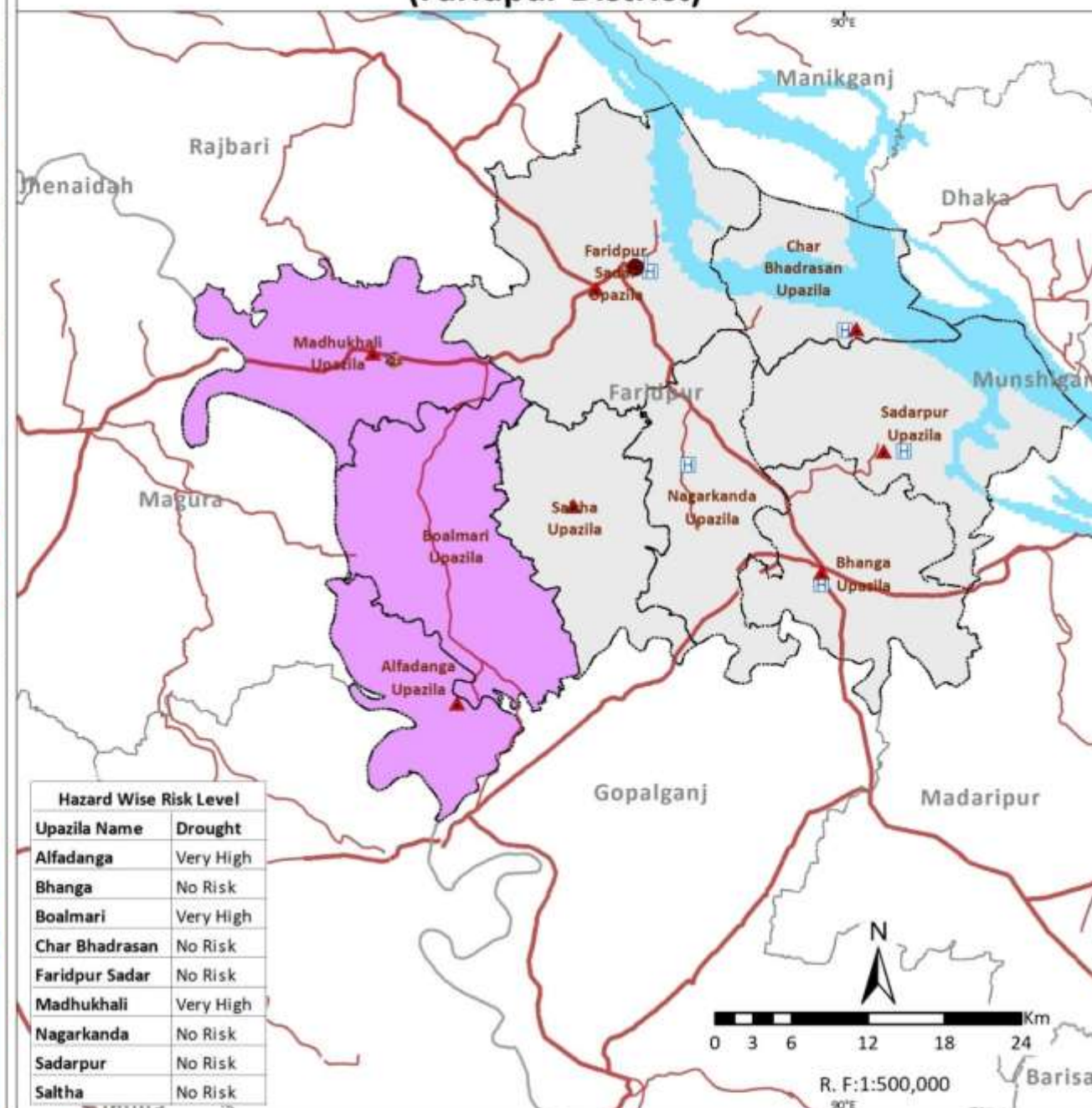




Risk Levels of Livelihood (Agriculture) to Multi- Hazard (Dhaka District)



Risk Levels of Livelihood (Agriculture) to Multi- Hazard (Faridpur District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- Division Head Quarter
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level for Moderate and above Category
- Flood, Drought
- Drought
- Risk level below moderate

Note:

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

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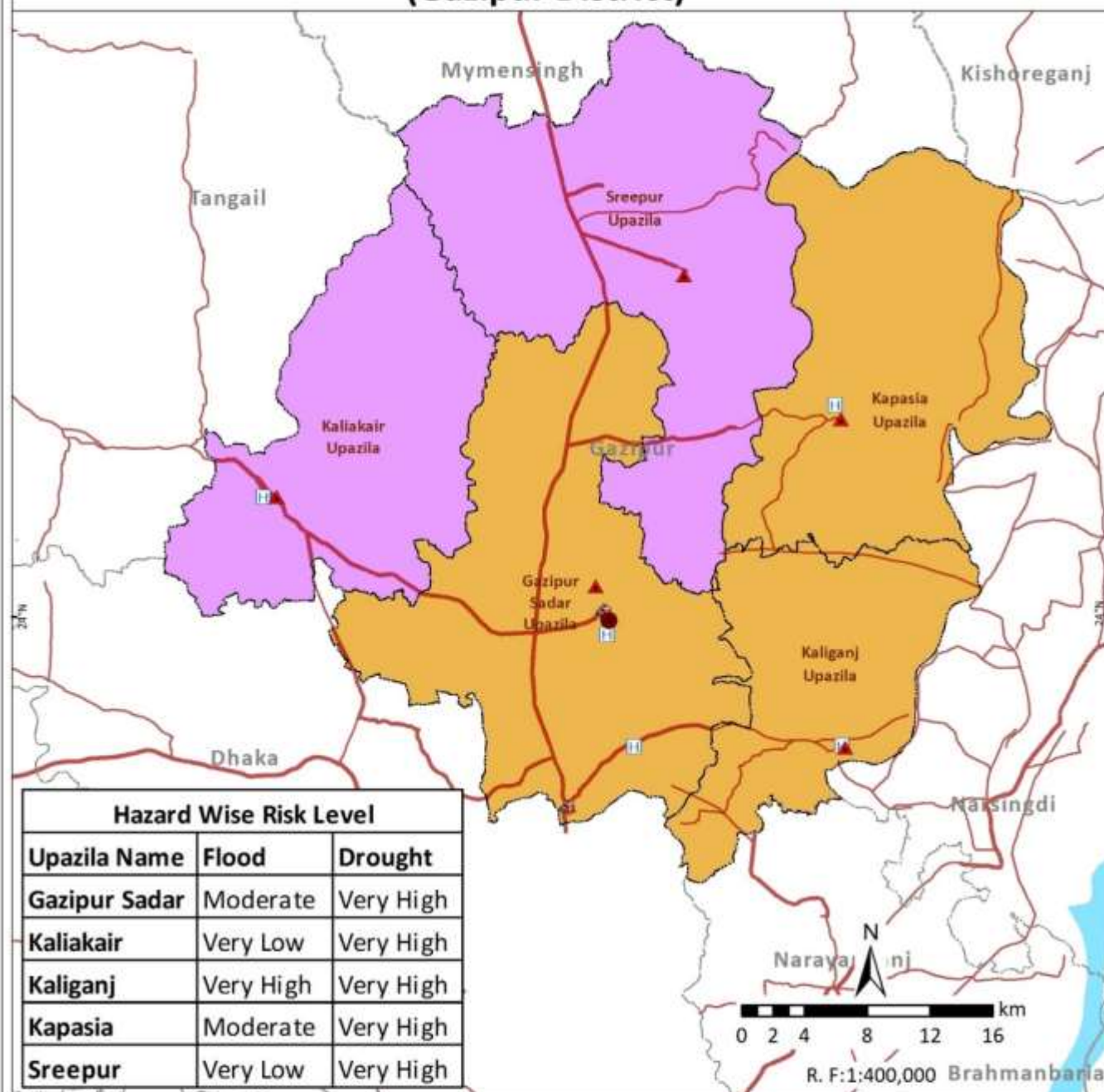
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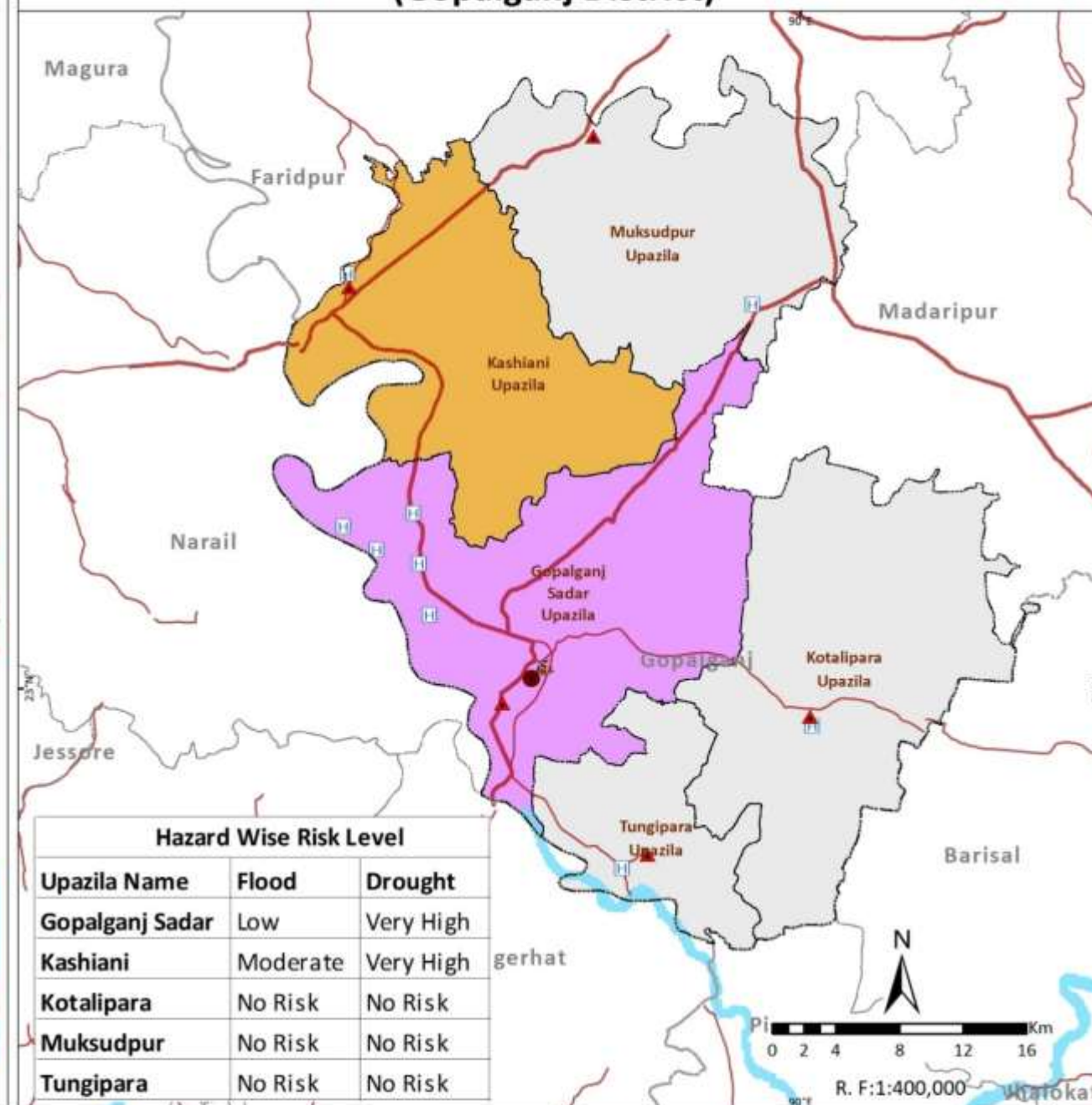
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Risk Levels of Livelihood (Agriculture) to Multi- Hazard (Gazipur District)



Risk Levels of Livelihood (Agriculture) to Multi- Hazard (Gopalganj District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level for Moderate and above Category
- Flood, Drought
- Drought
- Risk level below moderate

Note:

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

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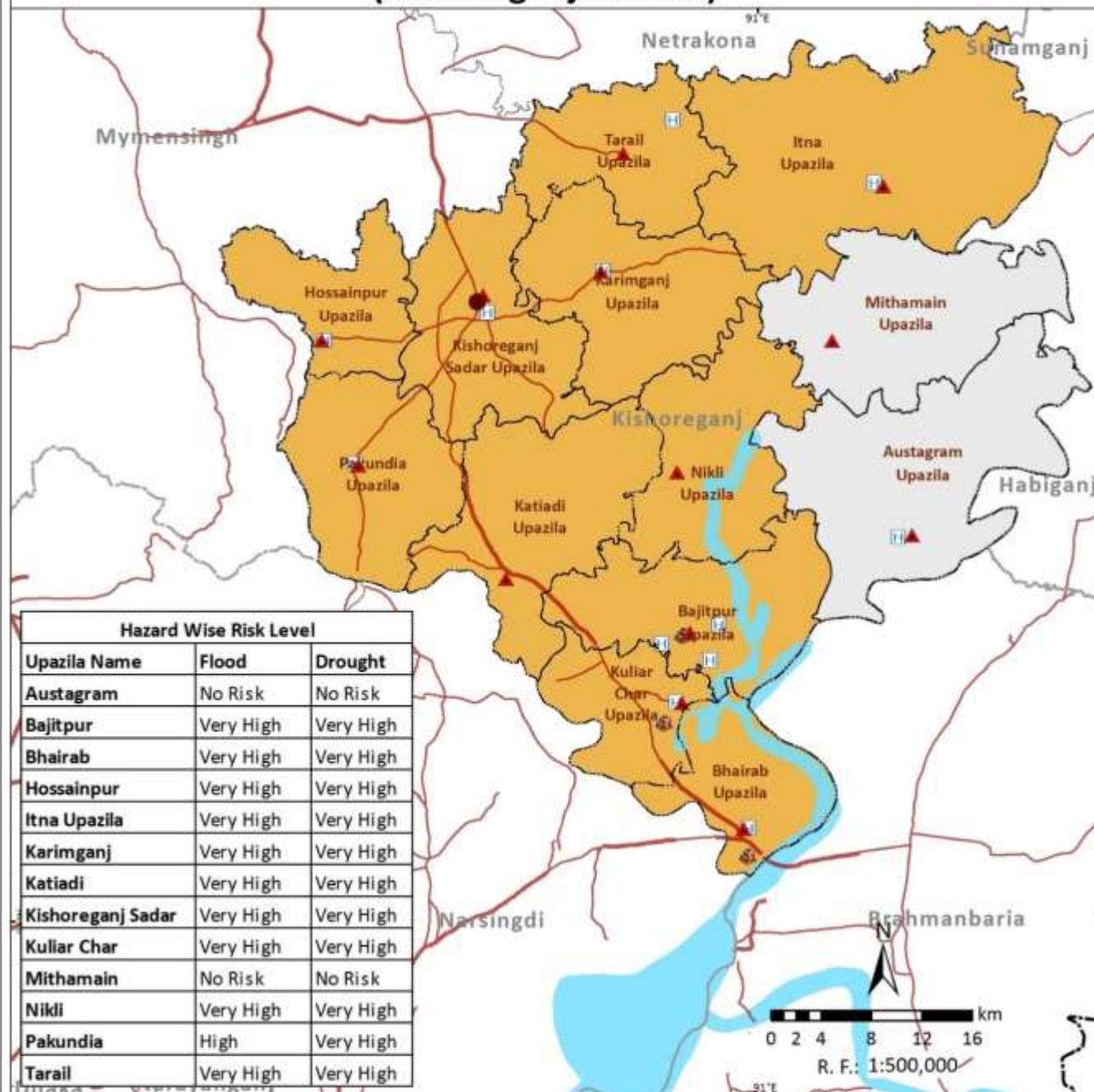
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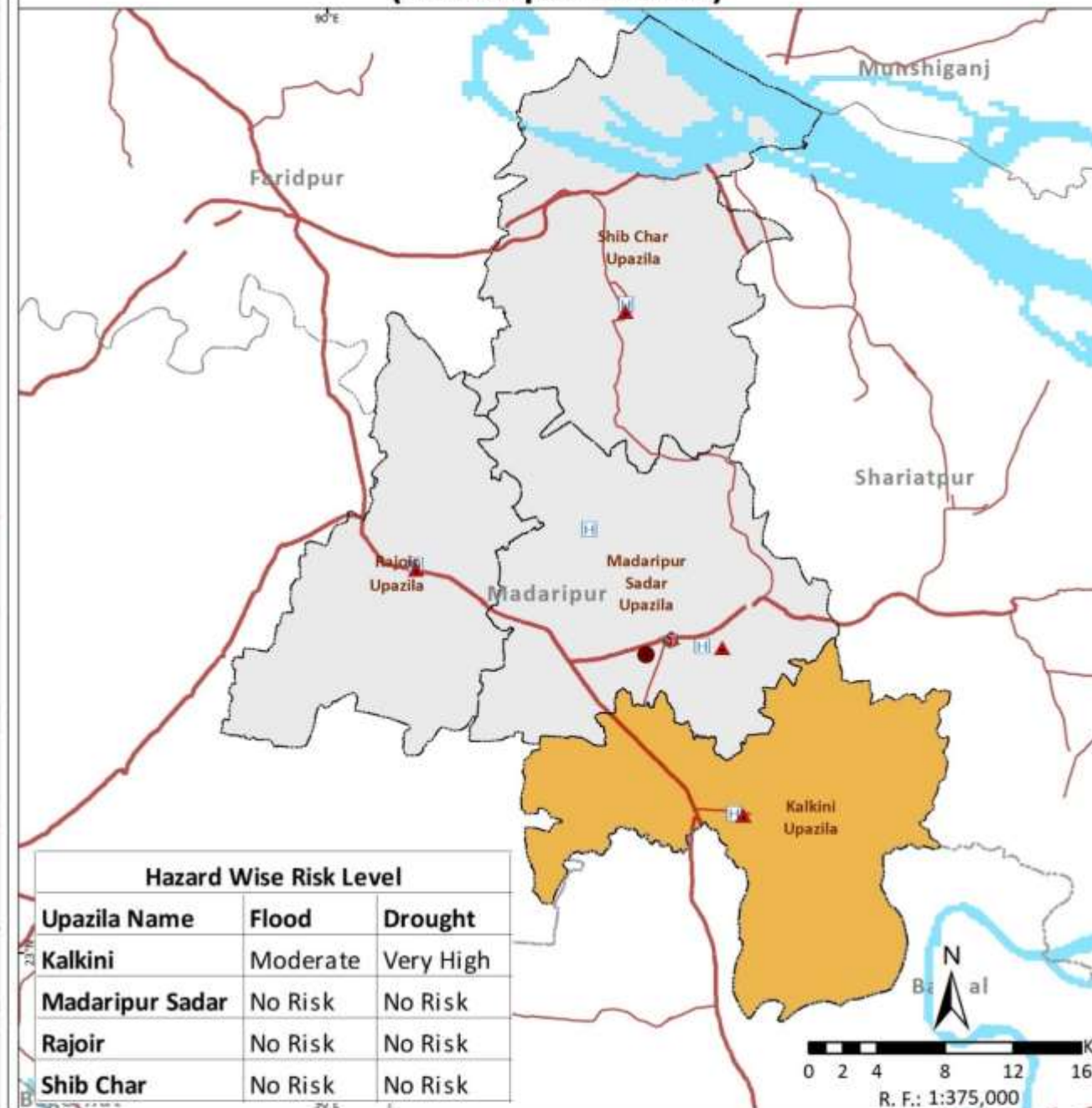
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Risk Levels of Livelihood (Agriculture) to Multi- Hazard (Kishoreganj District)



Risk Levels of Livelihood (Agriculture) to Multi- Hazard (Madaripur District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level for Moderate and above Category
- Flood, Drought
- Risk level below moderate

Note:

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.



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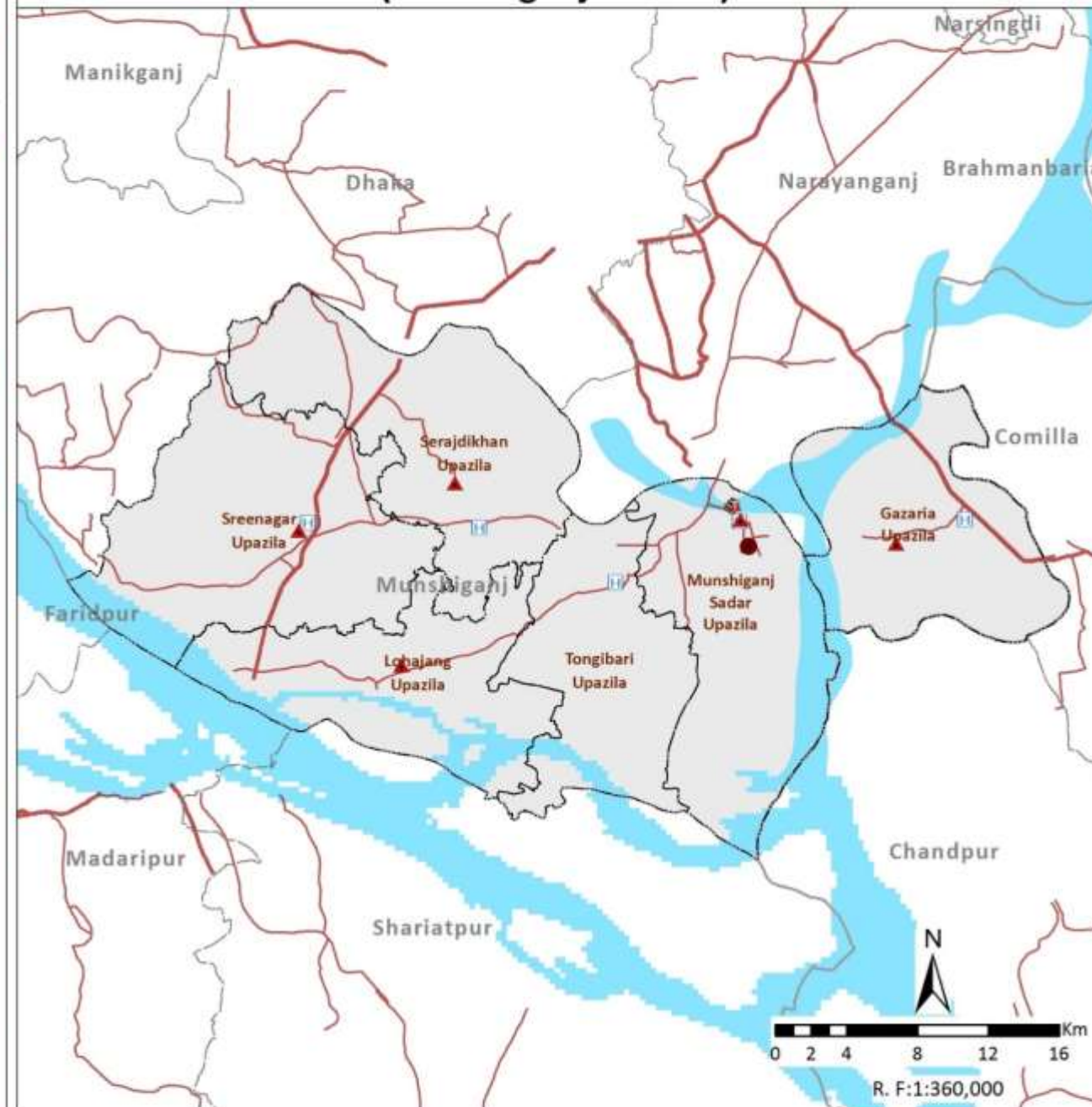
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Risk Levels of Livelihood (Agriculture) to Multi- Hazard (Manikganj District)



Risk Levels of Livelihood (Agriculture) to Multi- Hazard (Munshiganj District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level for Moderate and above Category
- Flood, Drought
- Risk level below moderate

Note:

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

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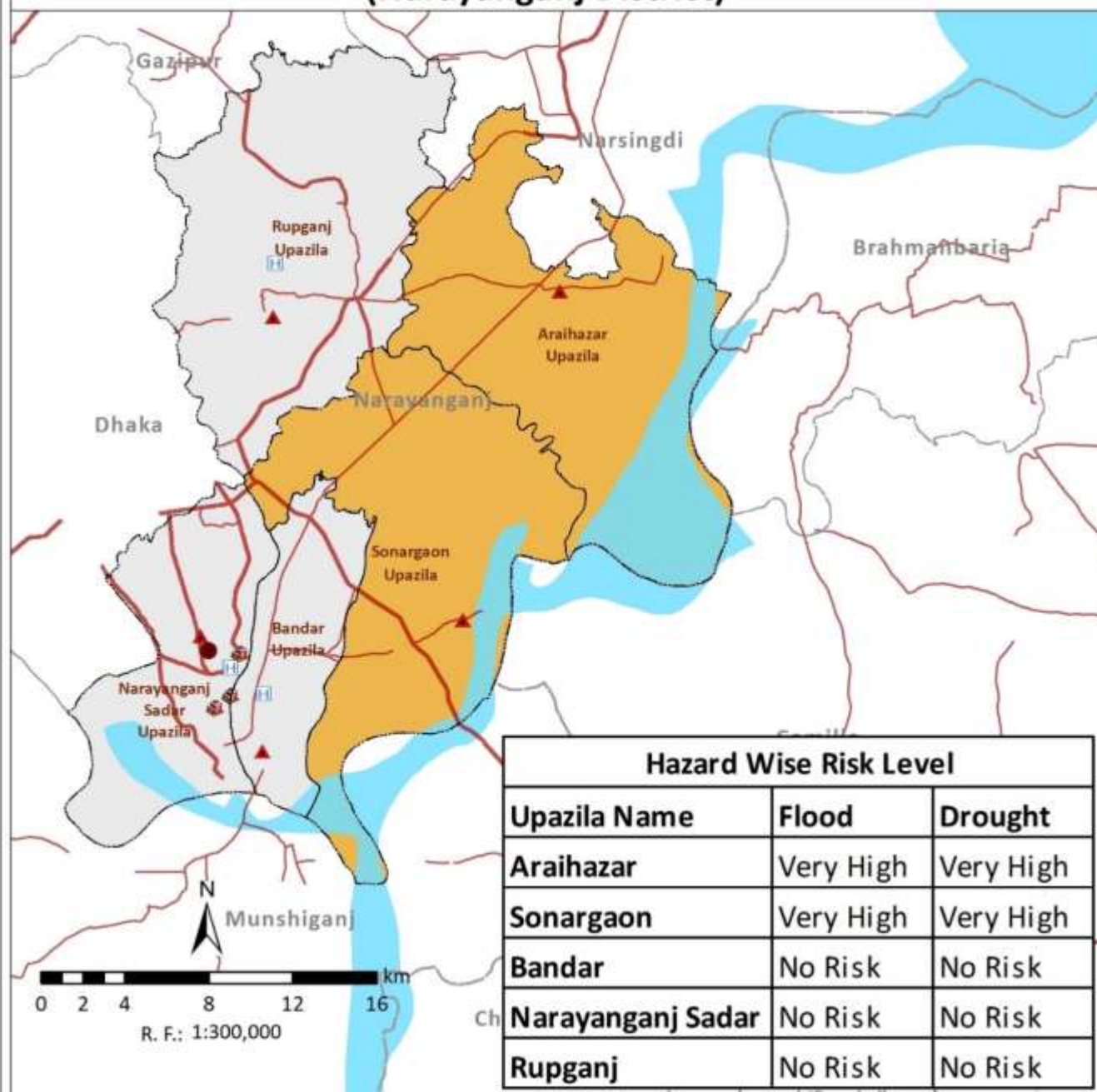
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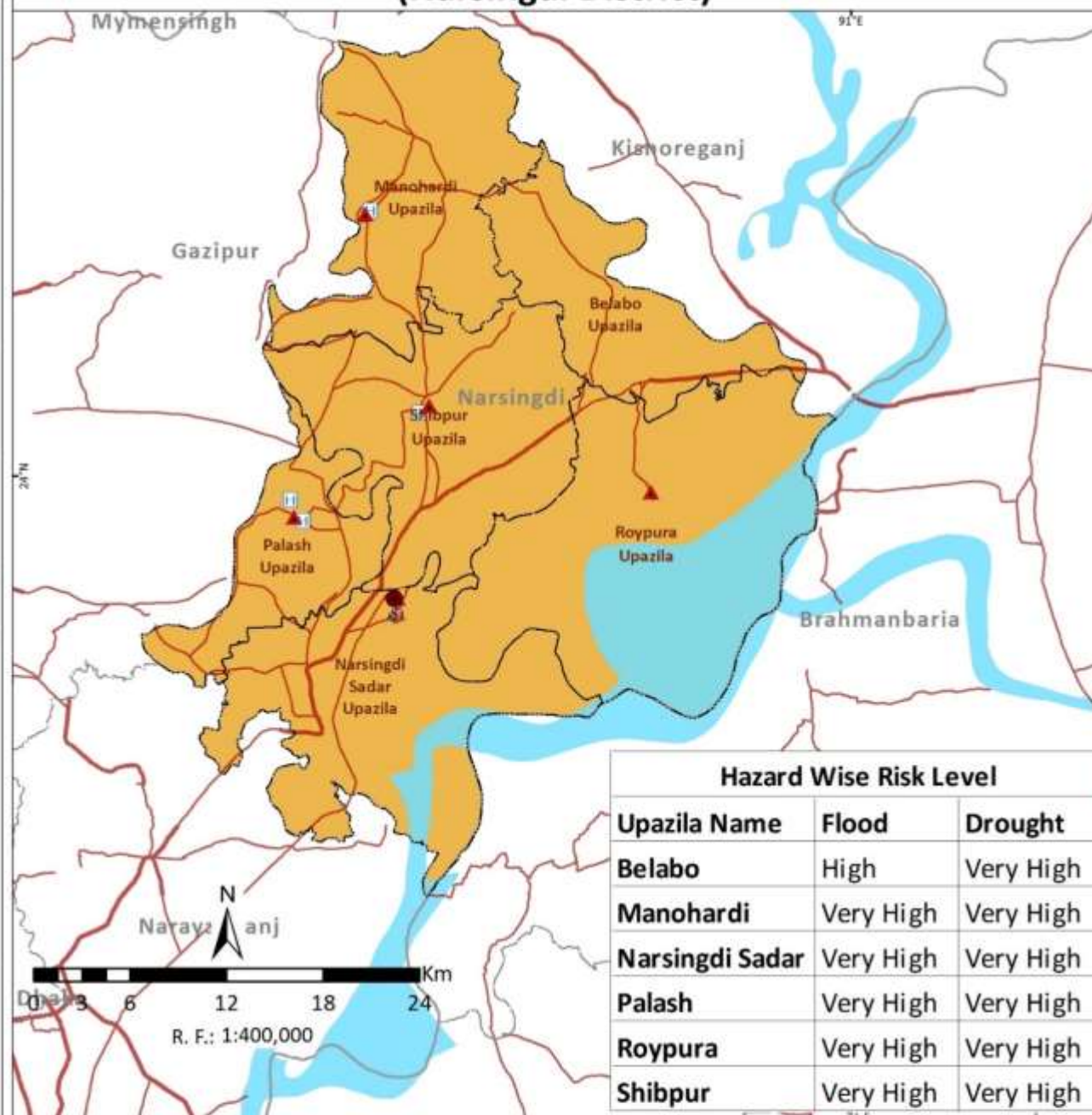
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Risk Levels of Livelihood (Agriculture) to Multi- Hazard (Narayanganj District)



Risk Levels of Livelihood (Agriculture) to Multi- Hazard (Narsingdi District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level for Moderate and above Category
- Flood, Drought
- Risk level below moderate

Note:

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.



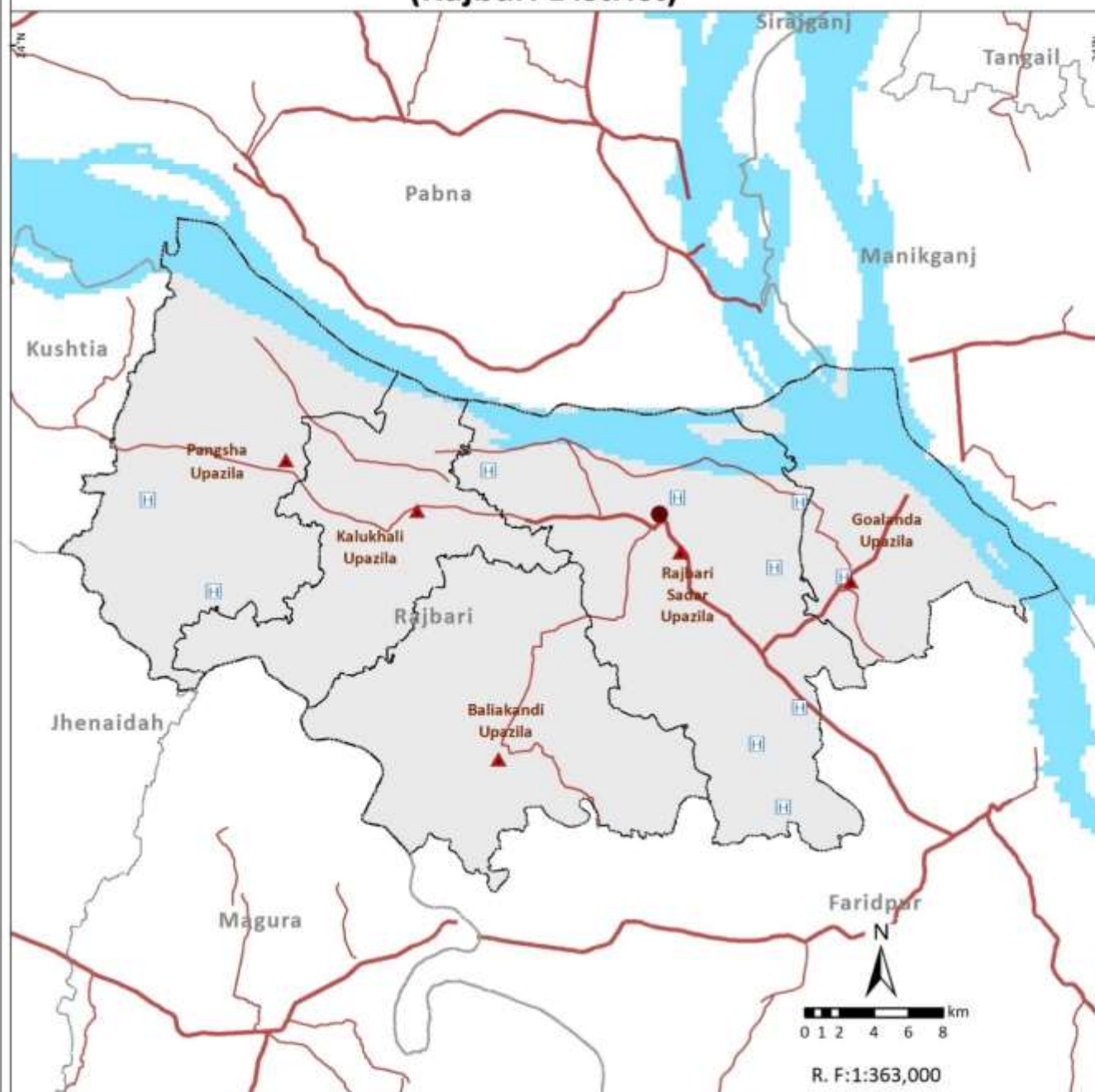
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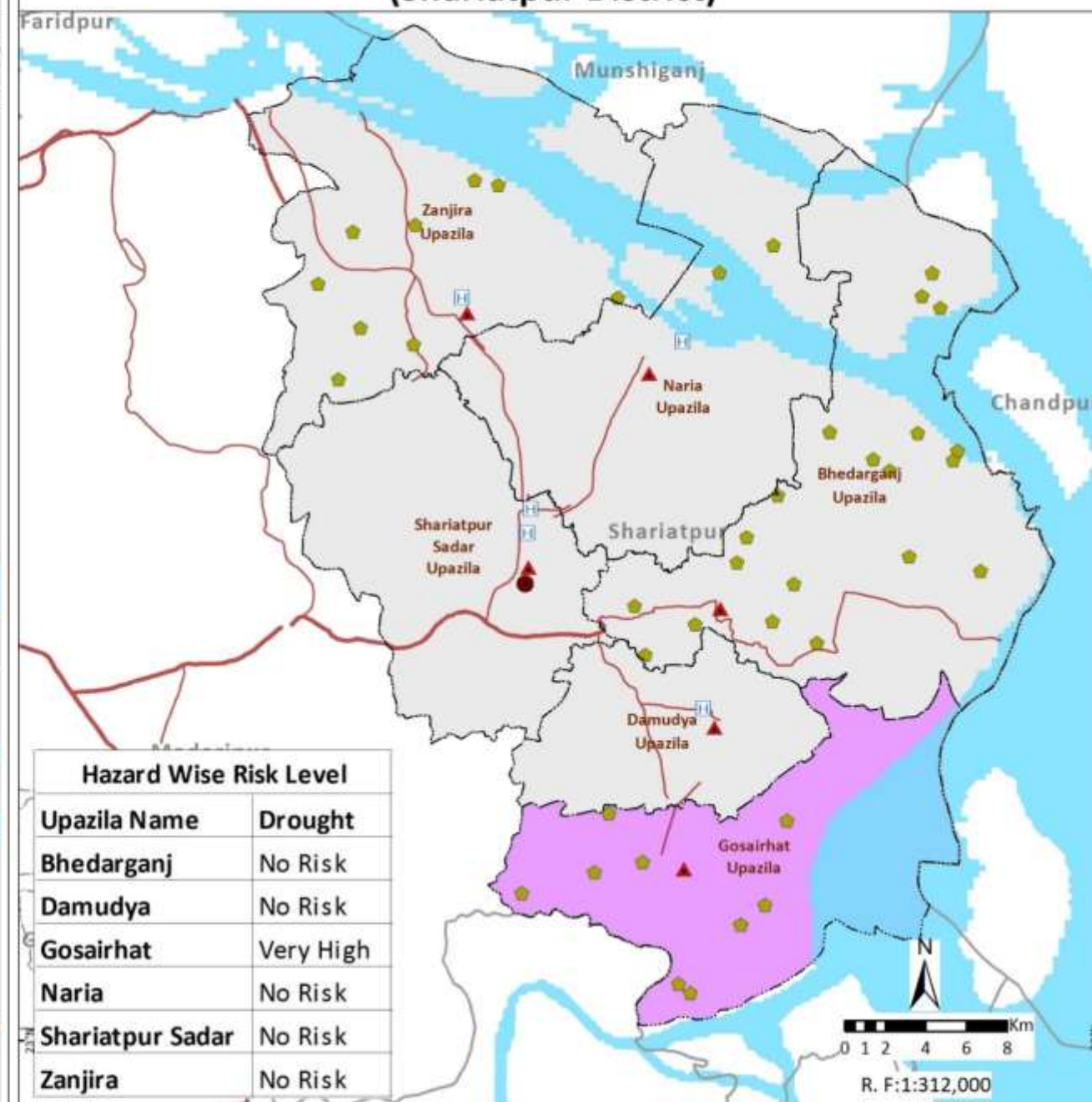
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Risk Levels of Livelihood (Agriculture) to Multi- Hazard (Rajbari District)



Risk Levels of Livelihood (Agriculture) to Multi- Hazard (Shariatpur District)



Hazard Wise Risk Level

Upazila Name	Drought
Bhedarganj	No Risk
Damudya	No Risk
Gosairhat	Very High
Naria	No Risk
Shariatpur Sadar	No Risk
Zanjira	No Risk

Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level for Moderate and above Category
- Drought
- Risk level below moderate

Note:

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

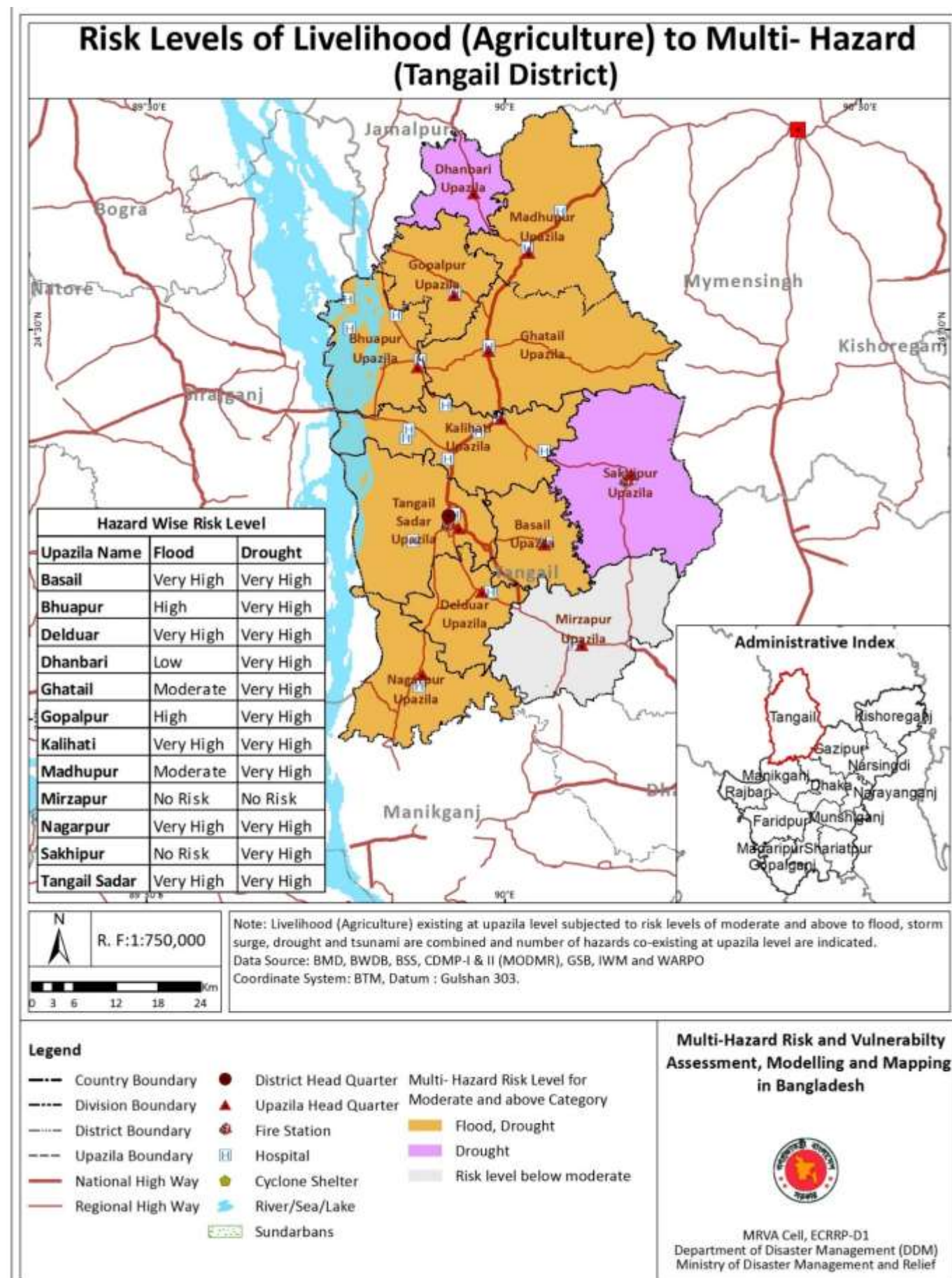
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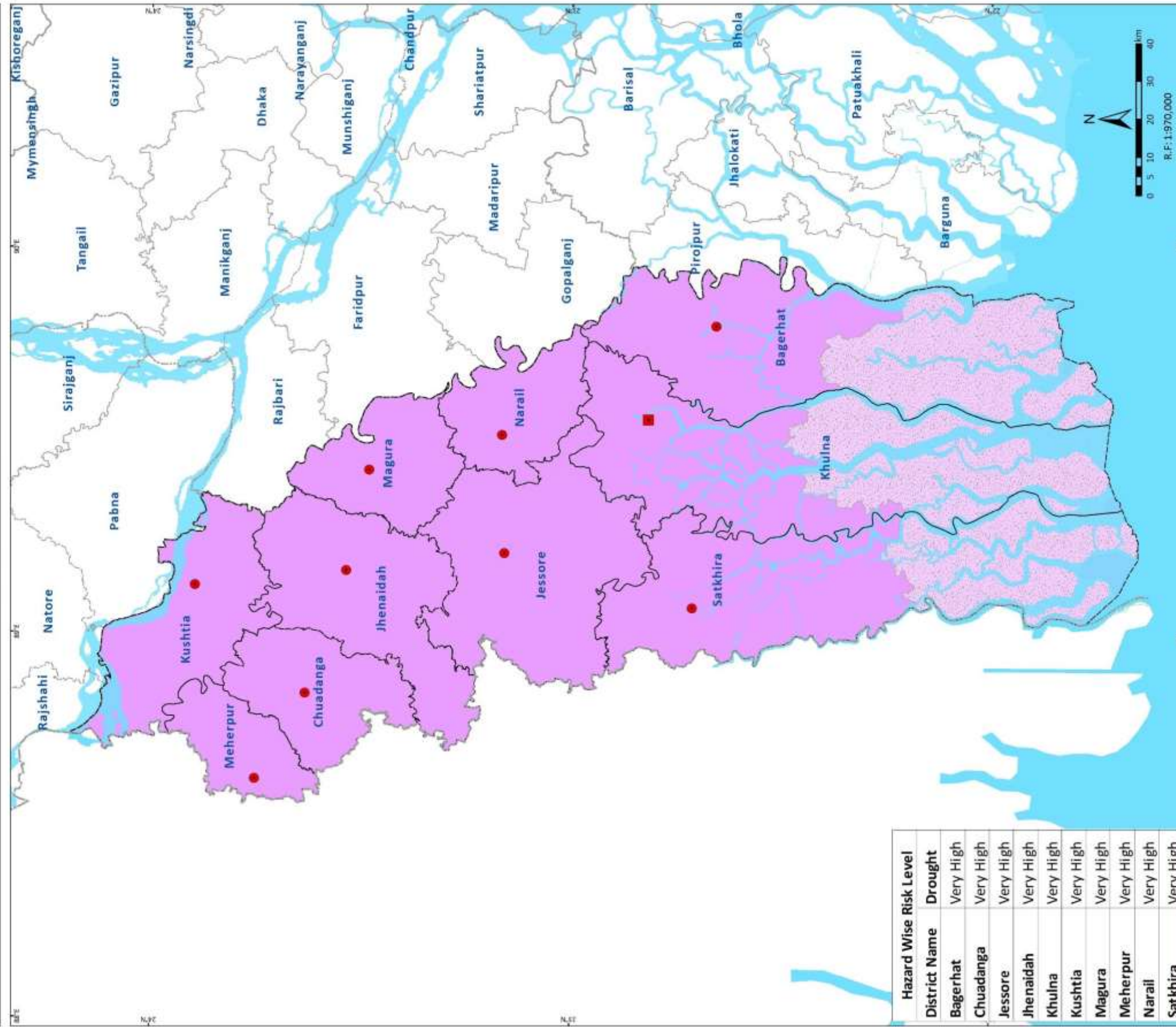


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Risk Levels of Livelihood (Agriculture) to Multi-Hazard (Khulna Division)



Hazard Wise Risk Level	
District Name	Drought
Bagerhat	Very High
Chudanga	Very High
Jessore	Very High
Jhenaidah	Very High
Khulna	Very High
Kushtia	Very High
Magura	Very High
Meherpur	Very High
Narail	Very High
Satkhira	Very High

Legend	
Country Boundary	Multi-Hazard Risk Level for Moderate and above Category
Division Boundary	Drought
District Boundary	
Division Head Quarter	
District Head Quarter	
River/Sea/Lake	
Sundarbans	

Note:
Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.



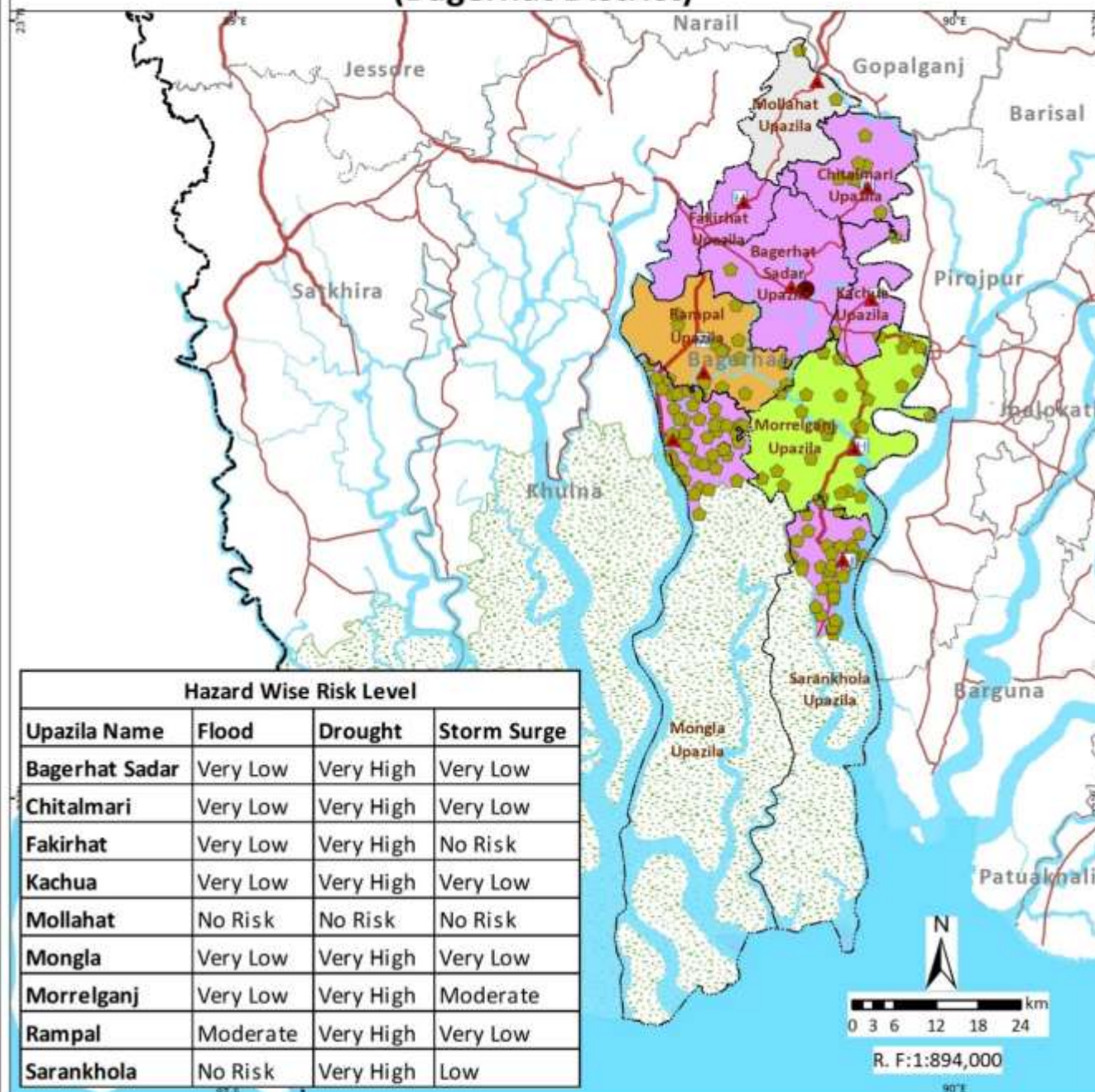
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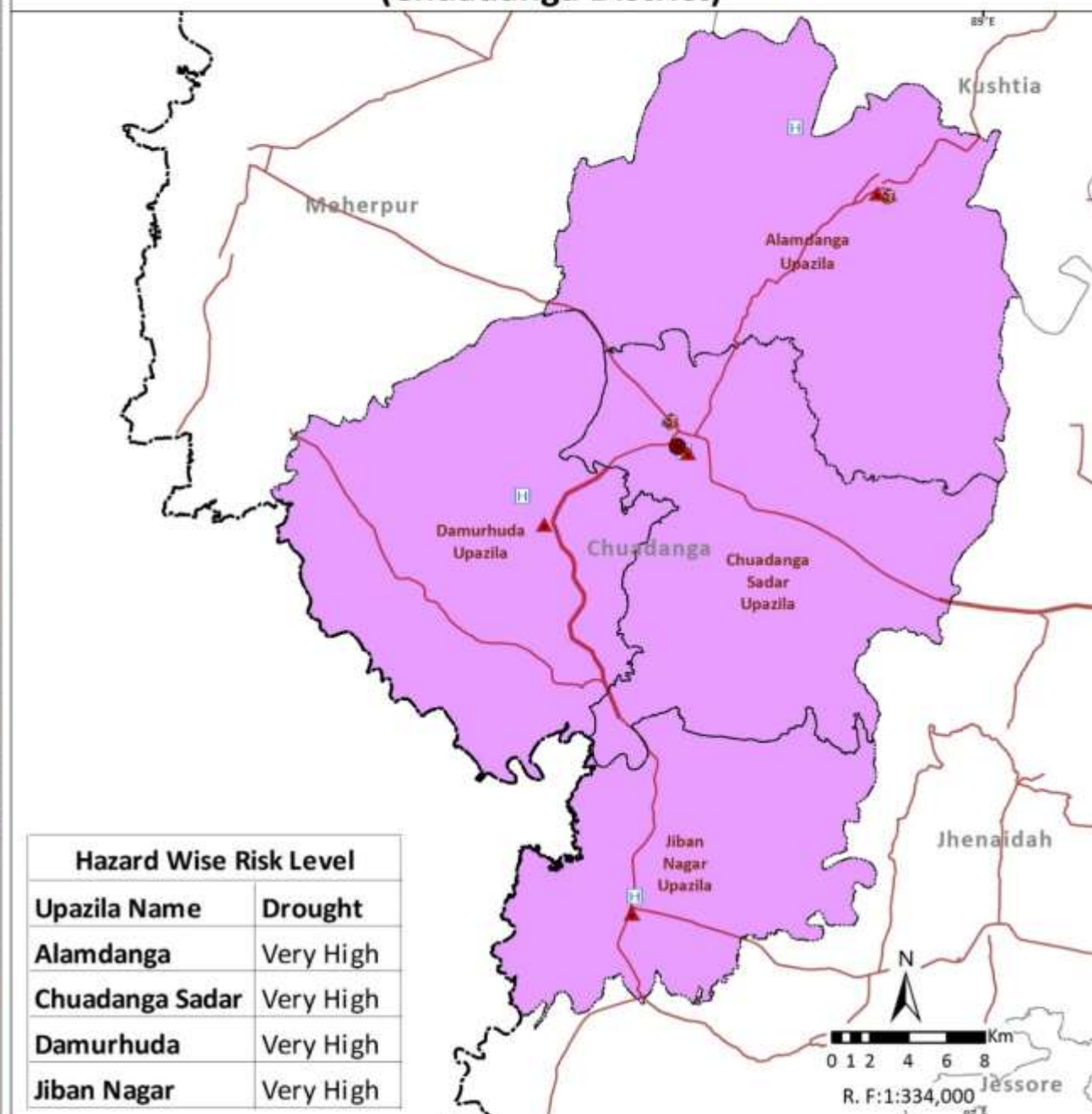
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Risk Levels of Livelihood (Agriculture) to Multi- Hazard (Bagerhat District)



Risk Levels of Livelihood (Agriculture) to Multi- Hazard (Chuadanga District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level for Moderate and above Category
- Flood, Drought
- Storm Surge, Drought
- Drought
- Risk level below moderate

Note:

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

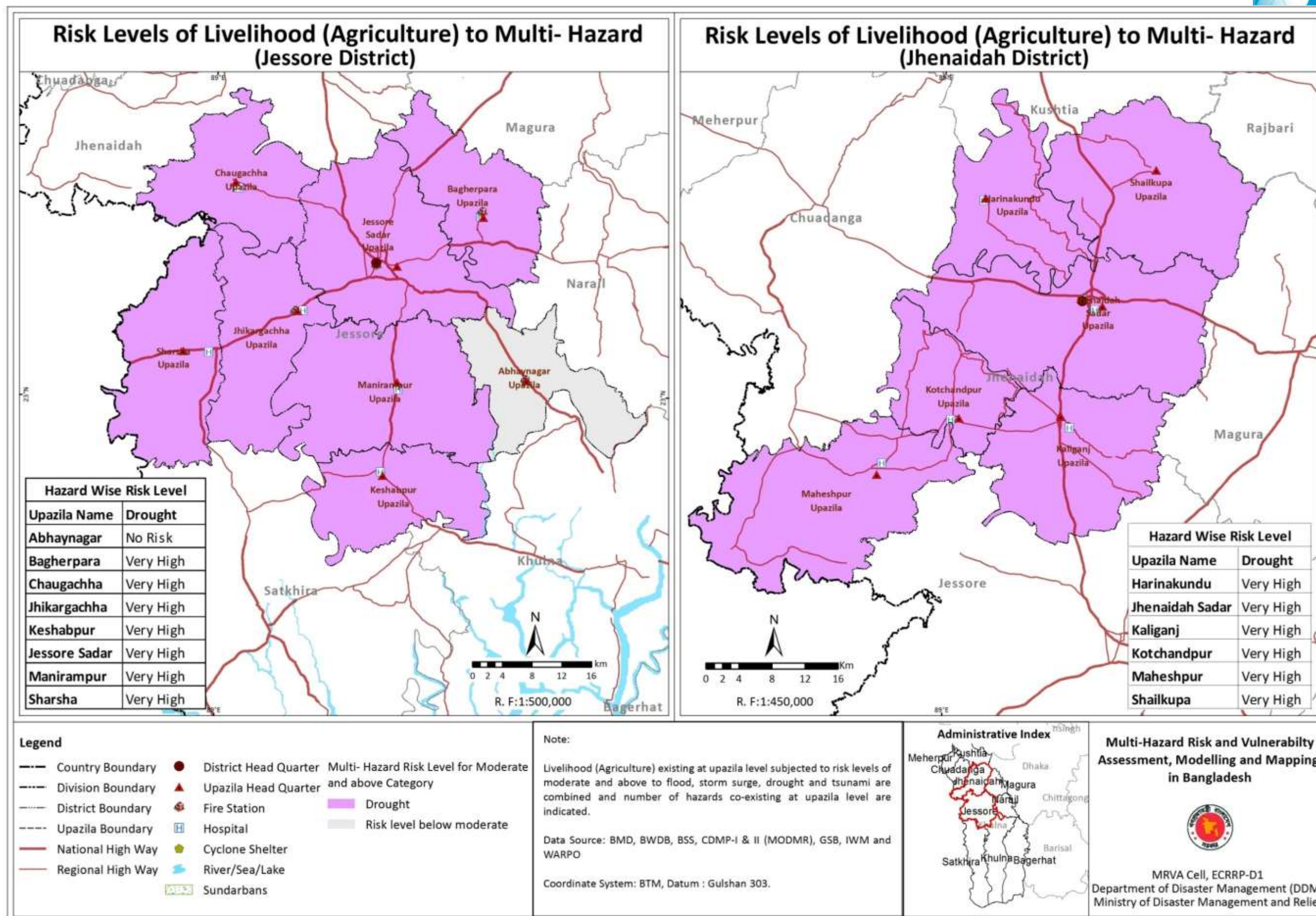
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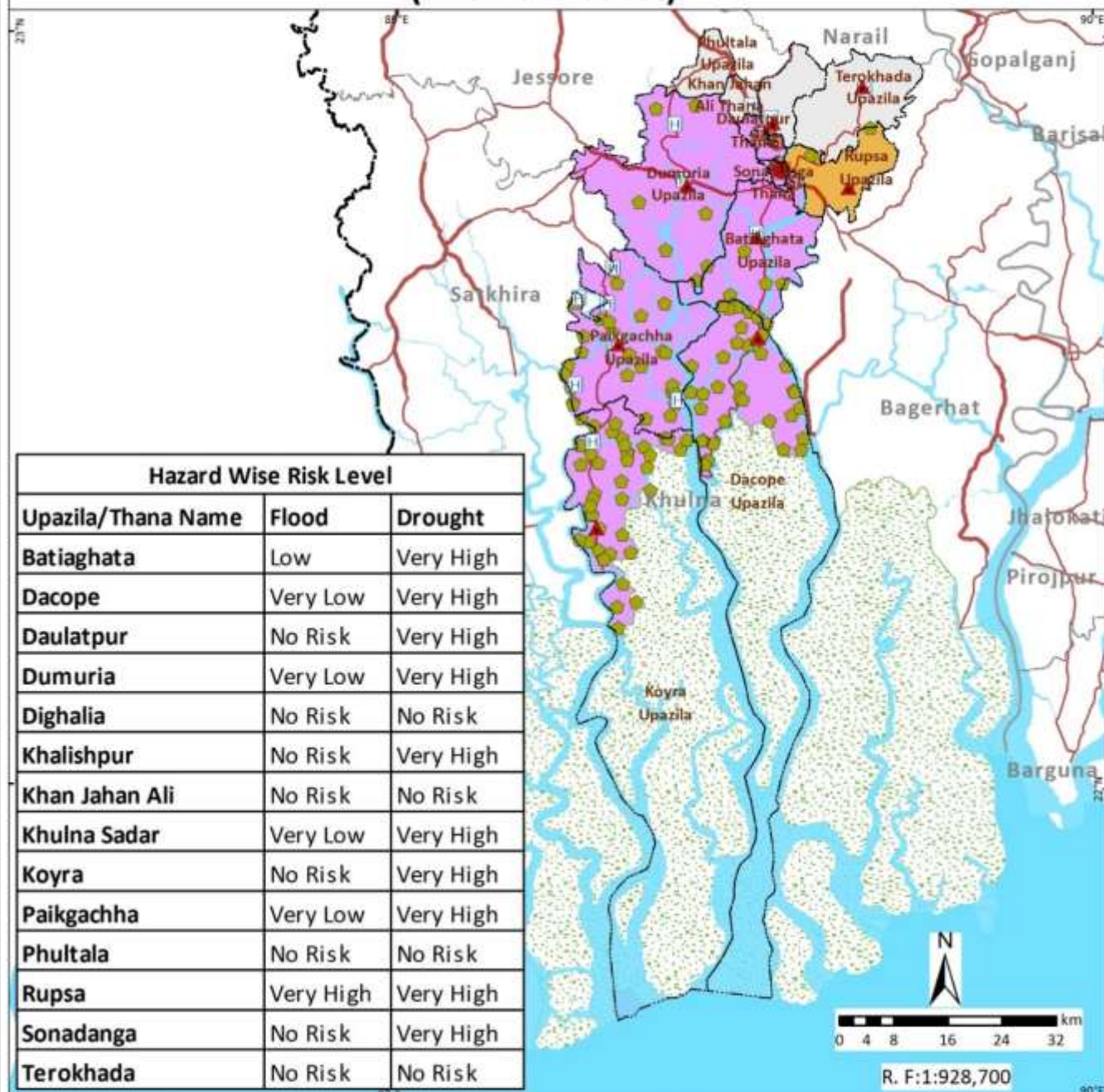


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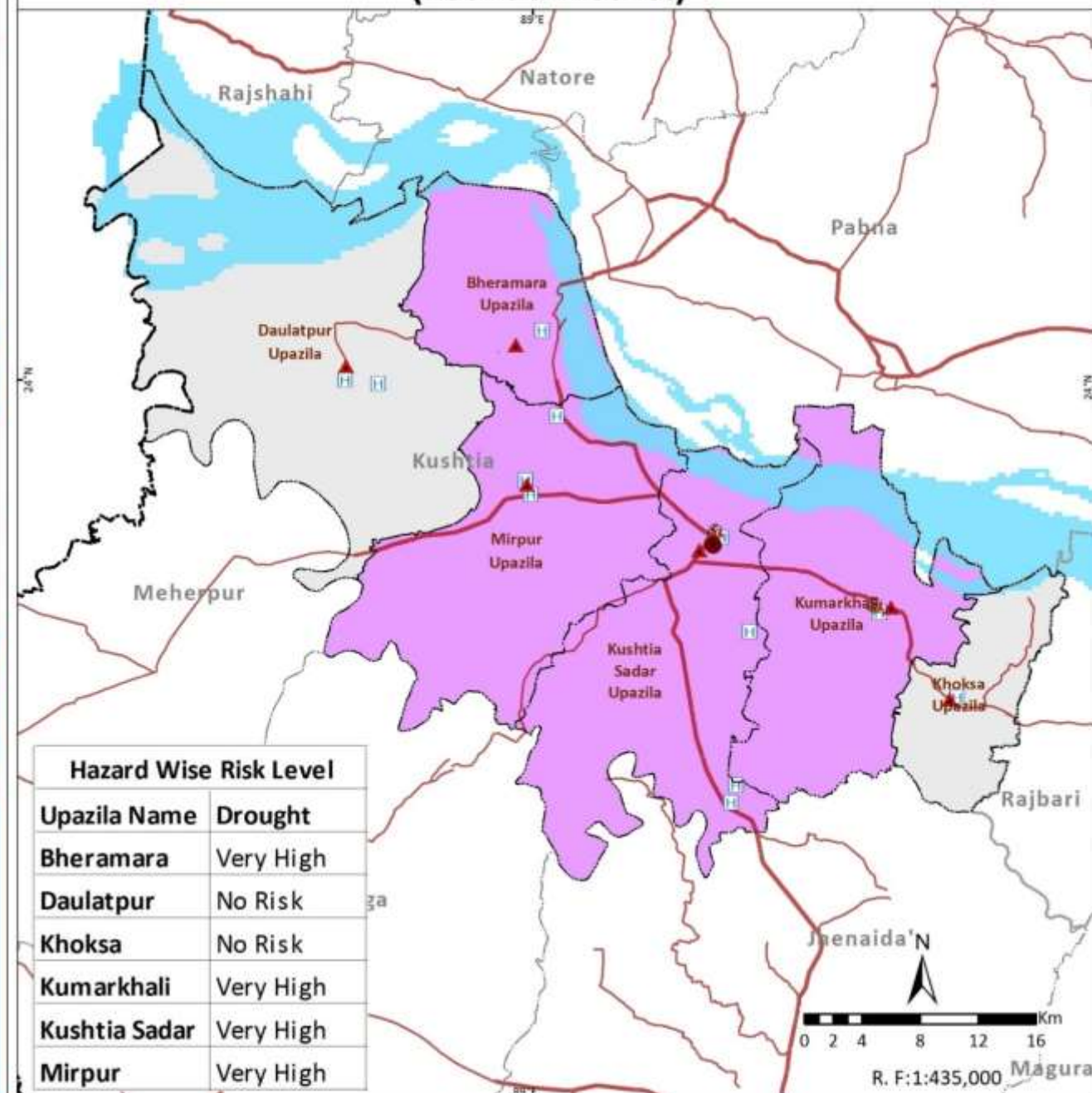




Risk Levels of Livelihood (Agriculture) to Multi- Hazard (Khulna District)



Risk Levels of Livelihood (Agriculture) to Multi- Hazard (Kushtia District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- Division Head Quarter
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level for Moderate and above Category
- Flood, Drought
- Drought
- Risk level below moderate

Note:

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

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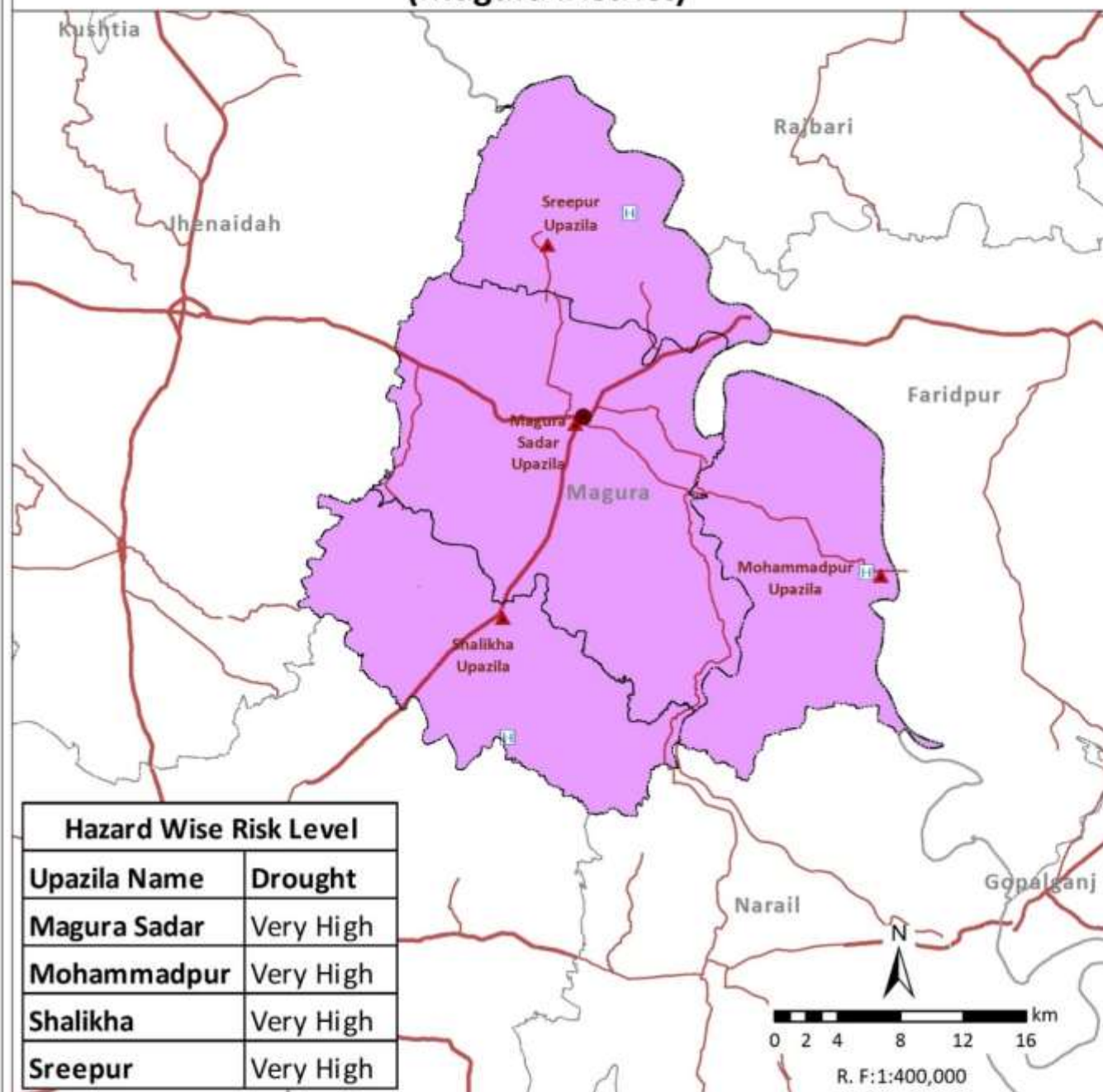
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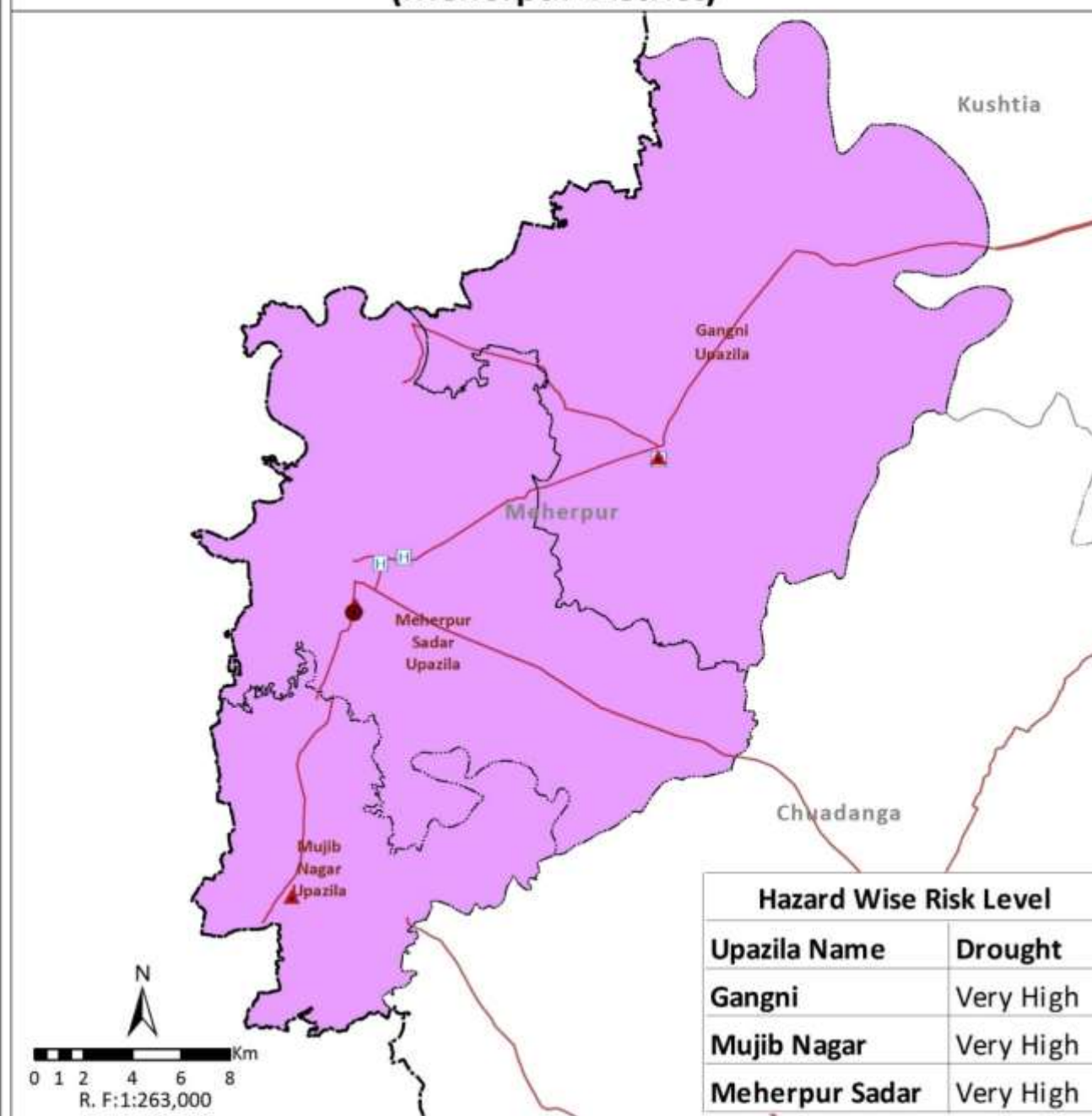
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Risk Levels of Livelihood (Agriculture) to Multi- Hazard (Magura District)



Risk Levels of Livelihood (Agriculture) to Multi- Hazard (Meherpur District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level for Moderate and above Category
- Drought

Note:

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

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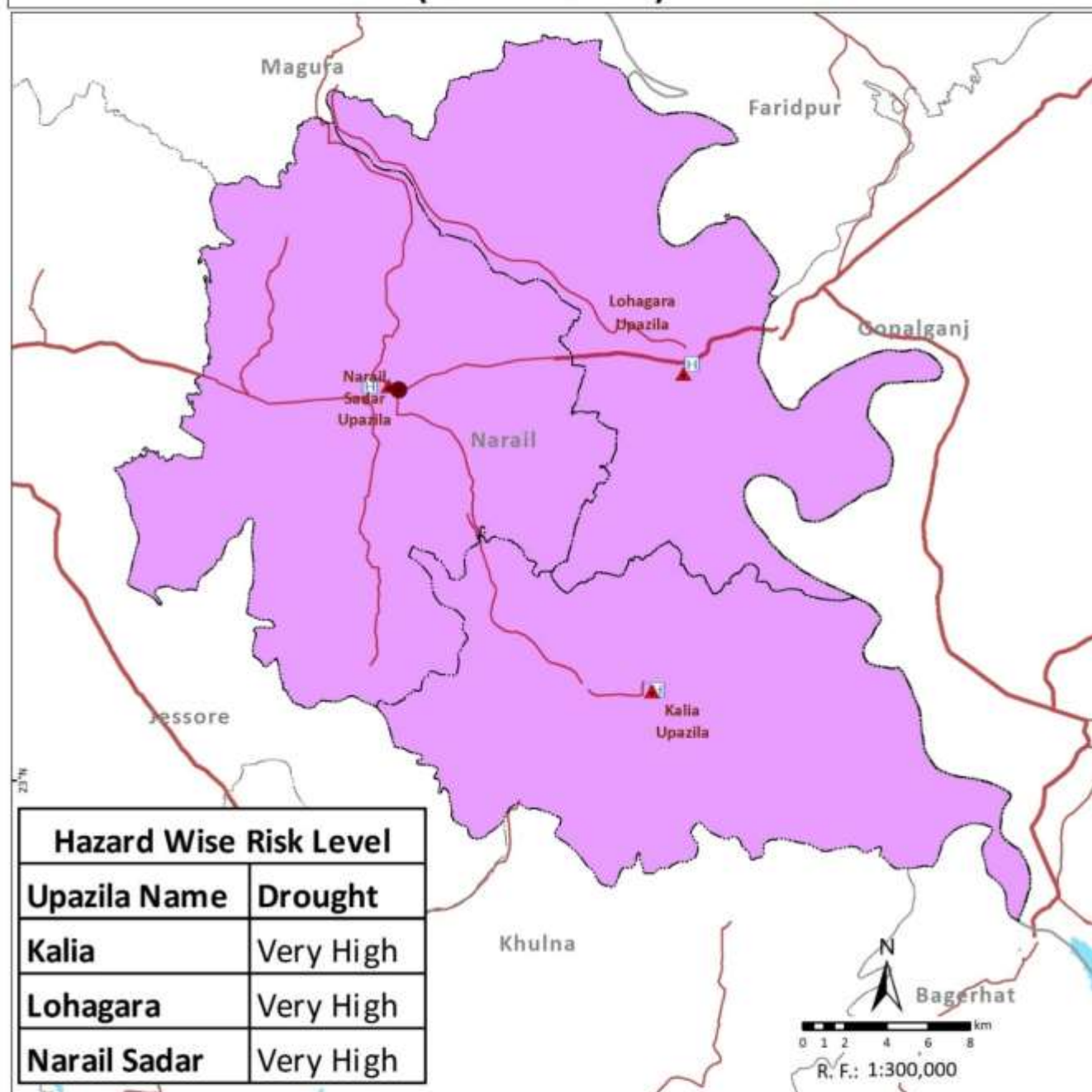
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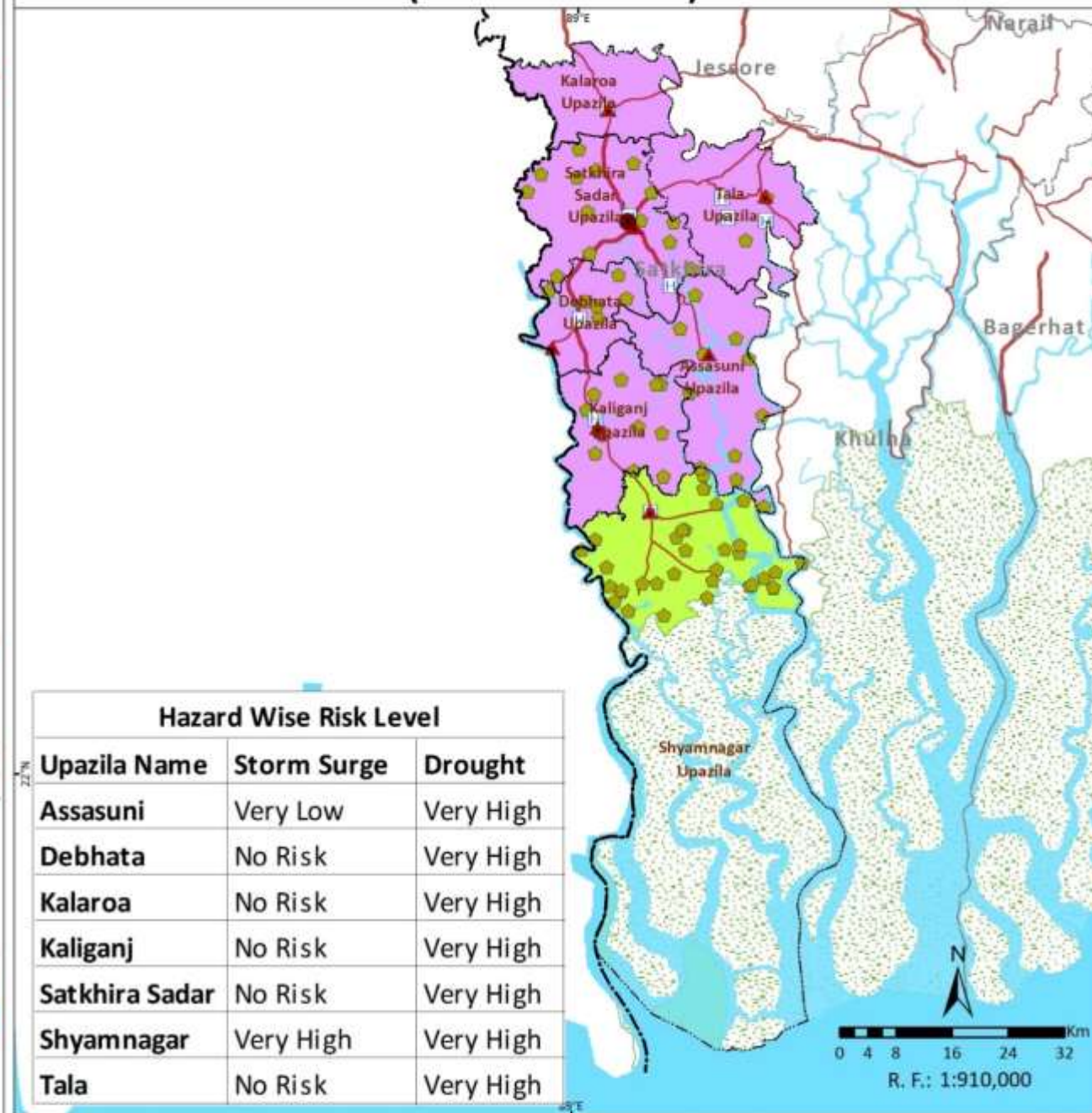
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Risk Levels of Livelihood (Agriculture) to Multi- Hazard (Narail District)



Risk Levels of Livelihood (Agriculture) to Multi- Hazard (Satkhira District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi- Hazard Risk Level for Moderate and above Category
- Storm Surge, Drought
- Drought

Note:

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum : Gulshan 303.

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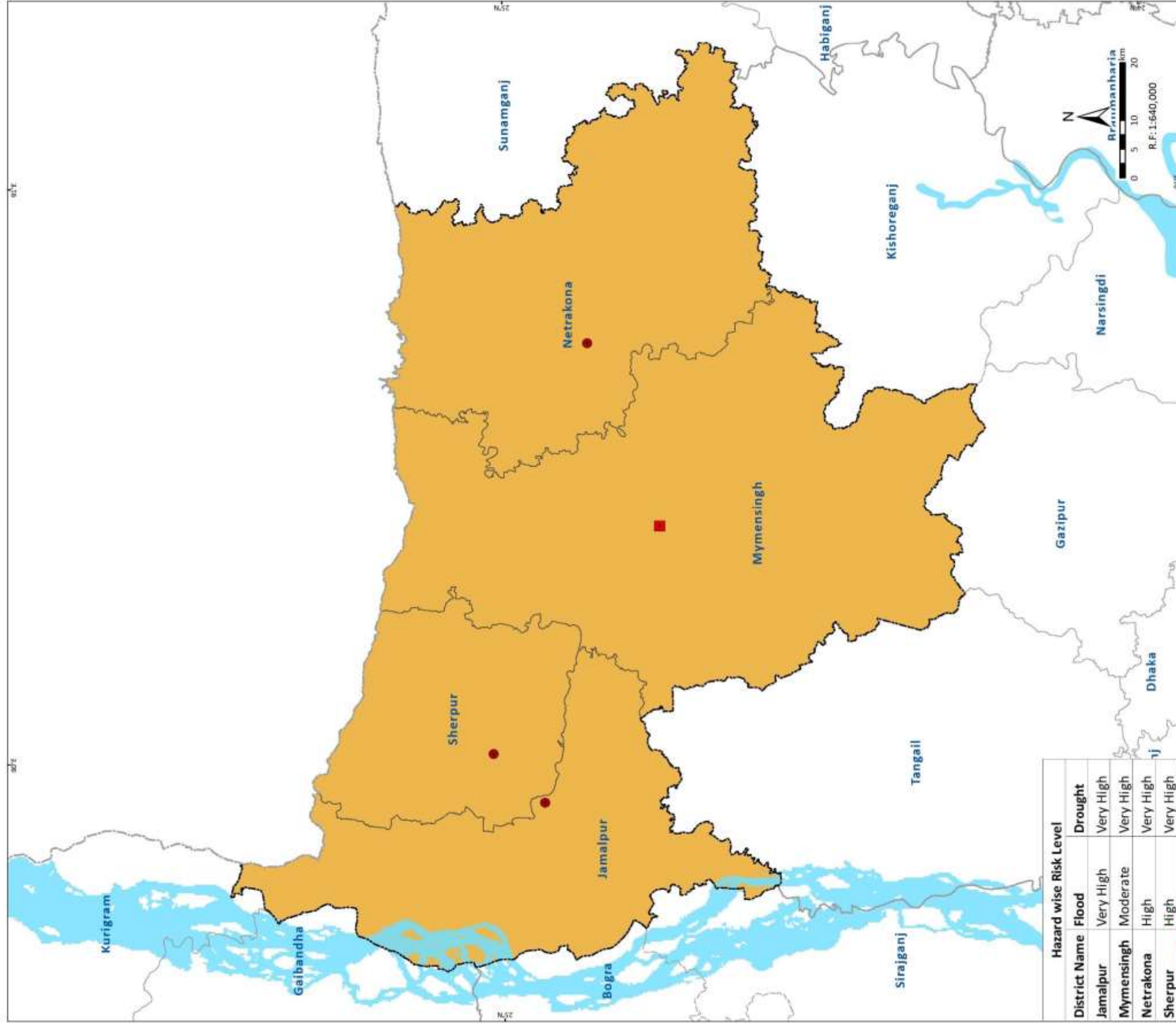


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Risk Levels of Livelihood (Agriculture) to Multi-Hazard (Mymensingh Division)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Division Head Quarter
- District Headquarter
- River/Sea/Lake
- Sundarbans

Multi-Hazard Risk Level for Moderate and Above Category



Flood, Drought

Note:

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

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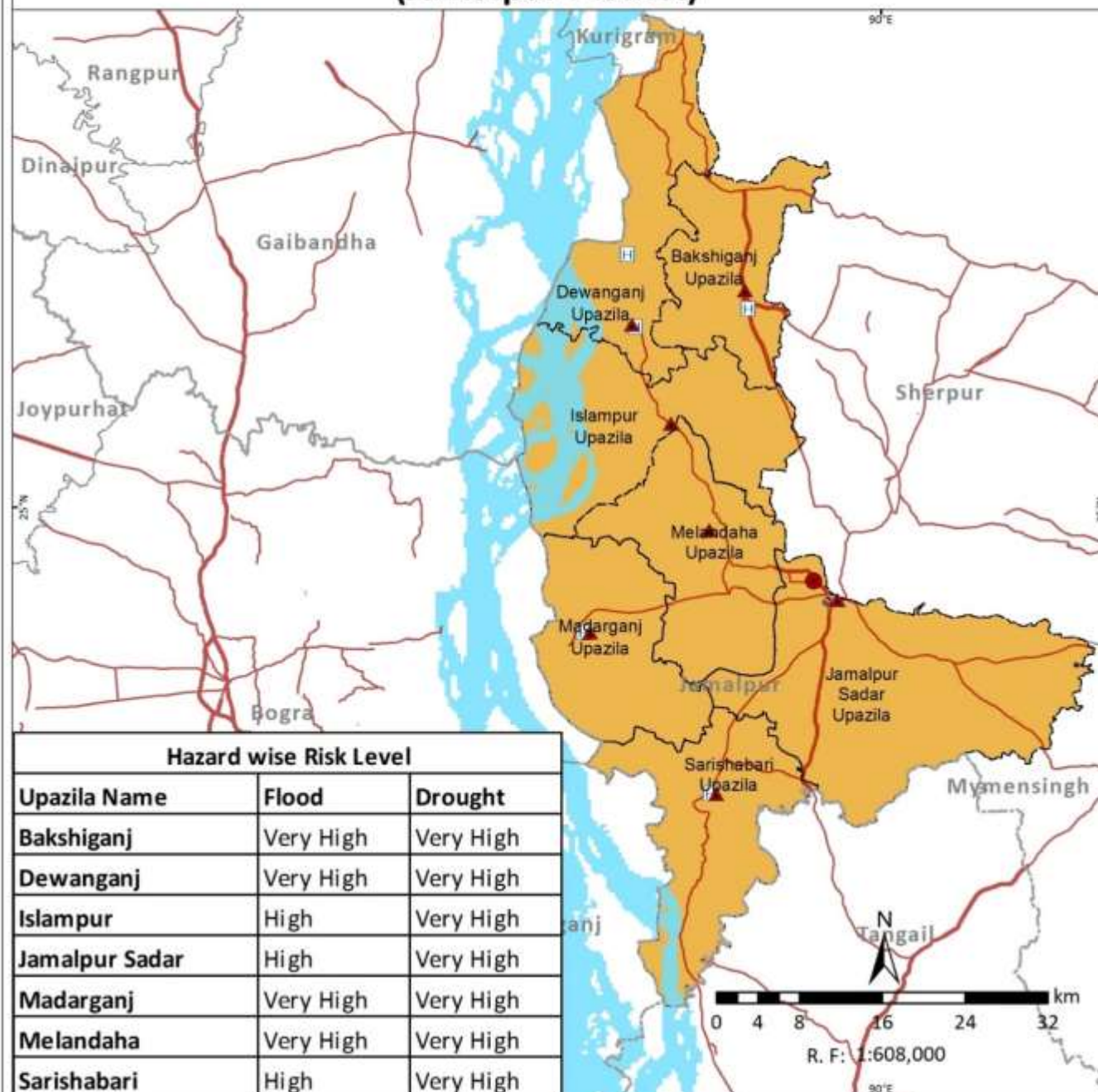


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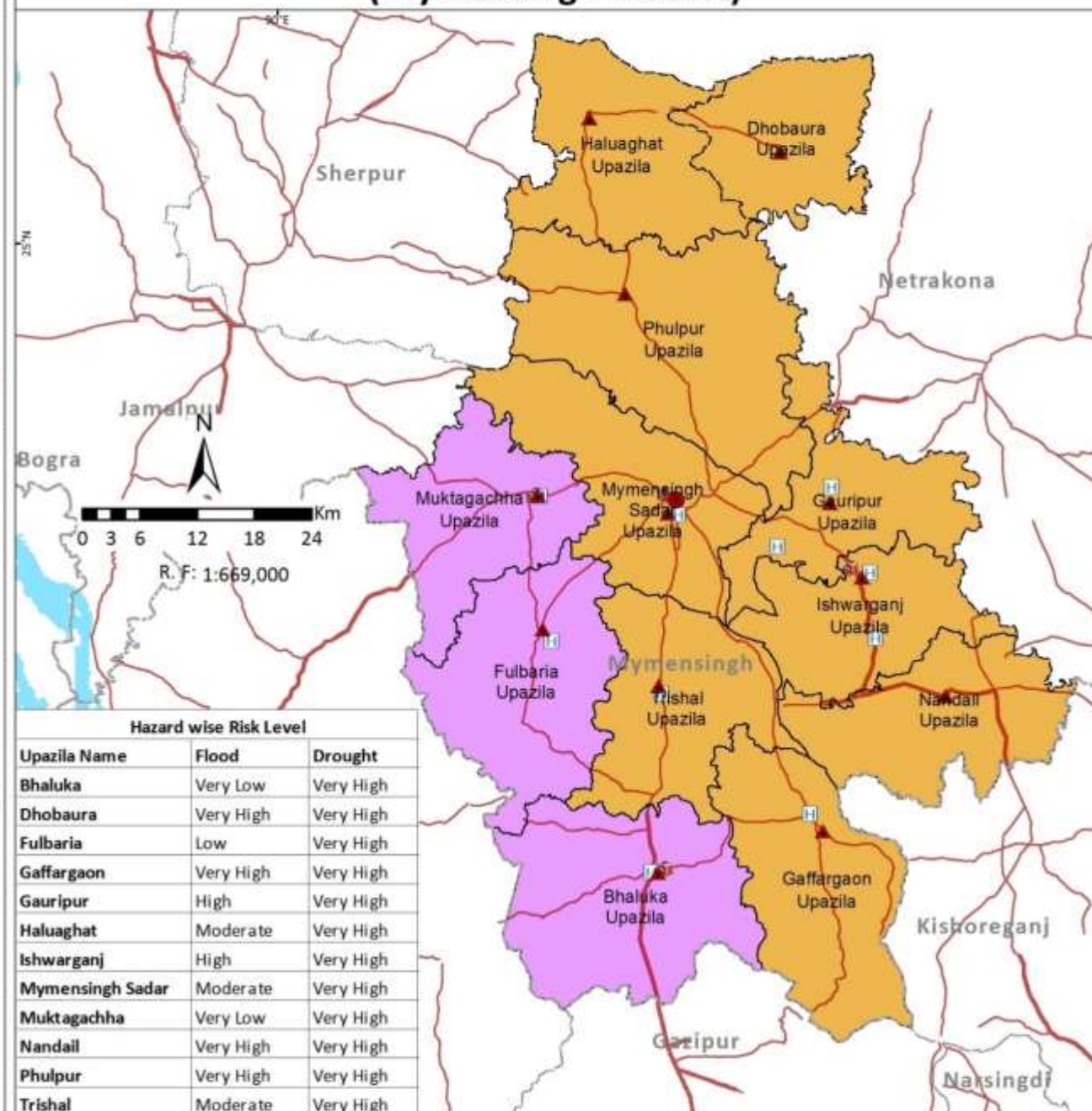




Risk Levels of Livelihood (Agriculture) to Multi hazard (Jamalpur District)



Risk Levels of Livelihood (Agriculture) to Multi hazard (Mymensingh District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
- Flood, Drought
- Drought

Note

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

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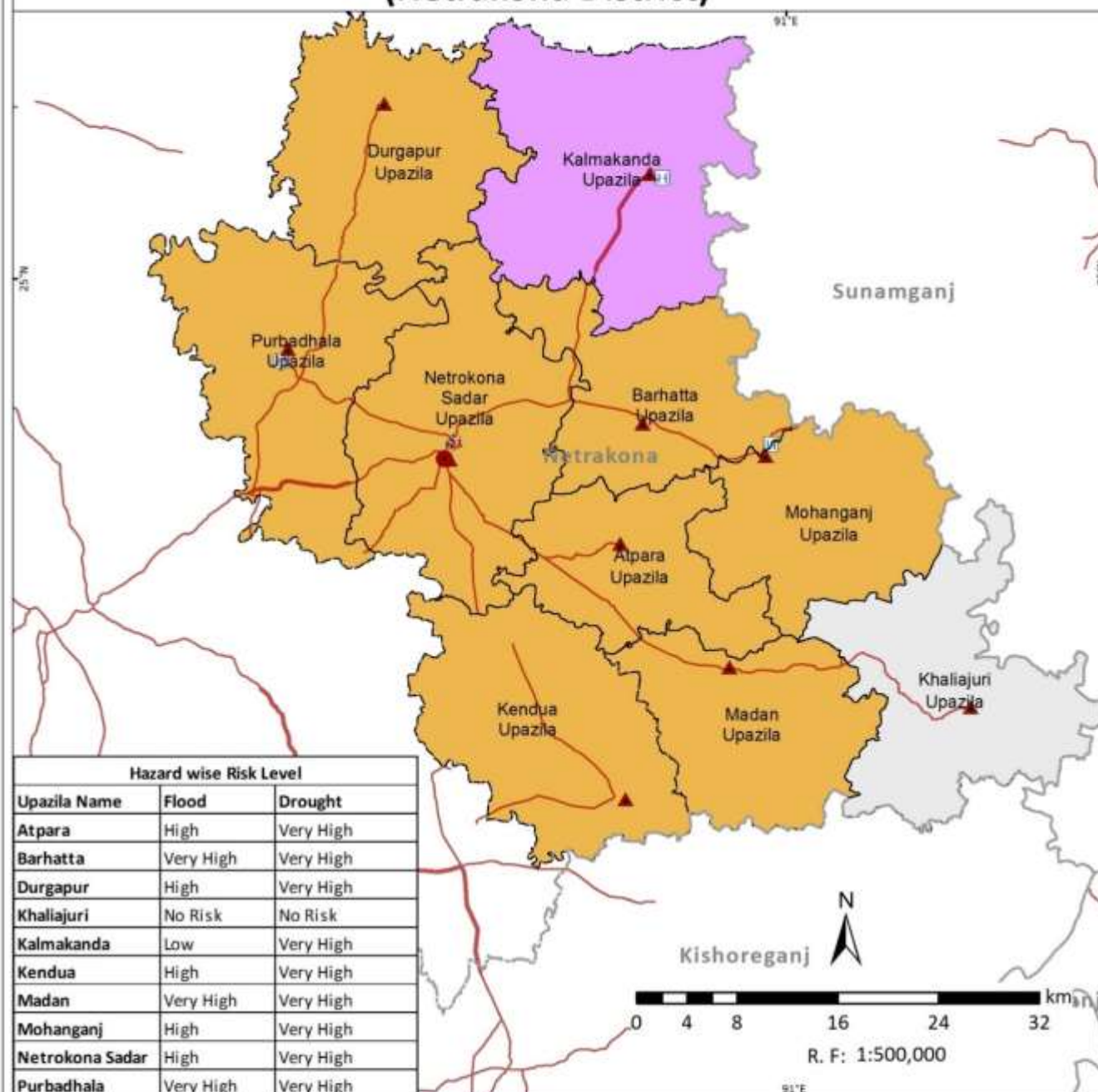
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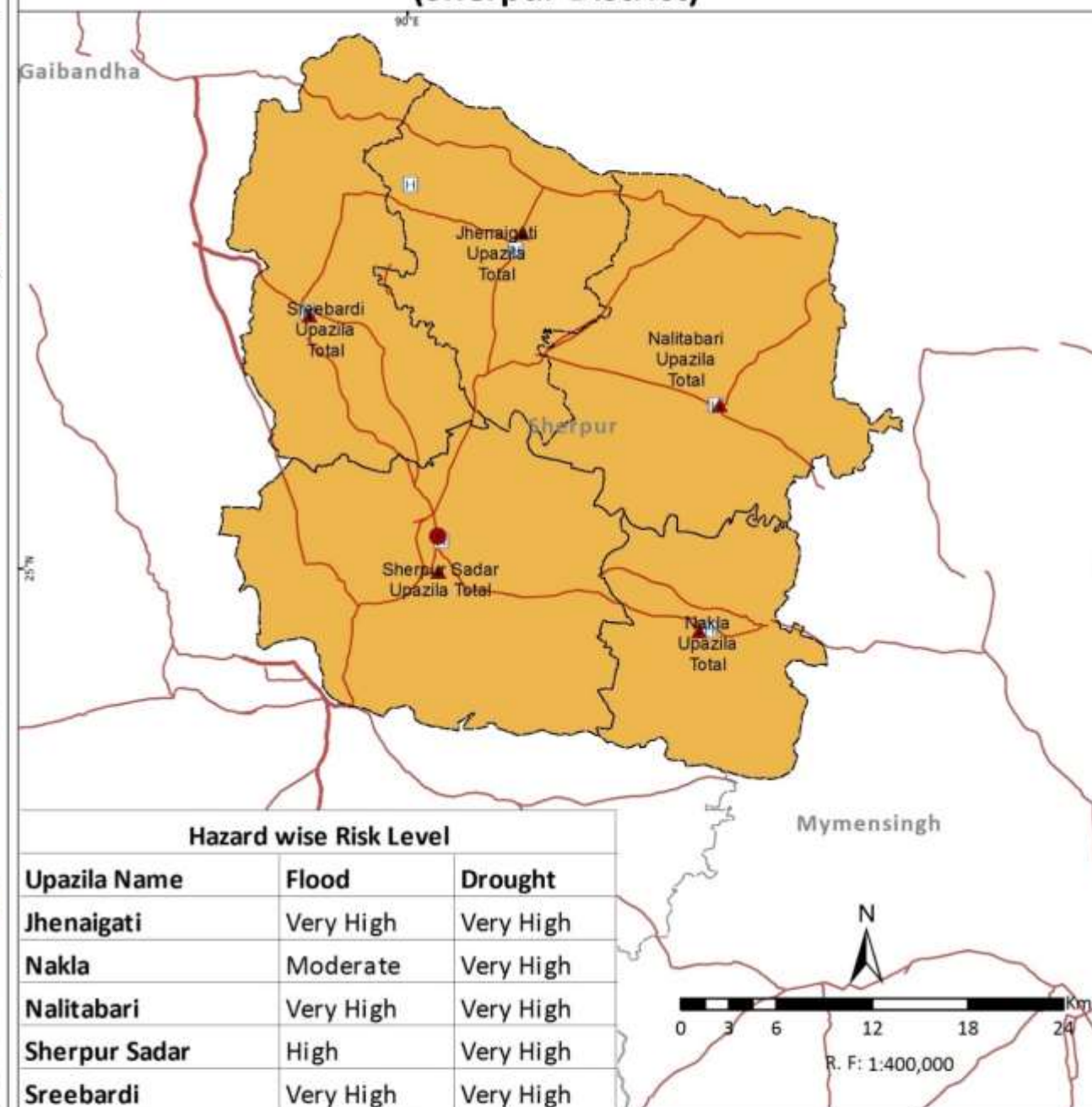
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Risk Levels of Livelihood (Agriculture) to Multi hazard (Netrakona District)



Risk Levels of Livelihood (Agriculture) to Multi hazard (Sherpur District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire Station
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk Level for Moderate and Above Category
 - Flood, Drought
 - Drought
 - Risk level below moderate

Note

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO

Coordinate System: BTM, Datum: Gulshan 303

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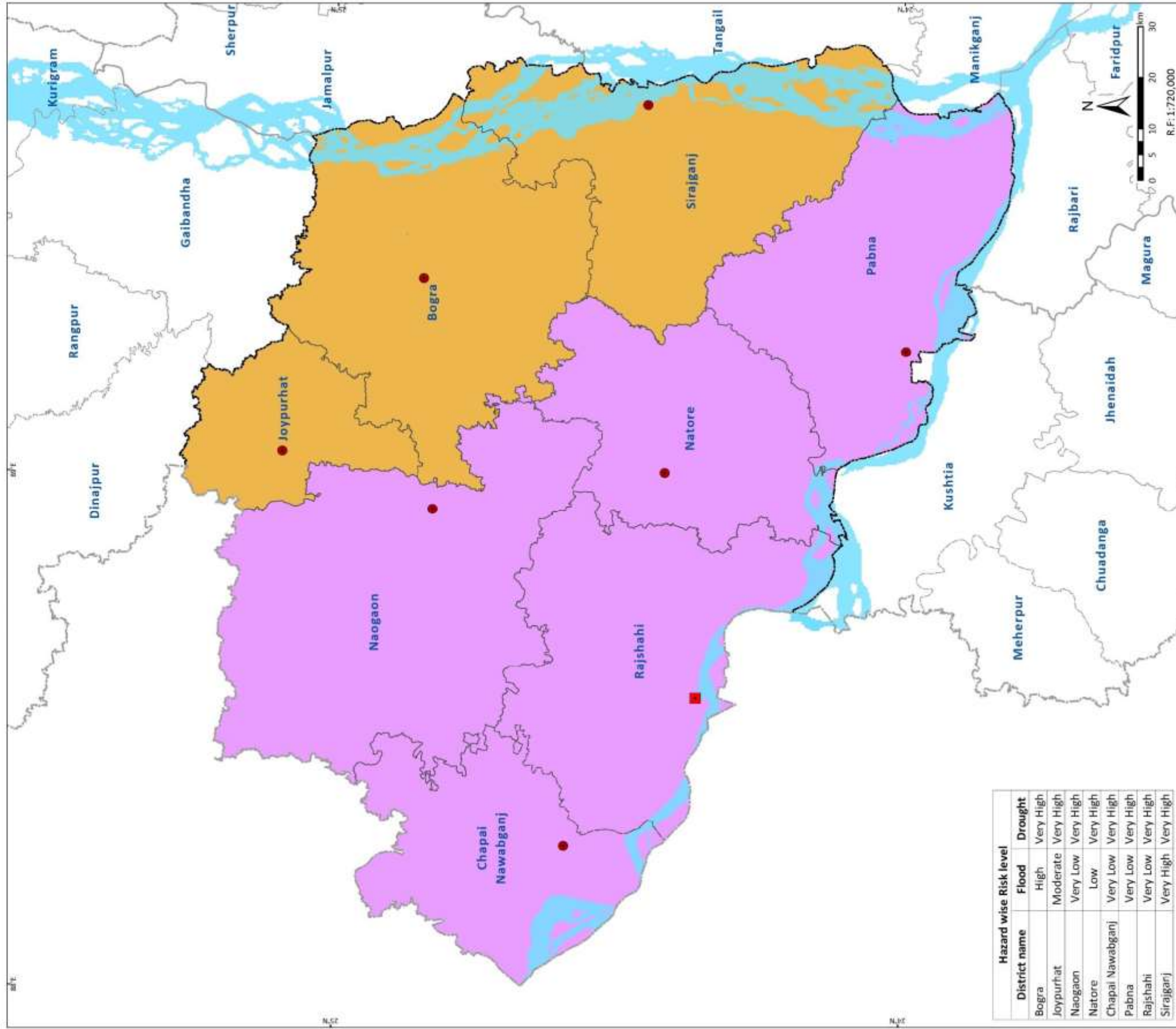


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Risk levels of Livelihood (Agriculture) to Multi-Hazard (Rajshahi Division)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Division Head Quarter
- District Head Quarter
- River/Sea/Lake
- Sundarbans

Note:
Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.



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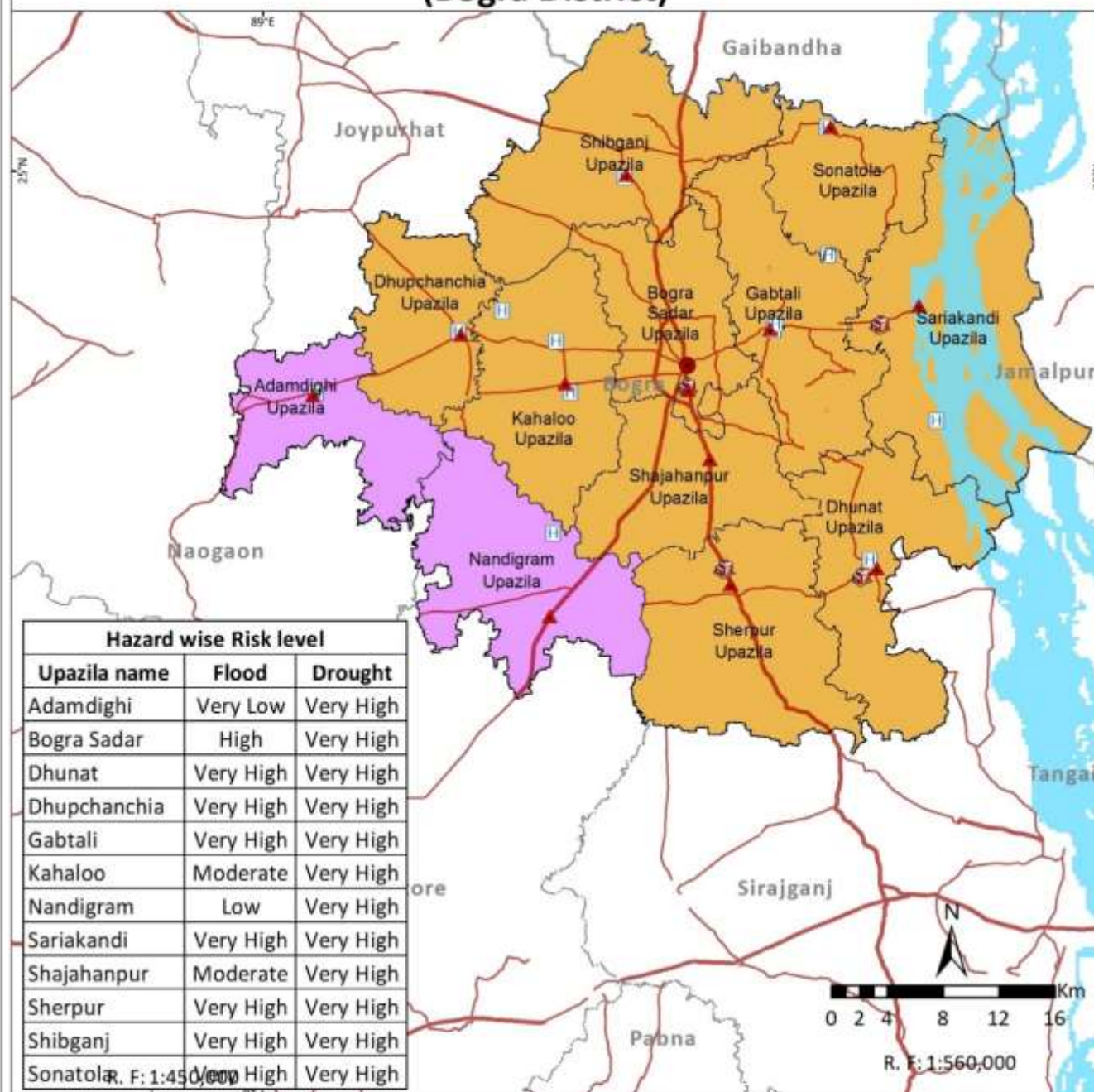


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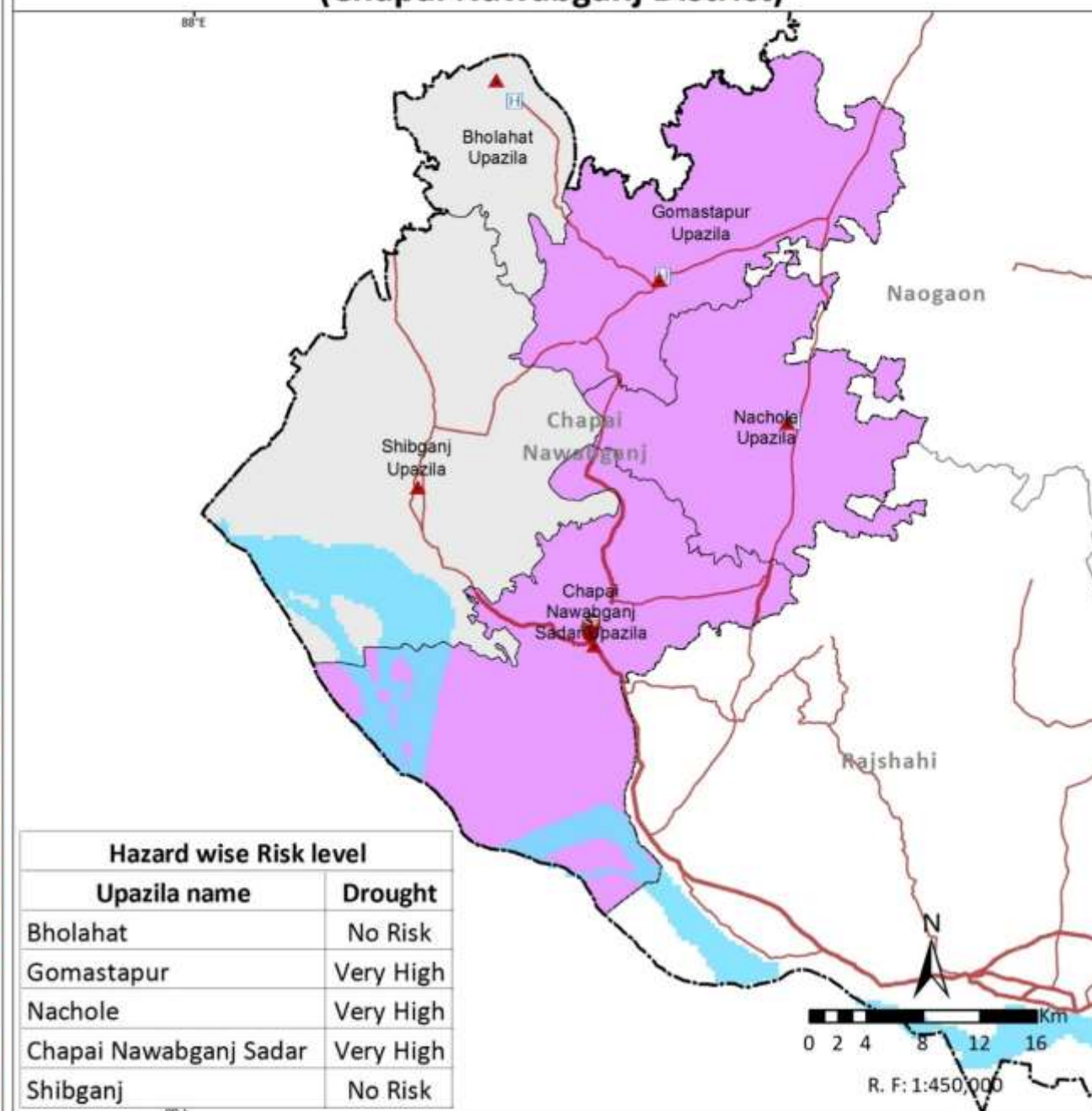




Risk levels of Livelihood (Agriculture) to Multi-Hazard (Bogra District)



Risk levels of Livelihood (Agriculture) to Multi-Hazard (Chapai Nawabganj District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Health Facilities
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood, Drought
- Drought
- Risk level below moderate

Note:

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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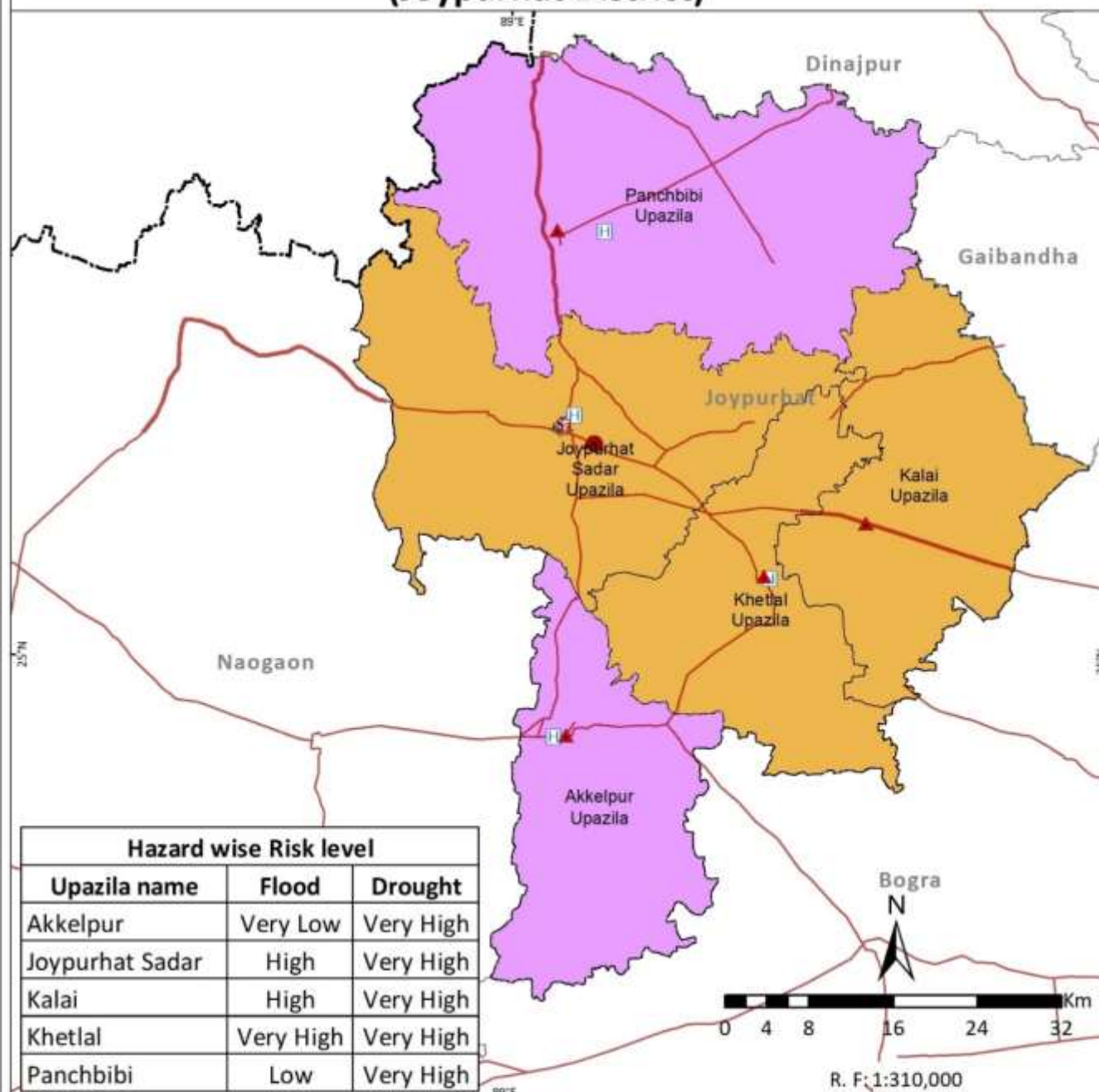
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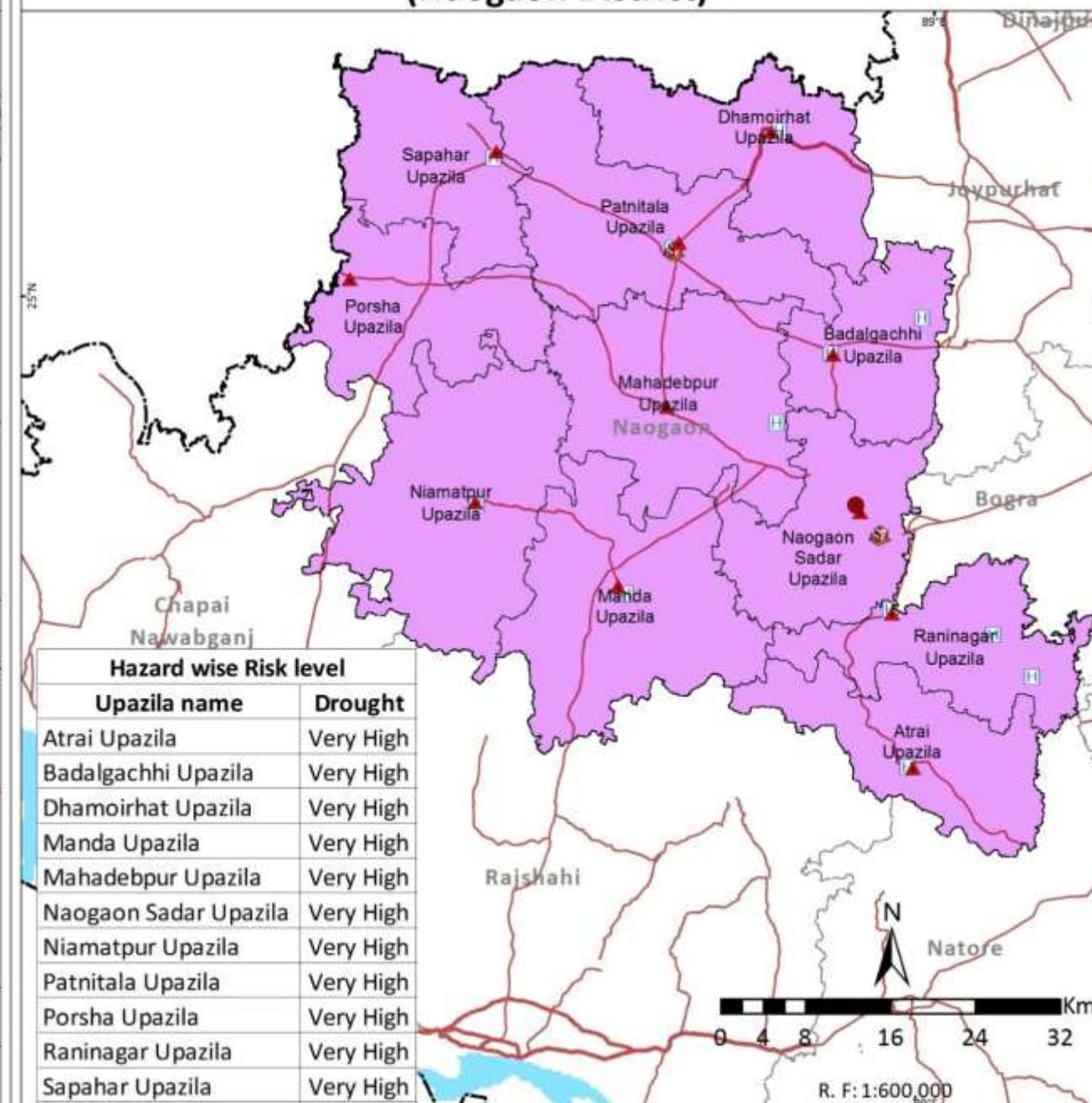
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Risk levels of Livelihood (Agriculture) to Multi-Hazard (Joypurhat District)



Risk levels of Livelihood (Agriculture) to Multi-Hazard (Naogaon District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood, Drought
- Drought

Note:

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

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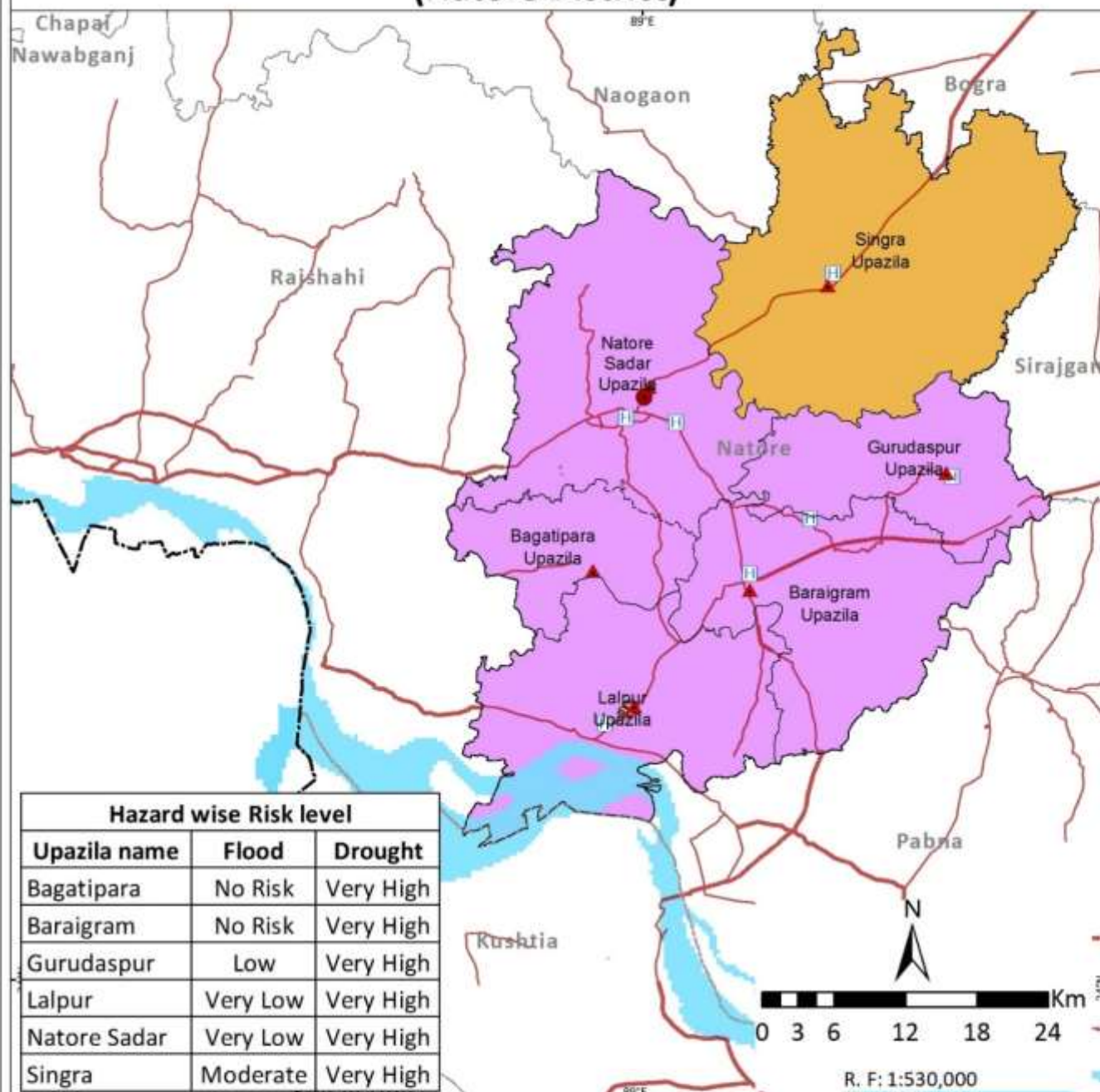
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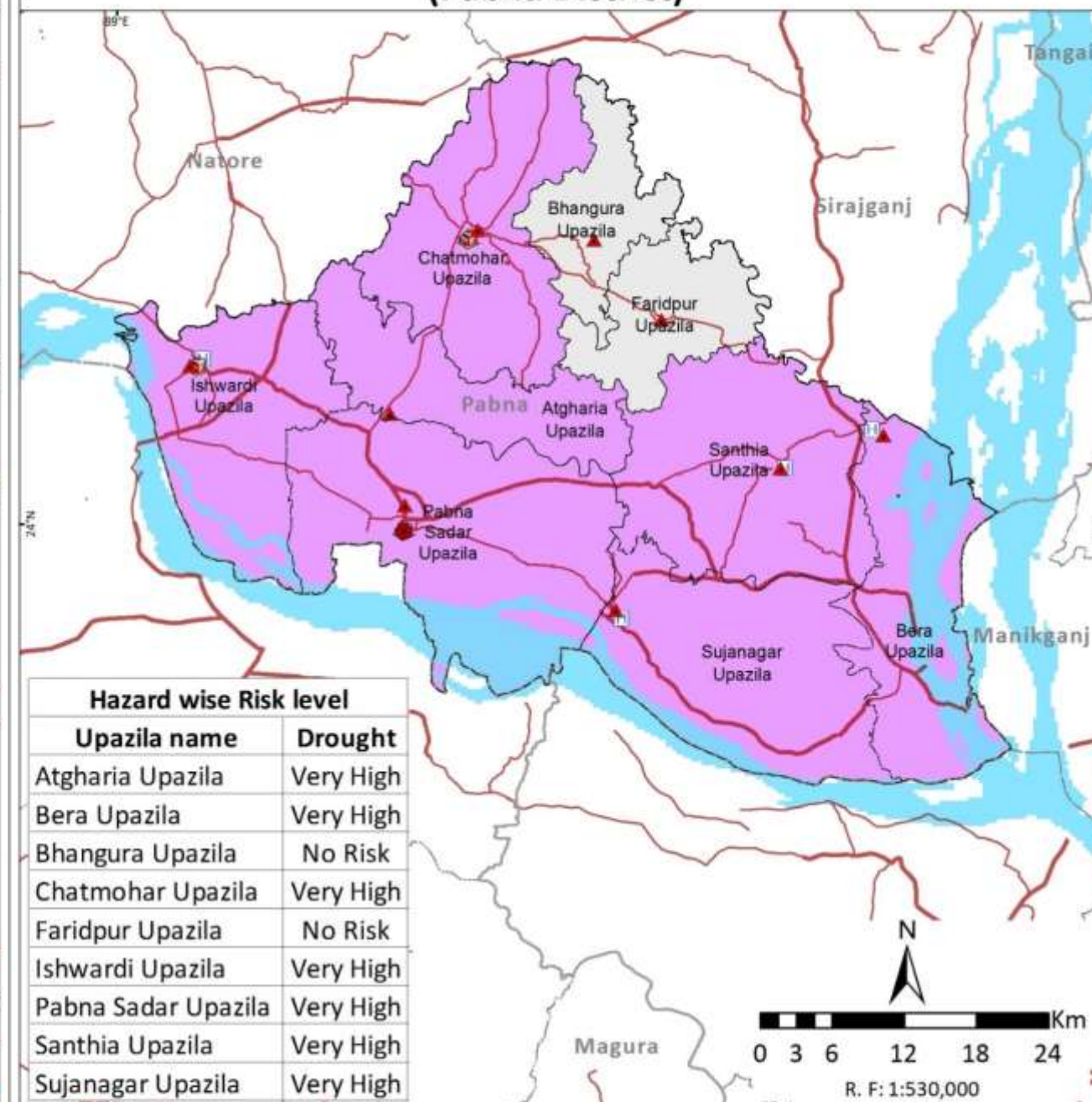
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Risk levels of Livelihood (Agriculture) to Multi-Hazard (Natore District)



Risk levels of Livelihood (Agriculture) to Multi-Hazard (Pabna District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood, Drought
- Drought
- Risk level below moderate

Note:

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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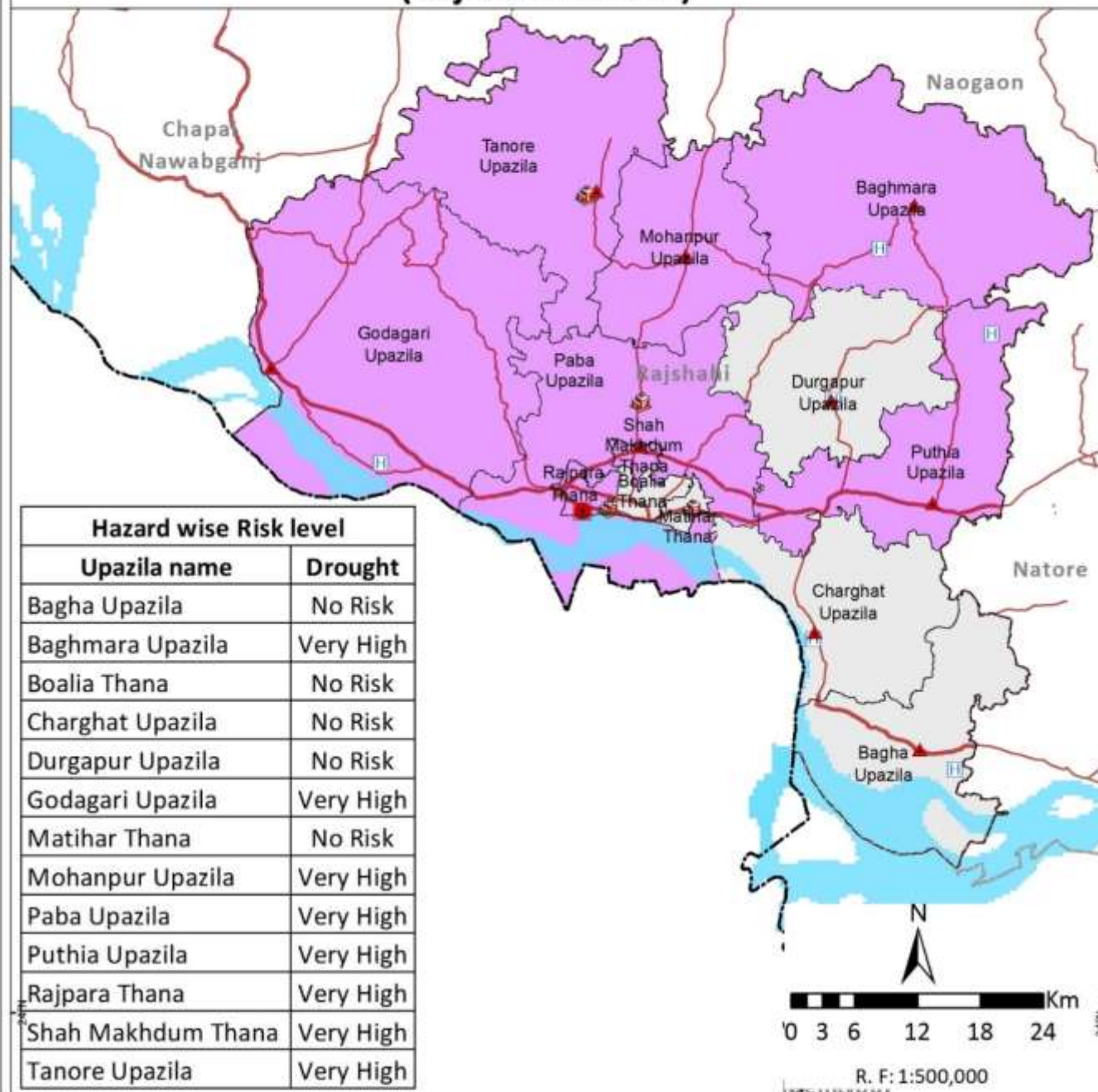
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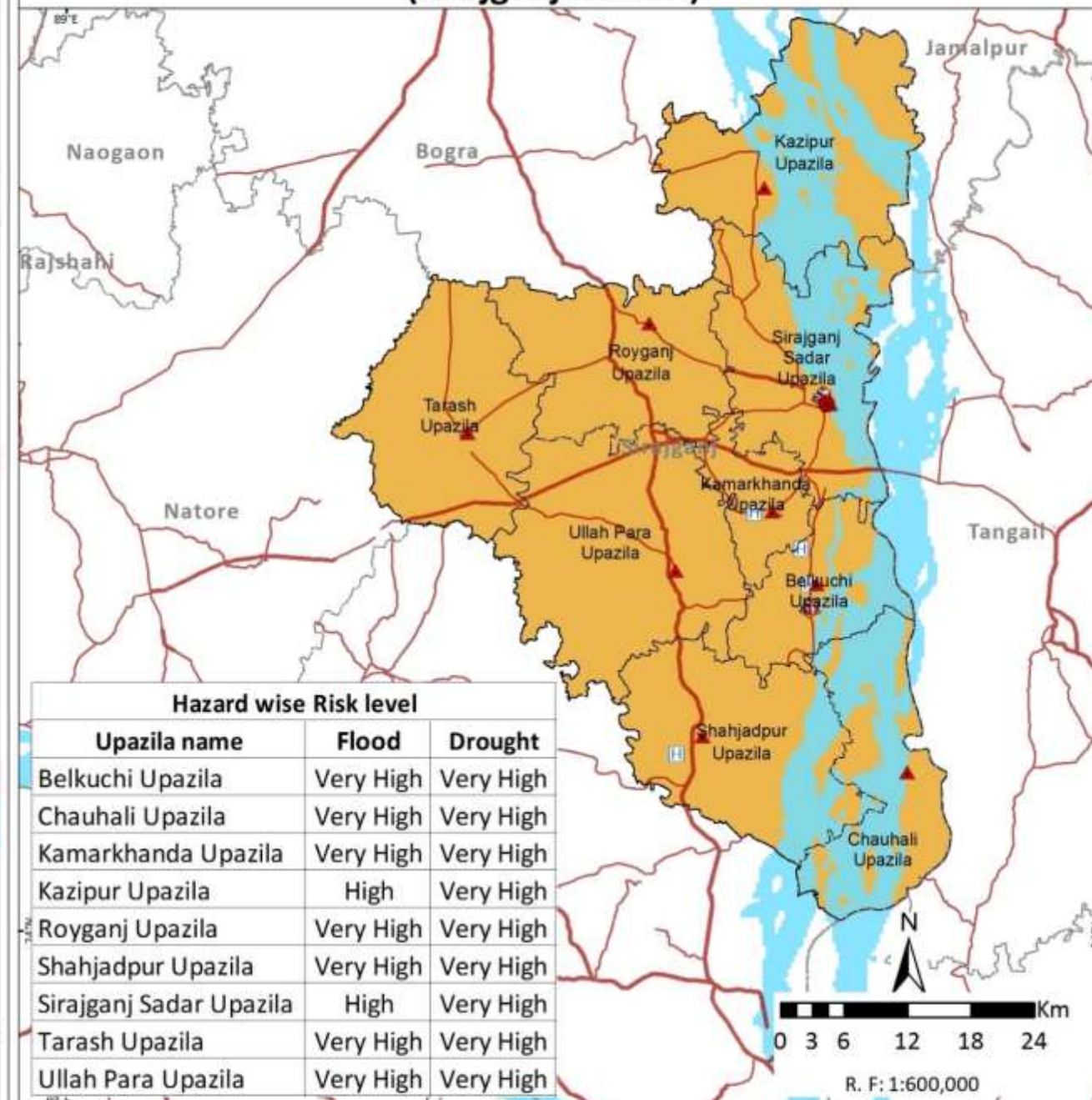
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Risk levels of Livelihood (Agriculture) to Multi-Hazard (Rajshahi District)



Risk levels of Livelihood (Agriculture) to Multi-Hazard (Sirajganj District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- Division Head Quarter
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood, Drought
- Drought
- Risk level below moderate

Note:

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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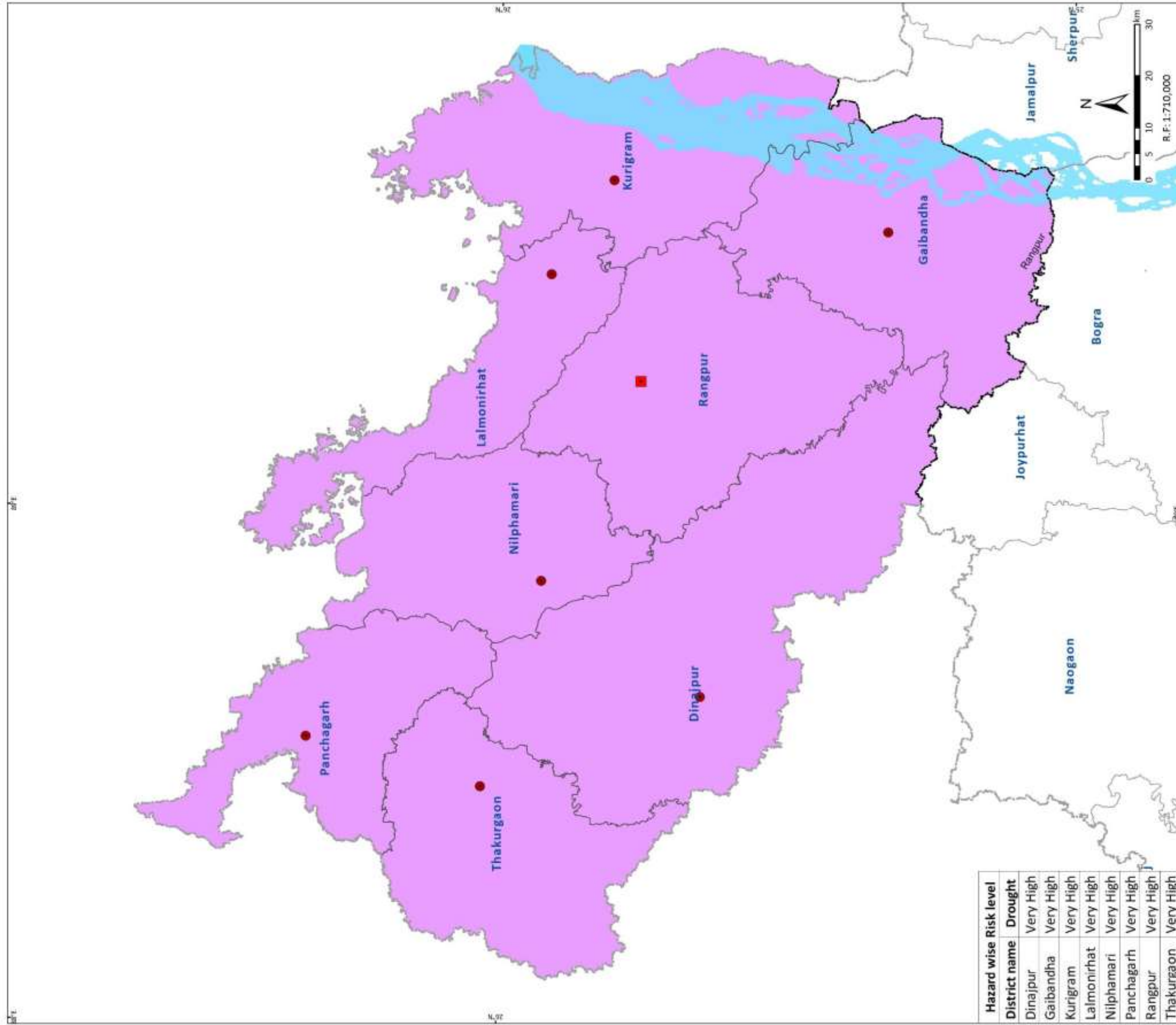


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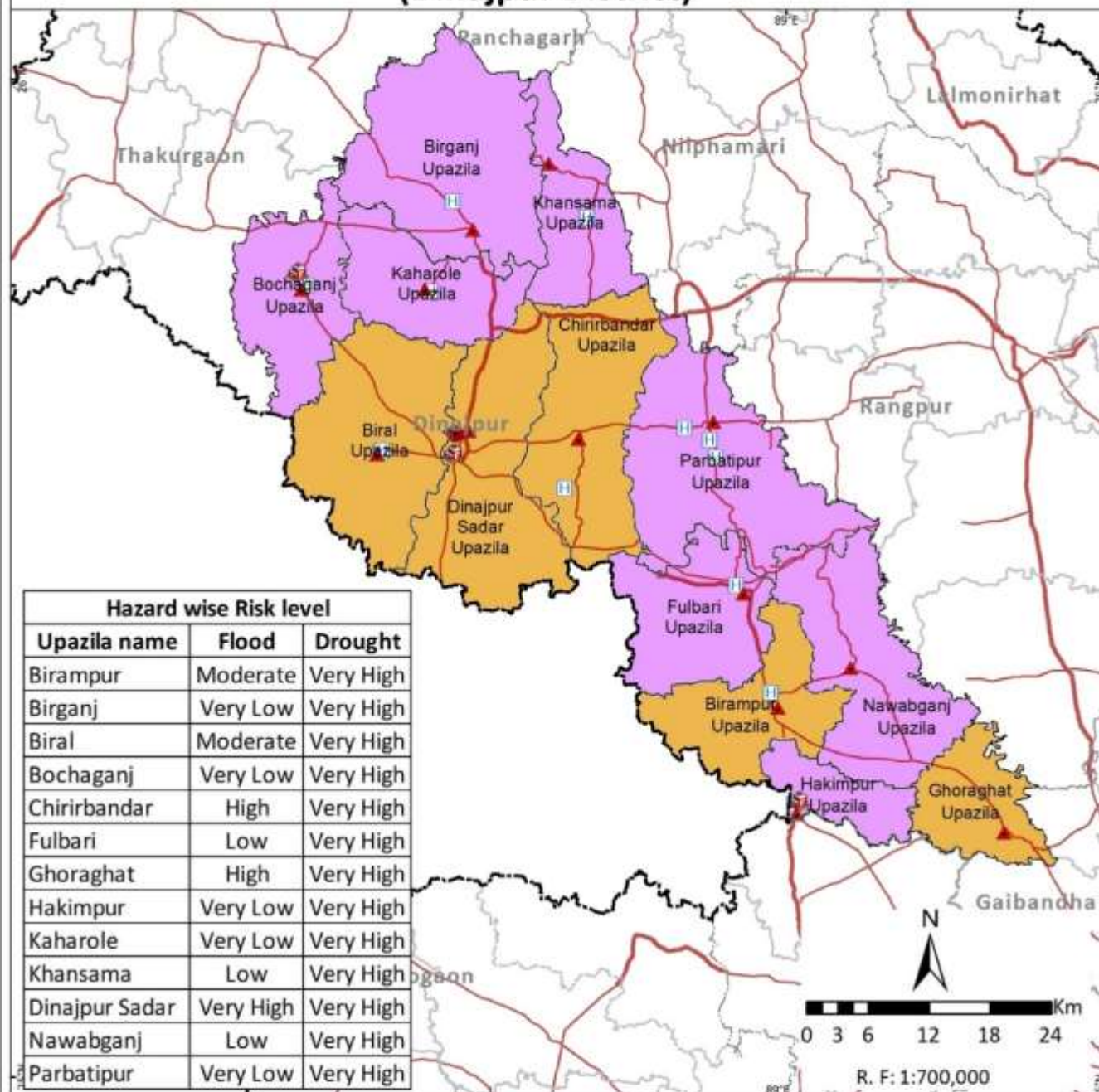
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Risk levels of Livelihood (Agriculture) to Multi-Hazard (Rangpur Division)

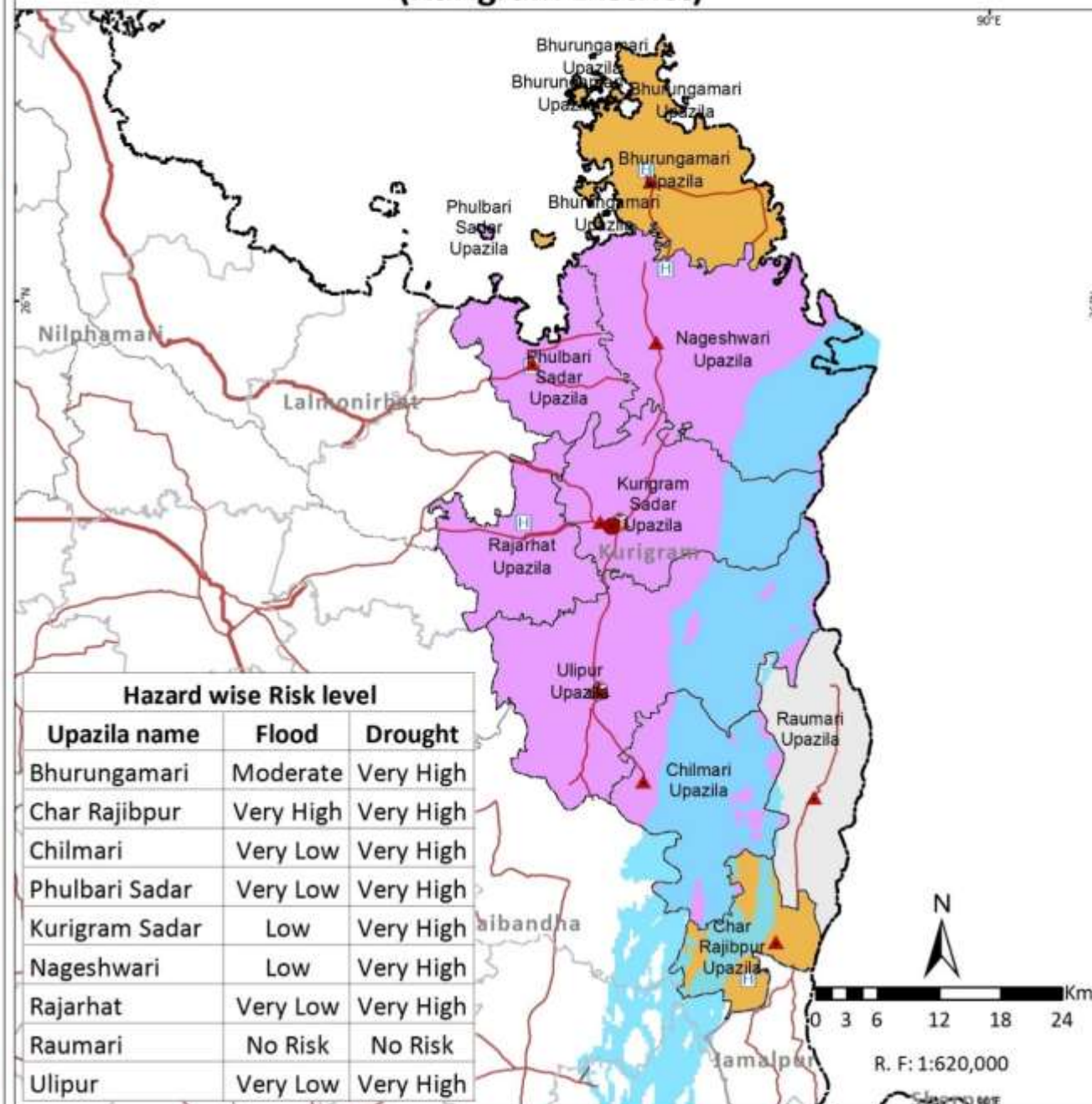




Risk levels of Livelihood (Agriculture) to Multi-Hazard (Dinajpur District)



Risk levels of Livelihood (Agriculture) to Multi-Hazard (Kurigram District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood, Drought
- Drought
- Risk level below moderate

Note:

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

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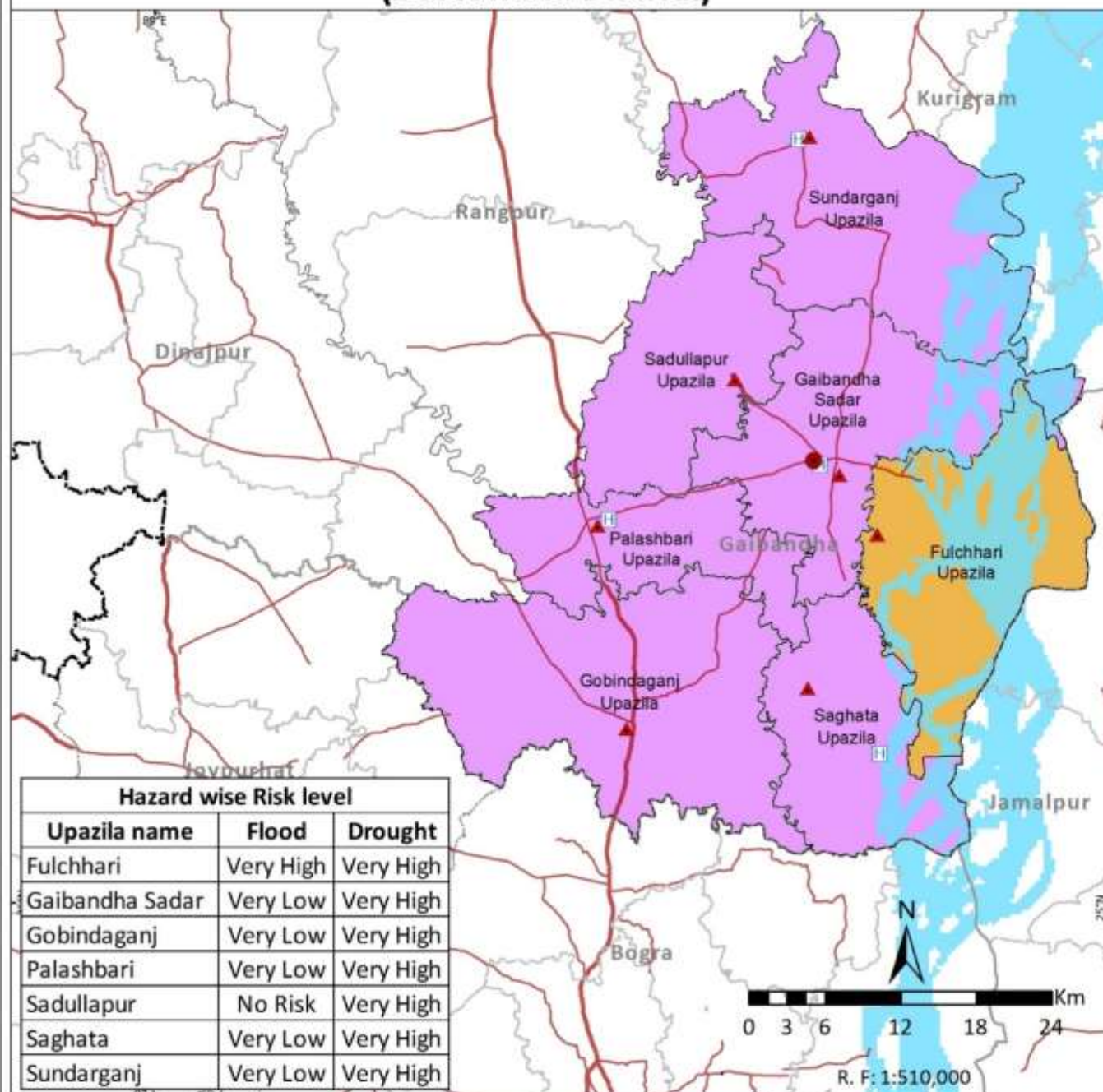
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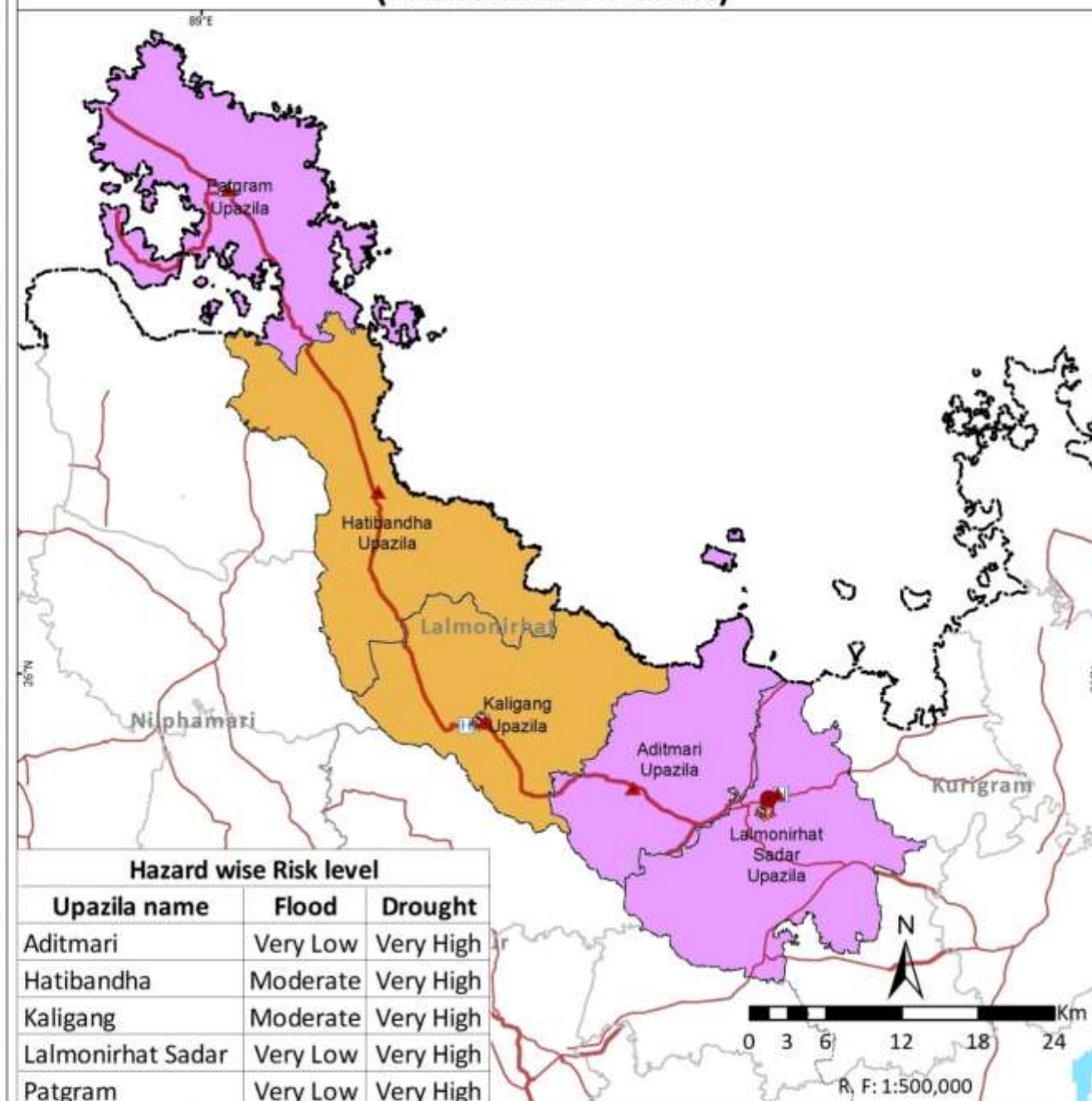
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Risk levels of Livelihood (Agriculture) to Multi-Hazard (Gaibandha District)



Risk levels of Livelihood (Agriculture) to Multi-Hazard (Lalmonirhat District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood, Drought
- Drought

Note:

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

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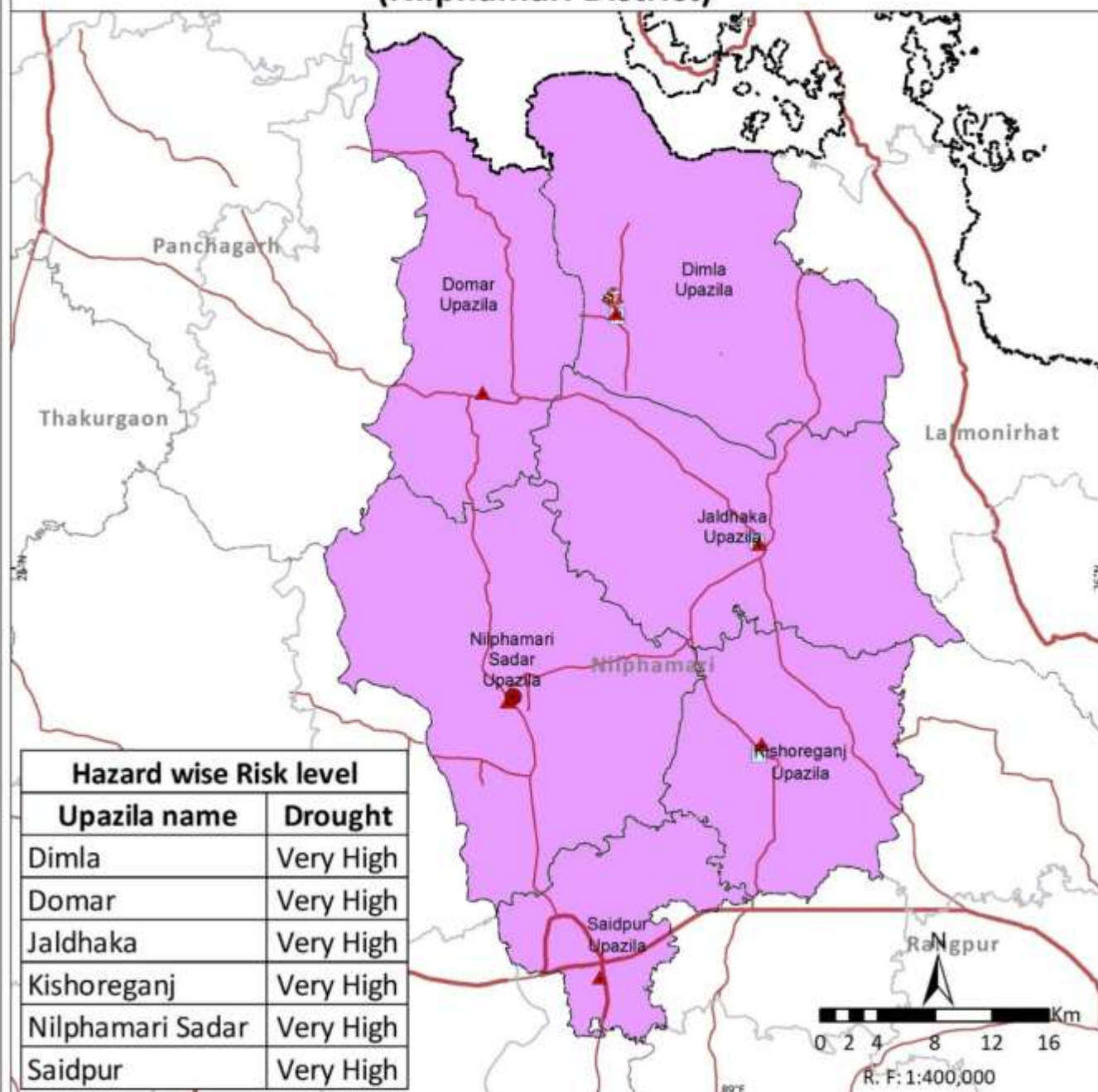
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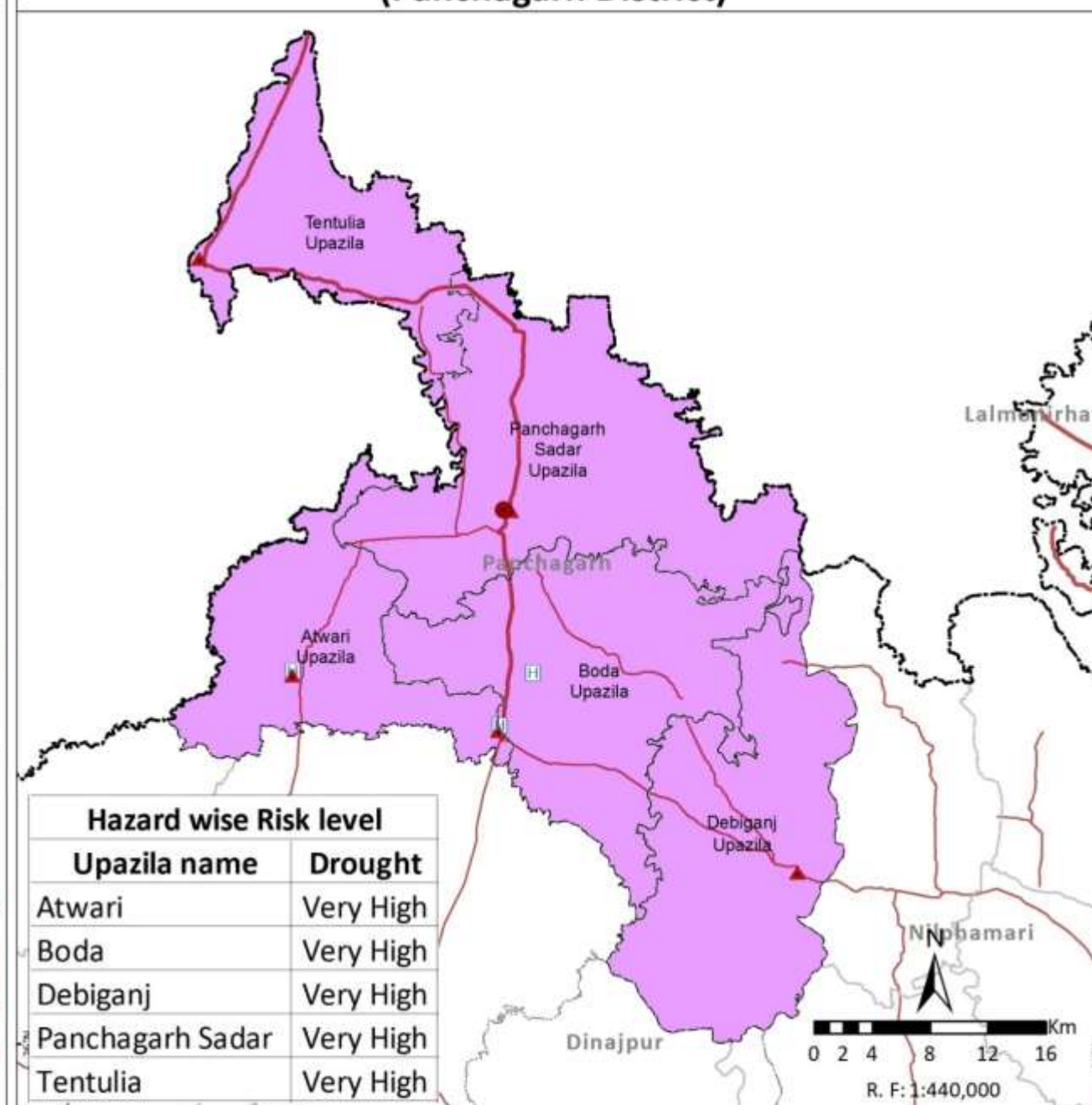
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Risk level of Livelihood (Agriculture) to Multi-Hazard (Nilphamari District)



Risk level of Livelihood (Agriculture) to Multi-Hazard (Panchagarh District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Drought

Note:

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

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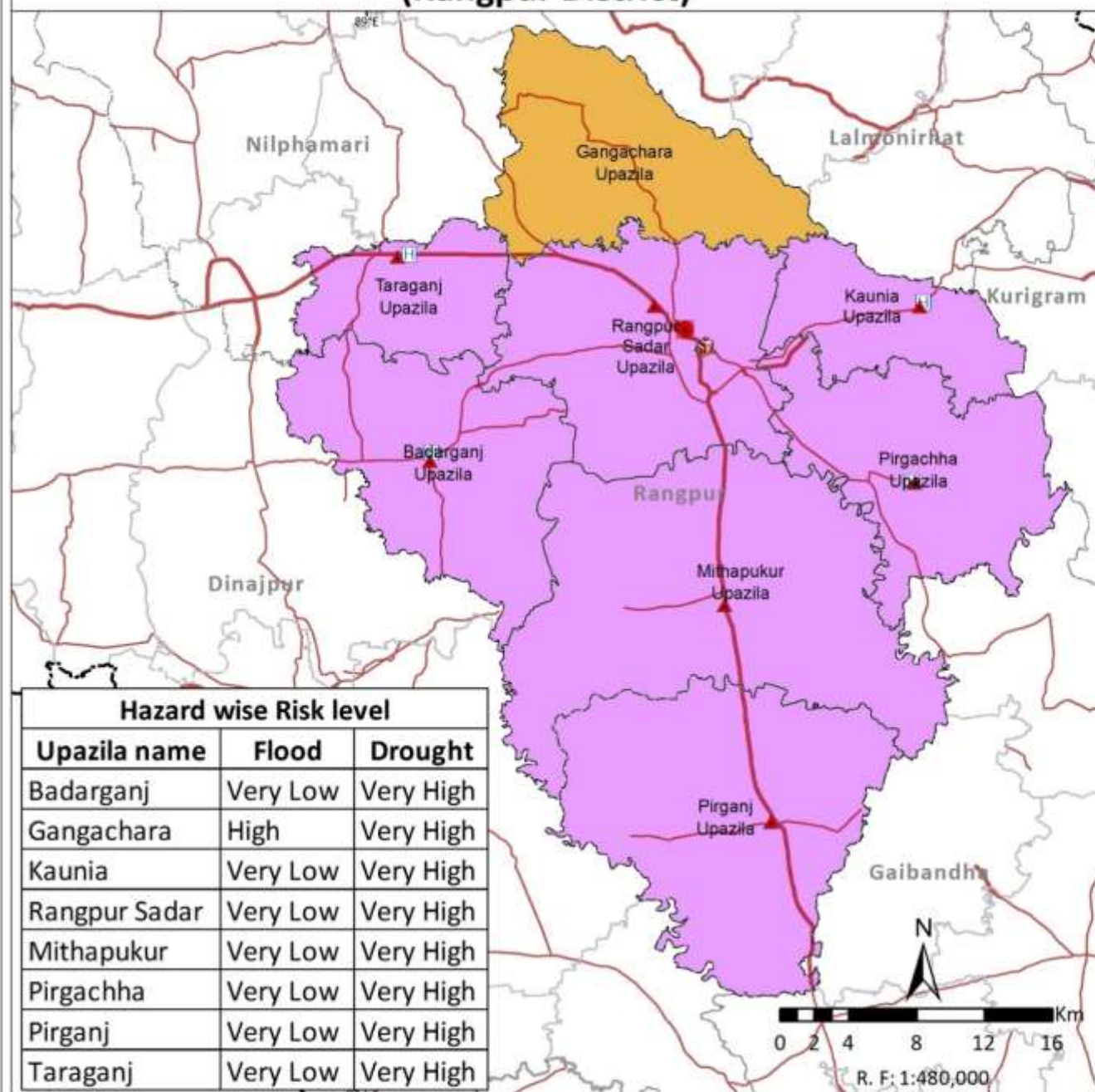
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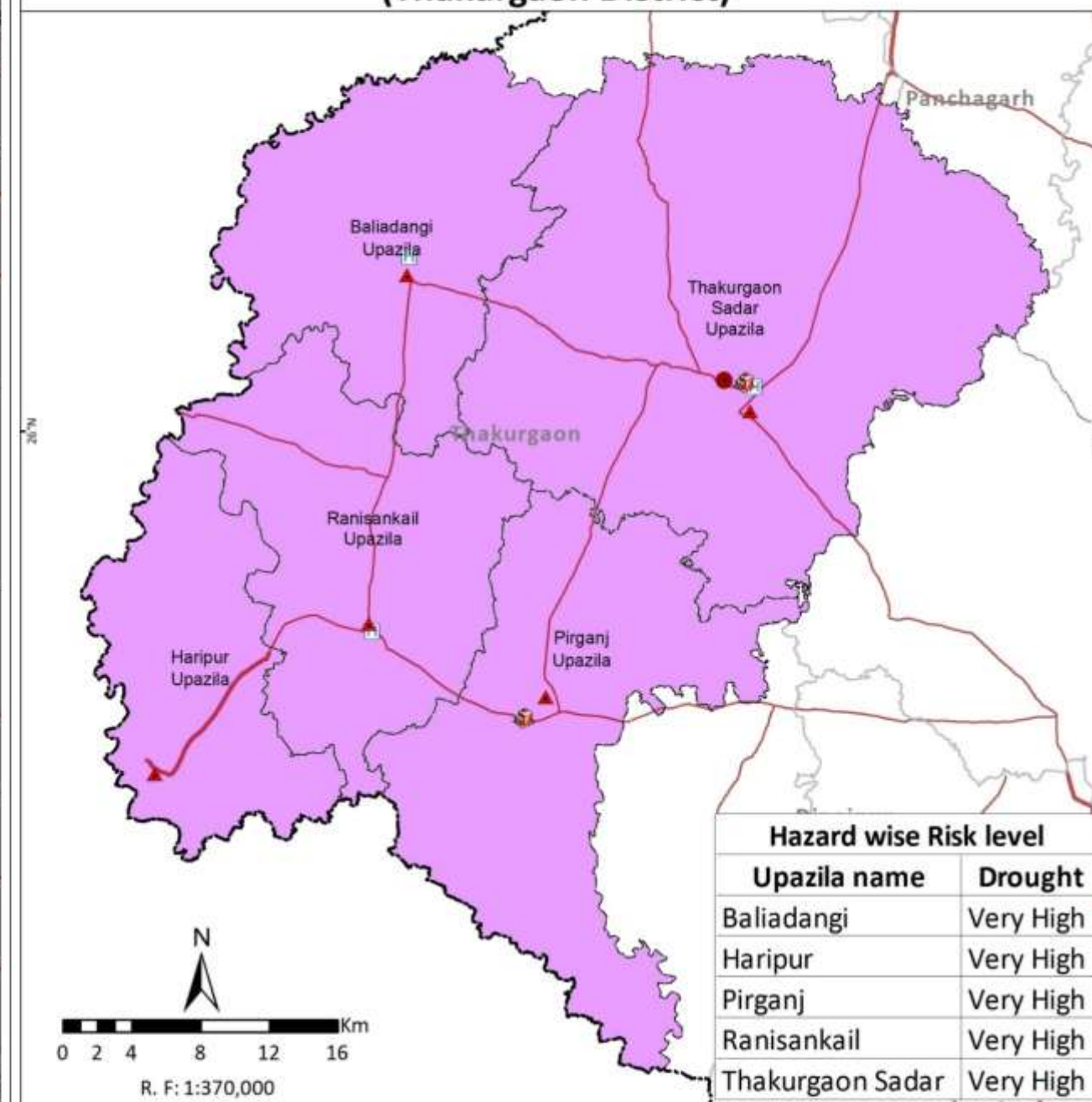
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Risk level of Livelihood (Agriculture) to Multi-Hazard (Rangpur District)



Risk level of Livelihood (Agriculture) to Multi-Hazard (Thakurgaon District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- Division Head Quarter
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood, Drought
- Drought

Note:

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

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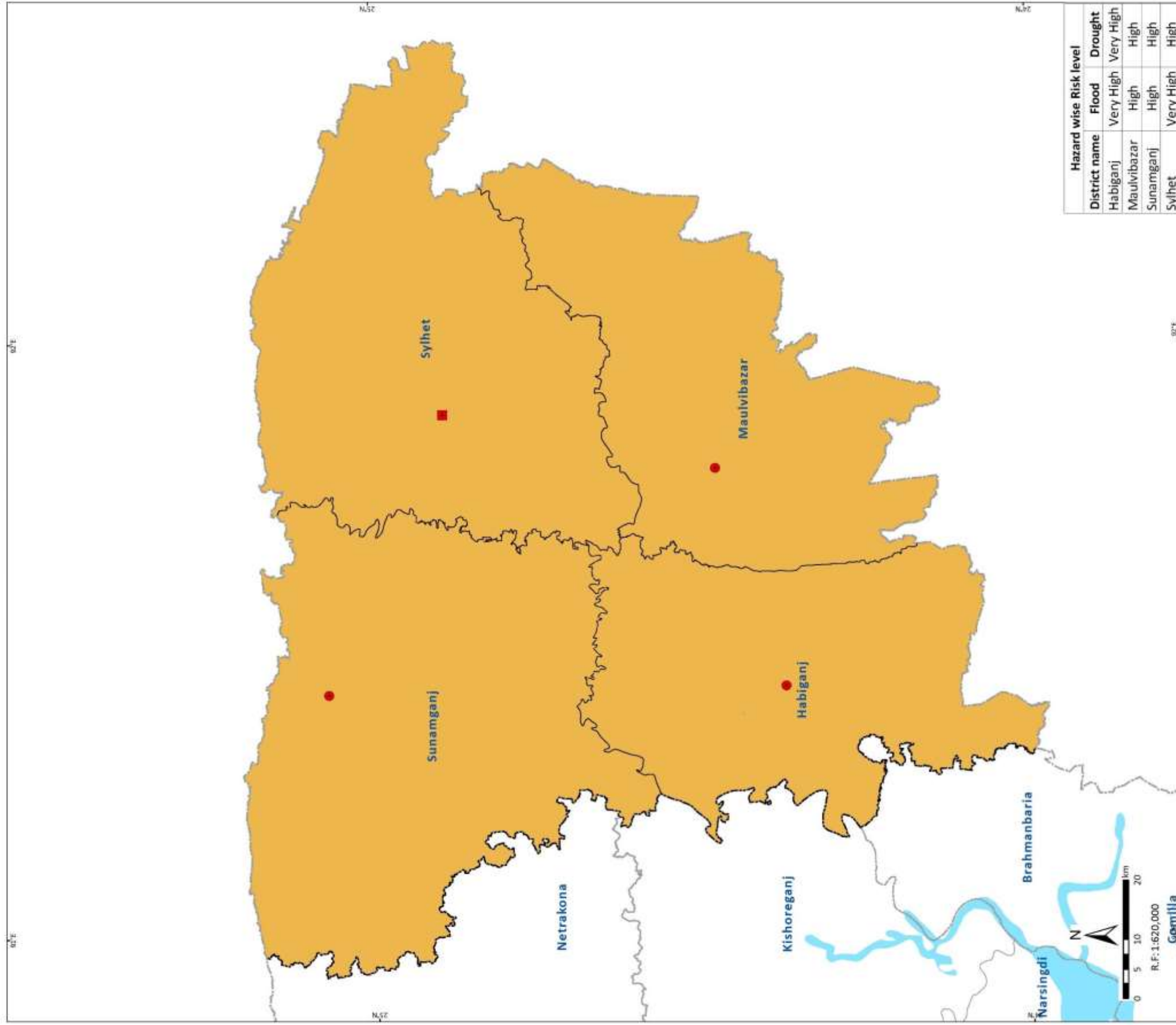


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Risk levels of Livelihood (Agriculture) to Multi-Hazard (Sylhet Division)



Hazard wise Risk level			
District name	Flood	Drought	
Habiganj	Very High	Very High	
Maulvibazar	High	High	
Sunamganj	High	High	
Sylhet	Very High	High	



Note: Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

Data Source: BMD, BWDB, BSS, CDMP-I & II (MODMR), GSB, IWM and WARPO.

Coordinate System: BTM, Datum : Gulshan 303.

Legend

- Country Boundary
- Division Boundary
- District Boundary
- Division Head Quarter
- District Head Quarter
- River/Sea/Lake
- Sundarbans

Multi-Hazard Risk level for Moderate and above category

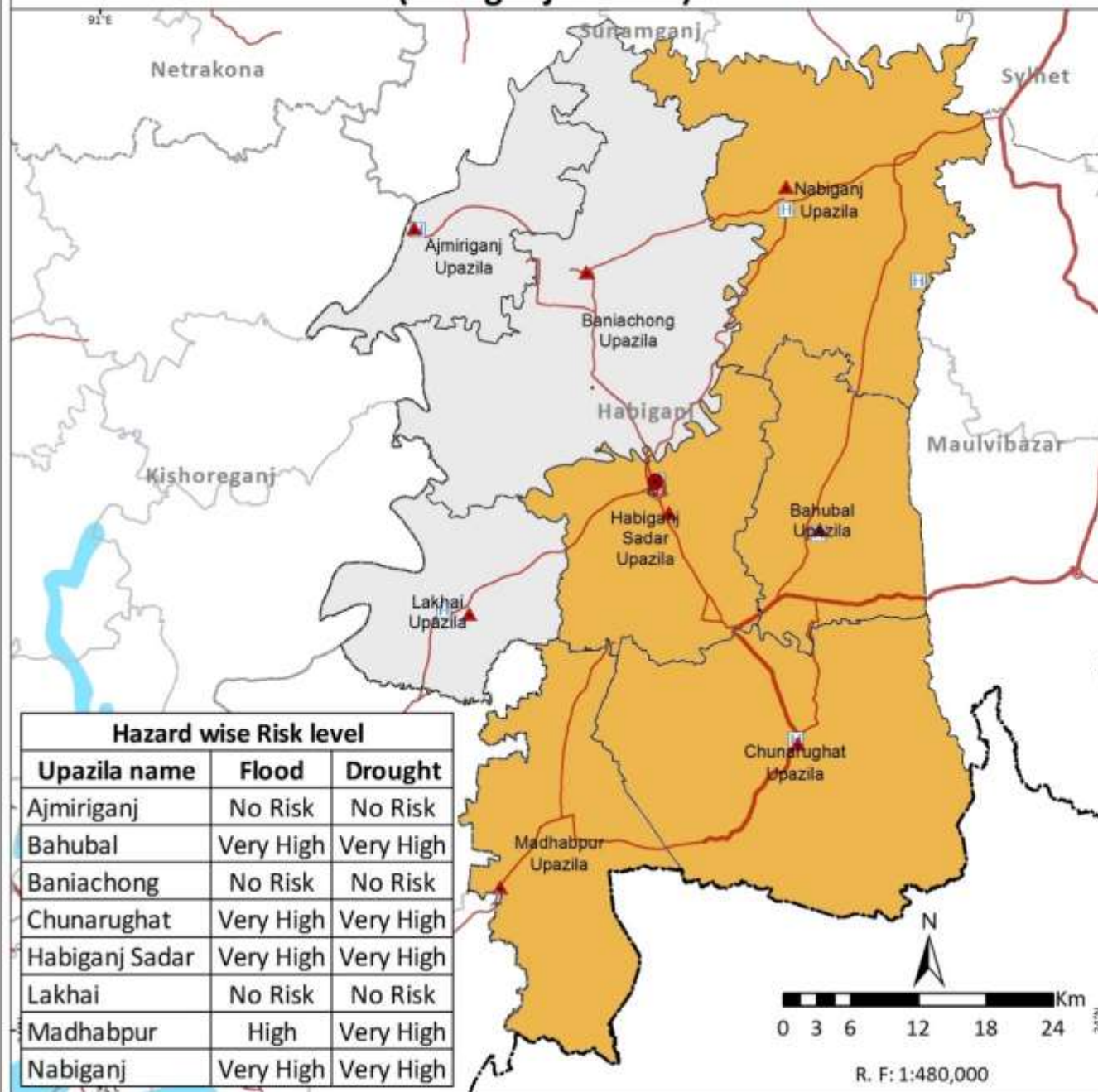
- Flood, Drought

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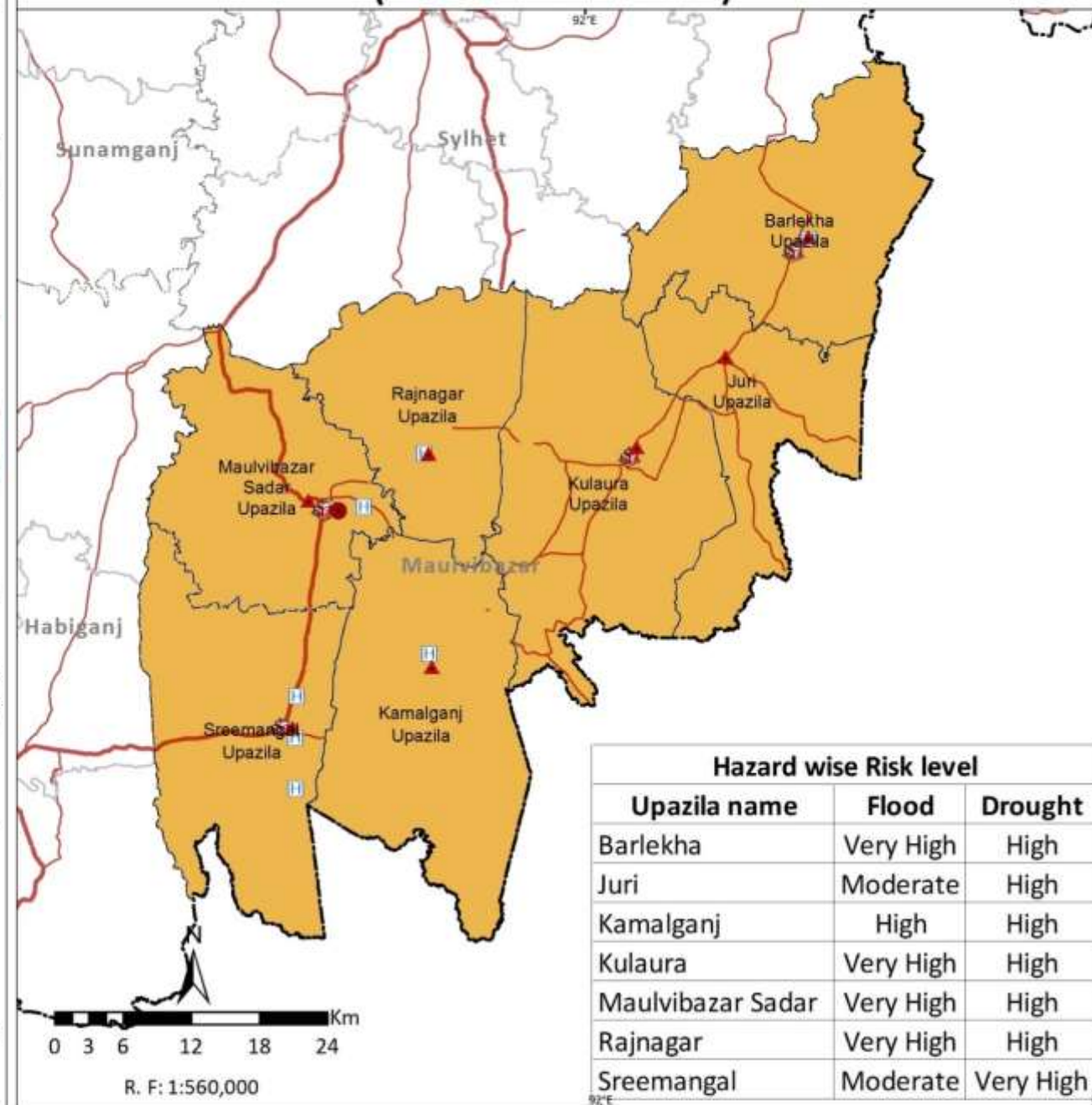
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Risk level of Livelihood (Agriculture) to Multi-Hazard (Habiganj District)



Risk level of Livelihood (Agriculture) to Multi-Hazard (Maulvibazar District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood, Drought
- Risk level below moderate

Note:

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

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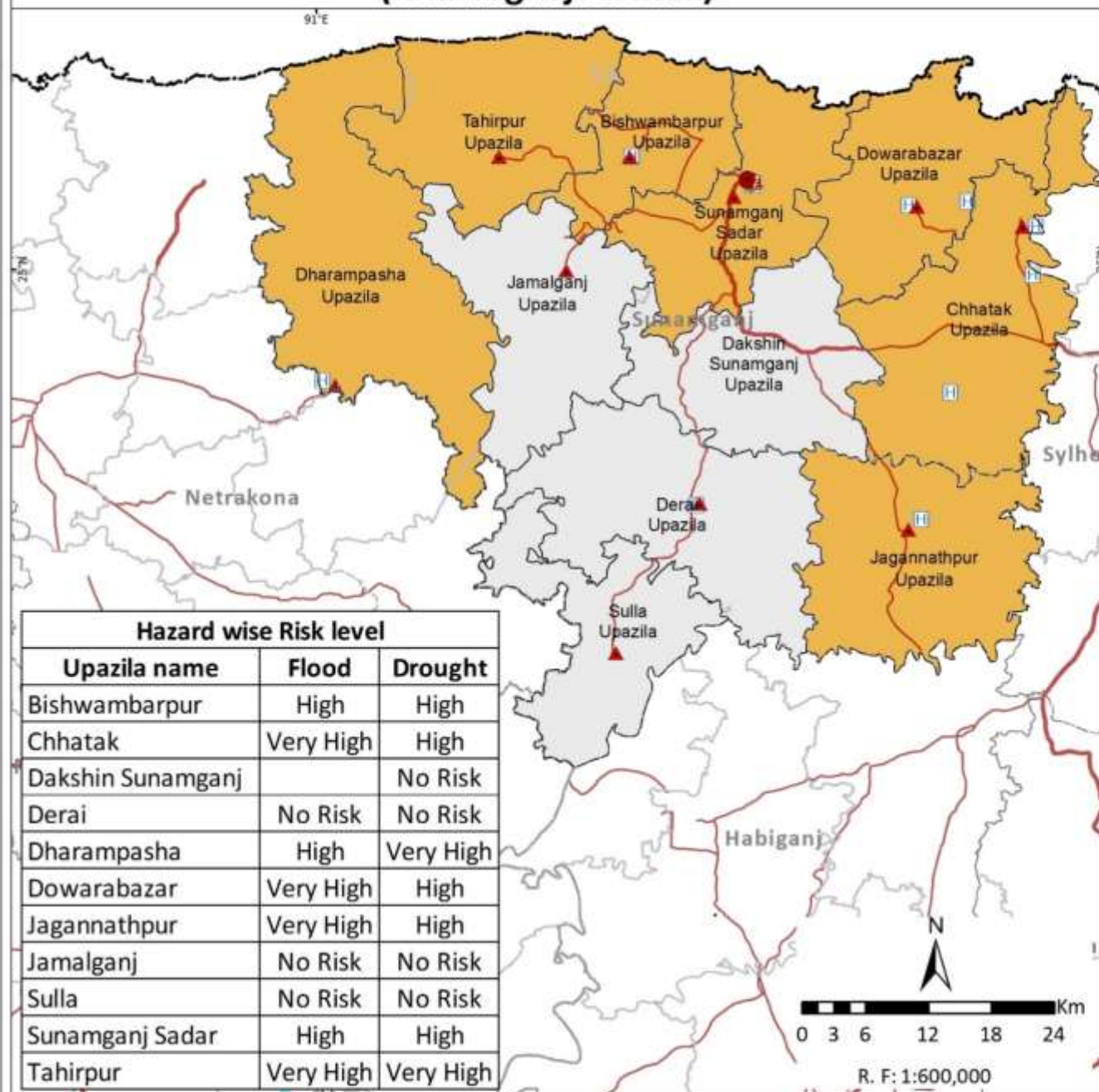
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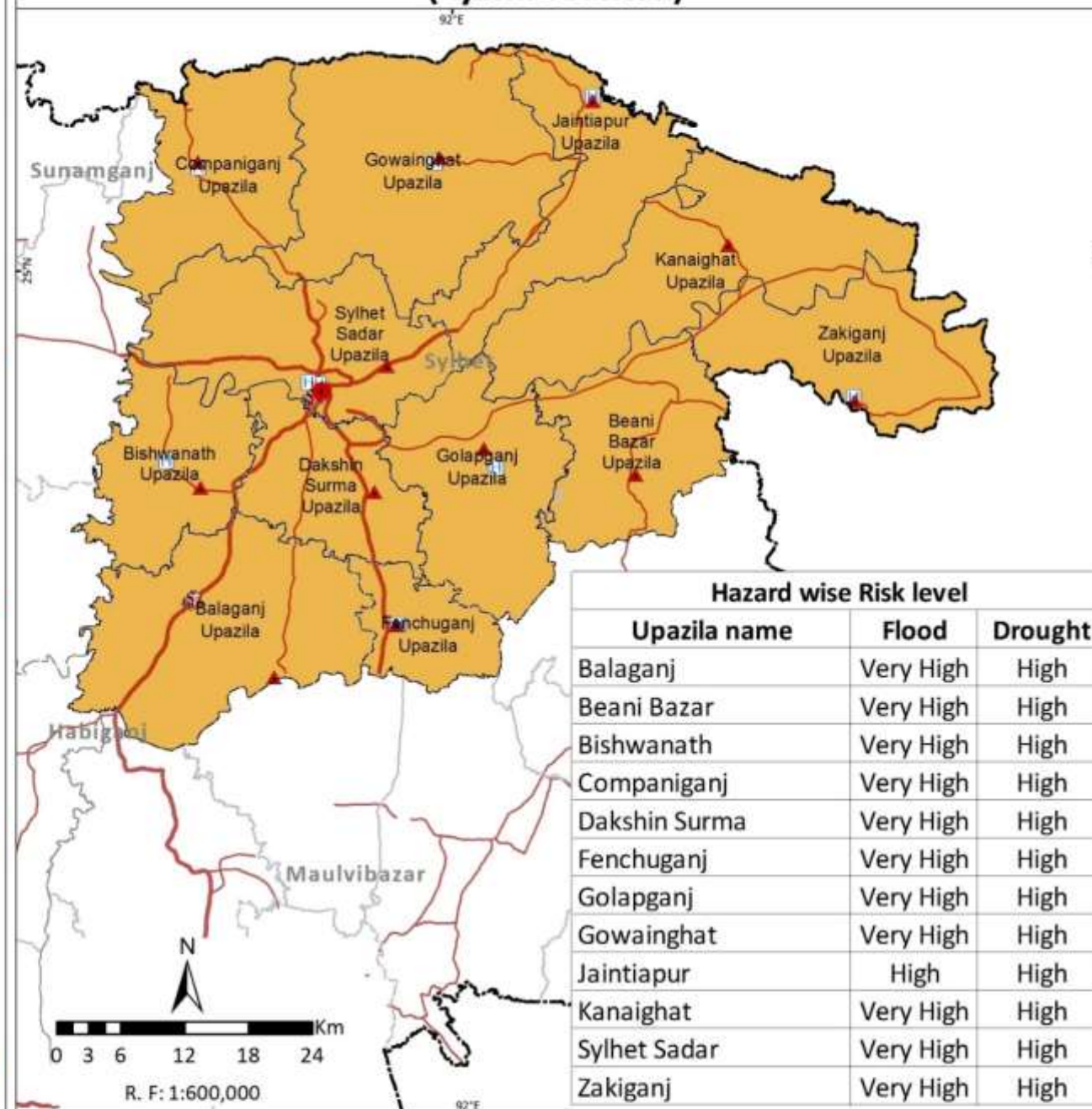
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Risk level of Livelihood (Agriculture) to Multi-Hazard (Sunamganj District)



Risk level of Livelihood (Agriculture) to Multi-Hazard (Sylhet District)



Legend

- Country Boundary
- Division Boundary
- District Boundary
- Upazila Boundary
- National High Way
- Regional High Way
- Division Head Quarter
- District Head Quarter
- Upazila Head Quarter
- Fire stations
- Hospital
- Cyclone Shelter
- River/Sea/Lake
- Sundarbans
- Multi-Hazard Risk level for Moderate and above category
- Flood, Drought
- Risk level below moderate

Note:

Livelihood (Agriculture) existing at upazila level subjected to risk levels of moderate and above to flood, storm surge, drought and tsunami are combined and number of hazards co-existing at upazila level are indicated.

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