District Disaster Management Plan

Banka District, Bihar

Inception Report

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Submitted by
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Executive Summary

Disaster is an event that causes the sudden disruption to normal life of a society and causes damage to property and lives to such an extent that normal social and economic mechanisms available to the society are inadequate to restore normalcy. Disasters are caused by hazards which impact upon vulnerable people, infrastructure, assets, and environment. As per Disaster Management (DM) Act, 2005 "*Disaster means a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or man-made causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of property, or damage to, or degradation of environment and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected areas*." A number of special programs are in operation in the State and districts of Bihar for mitigating the impact of natural disasters and local communities have developed their own indigenous coping mechanisms.

As per DM Act, 2005, it is mandatory to develop disaster management plans at various levels viz., Districts, State and the National levels. The multi-hazard prone State of Bihar requires multi-pronged strategies with appropriate DM mechanisms and well structured involvement of various stakeholders. The Bihar State Disaster Management Authority (BSDMA) has initiated the process of preparing DDMPs for all the Districts of Bihar. RMSI has been entrusted to prepare DDMPs for four districts namely Banka, Begusarai, Bhagalpur, and Khagaria.

RMSI will involve the District Disaster Management Authorities (DDMA) of the respective districts who are the implementing agencies for all disaster management related programs and activities; be it prevention, mitigation and preparedness related or disaster response, relief or post-disaster rehabilitation or reconstruction measures. The ownership of the DDMP lies with them as well as all the concerned stakeholders in the District. The comprehensive DDMP will be prepared largely by following the guidelines of NDMA, sample DDMP of Madhubani, and approved format. The plan will be prepared taking into consideration the lower administrative units below District i.e. Block and Panchayat levels for considerable interventions in case of disasters.

RMSI will adopt a consultative approach by involving all the concerned stakeholders and line departments in the district with close coordination with the respective district administration. The project activities in the district will be carried out under the overall advisory support of the resource persons appointed by BSDMA for the districts to the respective consulting agencies.

The methodology adopted by RMSI will include secondary data collection from various Government Departments of the State and districts; understanding district profile based on basic data related to physiography of the region, socio-economic data of district; analysis and development of hazard and vulnerability profile and maps of the district; identification of current as well as potential risks involved in these districts in terms of various hazards such as flood, drought, earthquake, windstorm, heat waves, fire, accidents, etc. The past experience and understanding of various NGOs and communities in terms of disaster will also be incorporated to identify the potential risks involved. Matrix-based analysis will be conducted considering historical hazard data of the district and current and potential risks. GIS maps will be developed for each District showing the current and potential multi-hazard risks in the district at Block/Panchayat level. Mainstreaming of DRR concerns into developmental plans will also be taken into consideration for DDMP.

All such analysis and information collected from various line departments during the project execution will be incorporated in the DDMP document of Banka District consisting of two volumes – DRR plan (volume 1) and District Response Plan (volume 2).

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Abbreviations Used

Abbreviation	Expanded Form
BSDMA	Bihar State Disaster Management Authority
CBDRM	Community Based Disaster Risk Management
CCA	Climate Change Adaptation
DM	Disaster Management
DDMA	District Disaster Management Authority
DDMP	District Disaster Management Plan
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
NDMA	National Disaster Management Authority
HVCA	Hazard Vulnerability Capacity Assessment
SOP	Standard Operating Procedure
ULB	Urban Local Body

1 Introduction

As per Section 31 of the Disaster Management Act, 2005 (DM Act) India, District Disaster Management Authority (DDMA) of each district in the country shall prepare District Disaster Management Plan (DDMP), which is to be approved by the State Disaster Management Authority (SDMA). It is to be reviewed and updated annually. Considering all these, the Bihar State Disaster Management Authority (BSDMA) has initiated to prepare DDMPs for all Districts of Bihar. RMSI is preparing DDMP of Banka District.

To enable a uniform framework for preparation of DDMPs in accordance with the mandated provision of DM Act, National Disaster Management Authority (NDMA) has prepared "Model Framework for preparation of DDMP". Following the sample DDMP of Madhubani given by BSDMA, RMSI will prepare DDMP of Banka District. DDMP will include Disaster Risk Reduction (DRR) Plan describing areas vulnerable to different forms of hazards in the district and measures to be taken for prevention, mitigation, capacity building, and preparedness. It will also include District Response Plan describing the procedures for allocation of responsibilities to the Government Departments at the district level and the local authorities for prompt response to disaster and relief thereof in the event of a disaster.

During the last one decade, there is a paradigm shift in approach of disaster management from relief mode to a more proactive way of disaster preparedness. DDMP will enable the districts and other administrative bodies to take proactive measures towards prevention, mitigation, preparedness for rehabilitation, and reconstruction and recovery against disasters. This also reinforces the national vision of building a safer and disaster resilient India by developing a holistic, proactive, multi-disaster and technology driven strategy for Disaster Management (DM) with a bottom up approach.

DM has several components in which relief is just a linking part of for development. However, at the same time, it is noticeable that none of these components in disaster management cycle is a watertight compartment. If disaster is handled more proactively with the perspective of long-term development and sustainability, the quantity of relief required could be reduced substantially.

Figure 1-1 Disaster Management Cycle

(Source: NDMA)

The multi-disaster prone State of Bihar requires a multi-disciplinary approach to deal with these disasters. This also demands active participation of various stakeholders. It requires a continuous and integrated process of planning, organizing, coordinating, and implementing measures that are necessary for prevention, mitigation, and preparation to face any disaster event and to respond, rehabilitate and reconstruct in post-disaster scenarios. Thus, it is important to put a plan in place for dealing with disasters in an organized way with all the stakeholders being well aware of their roles and responsibilities in responding to or preparedness for facing disasters.

1.1 The Study Area

RMSI is preparing DDMP of Banka District (Figure 1-2).

Figure 1-2 District under Study

Administratively, Banka District comes under Bhagalpur Division of Bihar. Normal precipitation varies from 990 to 1,700 mm in the District and the average rainfall is 1,200 mm. Most of the precipitation is received between July to September months (south west monsoon period). Being located between 25 to 27 degree North latitude the climate of Bihar is of mostly sub-tropical. Nevertheless, region close to Tropic of Cancer experiences tropical climate during summer. Like most Indian States, Bihar also reels under a hot summer during the months of March to May. Average temperature is 35-40 degrees Celsius throughout the summer months. April and June are the hottest months of the year. December to January are the coldest months in the State is mild with average temperature being 5 to 10 degrees Celsius.

Based on soil characterization, rainfall, temperature, and terrain, four main agro-climatic zones in Bihar have been identified each with its own unique characteristics. Banka District falls under Agro-Climatic Zone IIIA (Southern East). Agro climatic Zone III is located south of the river Ganges. Zone III is drought prone. These Districts also face various other hazards

apart from flood and drought such as earthquake, cyclone, cold waves, chemical hazard, fire hazard, etc (Table 1-1:).

Table 1-1: Hazard Frequency-matrix in the Study area

Hazard	Jan	Feb	March	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Flood							✓	✓	✓			
Earthquake	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Drought	✓	✓	✓	✓				✓	✓	✓	✓	✓
Cyclone/ Windstorm				✓	✓	✓						
Cold wave	✓											✓
Chemical	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fire	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

(Sources: http://disastermgmt.bih.nic.in/ and http://begusarai.bih.nic.in/dmanagement.htm)

1.2 Organization of the Report

The report consists of nine chapters and appendices as follows:

Chapter 1: Introduction (this chapter)

Chapter 2: Conceptual Framework

Chapter 3: Scope of the Project

Chapter 4: District Profile

Chapter 5: Approach, Methodology, and Activities

Chapter 6: DDMP Preparation, Planning and Reporting Mechanism

Chapter 7: Project Timeline and Delivery Schedule

Chapter 8: Monitoring and Evaluation System

Chapter 9: Project Team

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Appendix 1: List of key stakeholders and line departments proposed for meeting

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2 Conceptual Framework of DDMP

2.1 Futuristic Plan with Historical Perspective

Historical events of natural hazards such as flood, drought, earthquake, cold and heat waves, cyclonic storms/high-speed winds and other human-induced hazards like fire, epidemics, road / boat accidents, stampedes etc. of the district will be mapped and analyzed. Though incidences of fire are mainly local in nature, they have a severe impact on villages. Majority of villages have kuchcha houses, which have thatched roofs and wooden structures. In the summer months, when winds blow at high speed, fires from the traditional stoves risk the entire village.

Since Bihar is a multi-hazard prone State, a futuristic plan is needed to deal with any such situation arising due to disasters - natural or man-made. RMSI will carry out frequency analysis of the historical hazard events over time as well as hazard versus loss (human/livestock) over time to understand the trends. This will provide a way forward to a futuristic DDMP prepared after taking historical hazard events of the district into consideration.

2.2 Understanding about DDMP (Multi-Hazard Focus)

The multi-hazard prone state of Bihar requires multi-pronged strategies with a clear-cut disaster management mechanism to deal with these disasters. Involvement of various stakeholders is very much required in the DDMP preparation process. DDMP, an action document, will guide in:

- Continuous and integrated process of planning;
- Setting agenda for organizing, coordinating and implementing measures that are necessary for risk prevention and mitigation measures; and
- Helping all the concerned stakeholders in preparing to face disaster events, by providing timely and effective response, rehabilitation, and reconstruction.

The basic objectives of the DDMP document are as follows:

- Institutionalization of Disaster Management in district administration
- Encouraging a culture of disaster preparedness in the district
- DRR and disaster mitigation through better planning process
- Creation of better mechanism to handle any unprecedented disaster events
- Instant response and effective decision making during disasters
- Better coordination of relief and rehabilitation in the aftermath of a disaster
- Better coordination of all line departments in disaster management
- Encouraging and empowering the local community to own DDMP and inculcate disaster management planning in day to day life

As per DM Act 2005, the District Disaster Management Authority (DDMA) of the respective district is the implementing agency for all disaster management related programs and activities; be it prevention, mitigation and preparedness related or disaster response, relief or post-disaster rehabilitation and reconstruction measures. Disaster management plan is the document owned by the respective district administration as well as all stakeholders of disaster management. It neither is a confidential document nor restricted to any particular section or department in the administration. The basic underlying principle of Disaster Management is that it has to be part of all the concerned departments and stakeholders.
The DDMP is the sum of the horizontal and the vertical disaster management plans in the district. Horizontal plans include the specific plans prepared by line departments such as Police, Fire Services, Municipal Corporation/ Municipality, Civil Defence, Department of

Food and Civil Supplies, Public Works Departments etc. On the other hand, the Vertical plans include Sub Divisional Plans, Community Plans, School/Hospital plans, and plans of all other logical units at the lower level and State Disaster Management Plan and National Disaster Management Plan at the higher level.

2.3 Identifying Current and Potential Risks

Actually, in real terms, there is no natural disaster. It is natural activity, which interfaces with life and property. Natural disasters happen because we do not plan ourselves keeping natural activities in mind. It is due to low capacity of our infrastructure, wrong settlement pattern, and intrusive anthropogenic activities that lead to convert natural activities into natural disasters.

The level of risks to be caused is directly related to:

- Magnitude of the hazard
- Frequency of hazard or recurrence
- Intensity at the impact point
- Exposure to the hazard
- Density of Population
- Capacity of the community and infrastructure
- Settlement pattern
- Seasonality and the timings of the occurrence of the events
- Level of disaster preparedness

RMSI will identify current as well as potential risks involved in these districts in terms of various hazards such as flood, drought, earthquake, windstorm, heat waves, fire, accidents, etc. Detailed analysis will be undertaken in consultation with the concerned stakeholders and the line departments. The experience and understanding of various NGOs and communities in terms of previous hazards will be incorporated to identify the potential risks involved.

Methodology adopted will be matrix-based wherein historical hazard data of the district at Block/Panchayat level will be plotted against the risks involved. Based on these, current and potential risks will be mapped. A GIS map will be prepared showing the current and potential multi-hazard risks in the district at Block/Panchayat level.

2.4 Action Oriented Plan

DDMP is a dynamic document having inscribed the principles and guidelines for all the concerned stakeholders and the line departments for disaster management. For any DM plan to be effective, it is necessary that all the concerned stakeholders including DDMAs of respective districts should adopt and own the Plan. DDMP should be followed in letter and spirit. RMSI's approach for DDMP is to prepare it in such a manner that it becomes an action-oriented plan and all the stakeholders are able to synchronize the DDMP with other developmental plans in the district.

3 Scope of the Project

3.1 Approach for Comprehensive Plan

The overall approach adopted by RMSI for carrying out this assignment will be to prepare a comprehensive DDMP following the guidelines of NDMA, sample DDMP of Madhubani, and agreed/approved format for DDMP prepared by RMSI, using secondary data and interactions with key Stakeholders. The plan will be prepared taking into consideration the lower administrative units below District i.e. Block and Panchayat levels for considerable interventions in case of disasters.

The scope of the study guiding the preparation of DDMP includes:

- To identify the areas vulnerable to major types of hazards in the District
- To emphasize on pre-disaster phase by promoting a culture of prevention, mitigation and preparedness
- To adopt proactive measures at District level by all Govt. departments to prevent disasters and mitigate their effects
- To emphasize on different tasks and responsibilities of the Stakeholders and line departments in the District during the pre-disaster and post-disaster phases of disaster event
- To enhance disaster resilience of the people in the District by way of capacity building
- To emphasize on community involvement by promoting Community Based Disaster Risk Management (CBDRM)
- To emphasize on mainstreaming DRR into the developmental plans
- To emphasize on mainstreaming climate change adaptation (CCA) into the developmental plans
- To emphasize on putting in place institutional arrangements and techno-legal framework
- To emphasize on development of contemporary forecasting and early warning systems backed by responsive and full-proof communications and Information Technology (IT) support for last-mile connectivity
- To promote a productive partnership with the media for creating awareness and contributing in capacity building measures
- To emphasize on efficient response and relief with a caring approach towards the needs of the most vulnerable sections of the society
- To emphasize on recovery measures to bring back the community to a better and safer level than the pre-disaster stage
- To emphasize on setting-up an Emergency Operations Centre (EOC) at the district level to function effectively in search, rescue, and response
- To emphasize on developing the standardized mechanism to respond to disaster situation to manage the disaster efficiently

3.2 Consideration for lower administrative units (below District-Block and Panchayat level interventions)

DDMP should cater not only to the district but also the lowest level of the administrative units such as Block, Panchayat, and Revenue Villages. Therefore, RMSI will consider the mapping of the most vulnerable Panchayats in each district and suggest suitable interventions up to the Panchayat level. The team will emphasize on developing Rehabilitation Plans for the affected people and reconstruction measures to be taken by different Government departments and local authorities at District, Block, and Panchayat levels.

3.3 Mainstreaming Disaster Risk Reduction and Climate Change Adaptation in Developmental Plan

Development also leads to disaster. Various developmental plans in sectors/ infrastructure such as housing, bridges, roads, dams, school, hospitals, electricity, communication poles, etc. can also get severely impacted and damaged due to disaster. The damage occurring due to earthquake, for example, shows how development is susceptible to disasters. However, there are many infrastructures that remain unaffected despite the impact, which explains how hazard resistant development (infrastructure) can sustain.

The Government of Bihar (GoB) has adopted the Bihar Disaster Risk Reduction Framework (BDRRF) for 2015- 2030 to achieve the vision of a Disaster Resilient Bihar. This framework emphasizes on formulating a DRR roadmap, which will be implemented by the State's administrative machinery upholding multi-stakeholder engagements and establishment of a robust monitoring system. DRR is to be mainstreamed across GoB's planning processes addressing the requirements for strengthening preparedness, emergency response, rehabilitation, reconstruction and recovery. All development planning should mainstream DRR components to undertake robust risk management, resilience of critical infrastructure, and ensuring delivery of essential services in case of disruptions.

The methodology adopted by RMSI will be based on consultation with various stakeholders at district and State level, and secondary data from the Government departments and published documents. RMSI team will first identify the national flagship developmental programs - ongoing and proposed in the State and districts. The team will then conduct an index-based assessment and suggest the possible integration of DRR components in these programs.

Climate change variability will also be mapped based on historical climate data. Based on the analysis, suitable climate-change adaptation measures will also be suggested in DDMP.

Mainstreaming of DRR concerns in the developmental planning will help emphasize on reducing the loss of public and private property, especially critical facilities and infrastructure, through proper planning. Hence, it is important to review or revisit the development programs of the districts and see whether they are being undertaken in consonance with the locally occurring hazards. It is imperative to understand whether the infrastructure created in the district are hazard resistant/ hazard prone or not and whether the development is adding further risk to the district or actually helping the district in reducing risks. RMSI's emphasis will be on the need for reconstruction as an opportunity to build disaster resilient structures and habitat.

3.4 Value addition by RMSI

Moreover, RMSI understands that there is a scope for improvement in the sample DDMP of Madhubani. Additionally, we will provide GIS based maps for varying thematic layers such as LU/LC, Soil, Vegetation, Demography, Hazard, Geo-hydrology, River, Inundation and many more depending upon the availability of data at such scale to do the value addition in the DDMP of Banka District. Some of the other value additions are as follows:

- Organize and present the DDMP in a more user friendly manner,
- Quick reference of emergency numbers inside DDMP,
- District/Block/Panchayat basic profiles as a ready reckoners,
- Updated demographic and asset data to the extent possible

4 Banka District Profile

District profile of Banka will be prepared taking various socio-economic, climatological, vulnerabilities to hazards, and existing capacities into consideration. Since the Banka District faces multiple hazards annually, RMSI's focus would be to understand their vulnerabilities to multi-hazard. The team will prepare DDMP having multi-hazard focus.

District profile will consist of following aspects in DDMP:

i) History of past disaster events
ii) Climate (temperature, rainfall and weather patterns)
iii) Geological features (fault lines, mountain areas), topography (rivers)
iv) Land use/ Land cover - Forests , agriculture, land use pattern, irrigation systems and dams
v) Demography (size, growth trends, literacy rate, poverty level, income per-capita, main occupations, etc
vi) Society (religious, ethnic groups, social structure, situation of cohesion/conflict)
vii) Economy (key sectors, percentage of their share in economy, growth and development trends)
viii) Infrastructure and services (roads, telecommunications, hospitals, educational institutions, water sanitation etc)
ix) Shelter, if any (number and types)- Flood Shelters, etc
x) Politico-social systems (local government system, councils, etc)
xi) Administrative system (administrative units, number of blocks, Gram Panchayat, villages) in the district

The hazard, risk, and vulnerability profile of Banka district will be prepared. RMSI will develop vulnerability maps of the districts based on hazard historical profile of the district.

5 Approach, Methodology and Activities

5.1 Approach

We will adopt a consultative approach by involving all the concerned stakeholders and line departments in the district with close coordination with the district administration.

The project activities in the district will be carried out under the advisory support of the resource persons appointed by BSDMA for the districts to the respective consulting agencies.

5.2 Methodology

RMSI will broadly follow the methodology provided by the BSDMA (Figure 5-2). However, we will supplement the methodology given by the BSDMA with additional inputs in order to bring about value addition in the DDMP.

Additional inputs will involve:

- Procedures followed in various thematic GIS mapping (Figure 5-1)
- Approach for vulnerability and potential risk mapping (index-based)

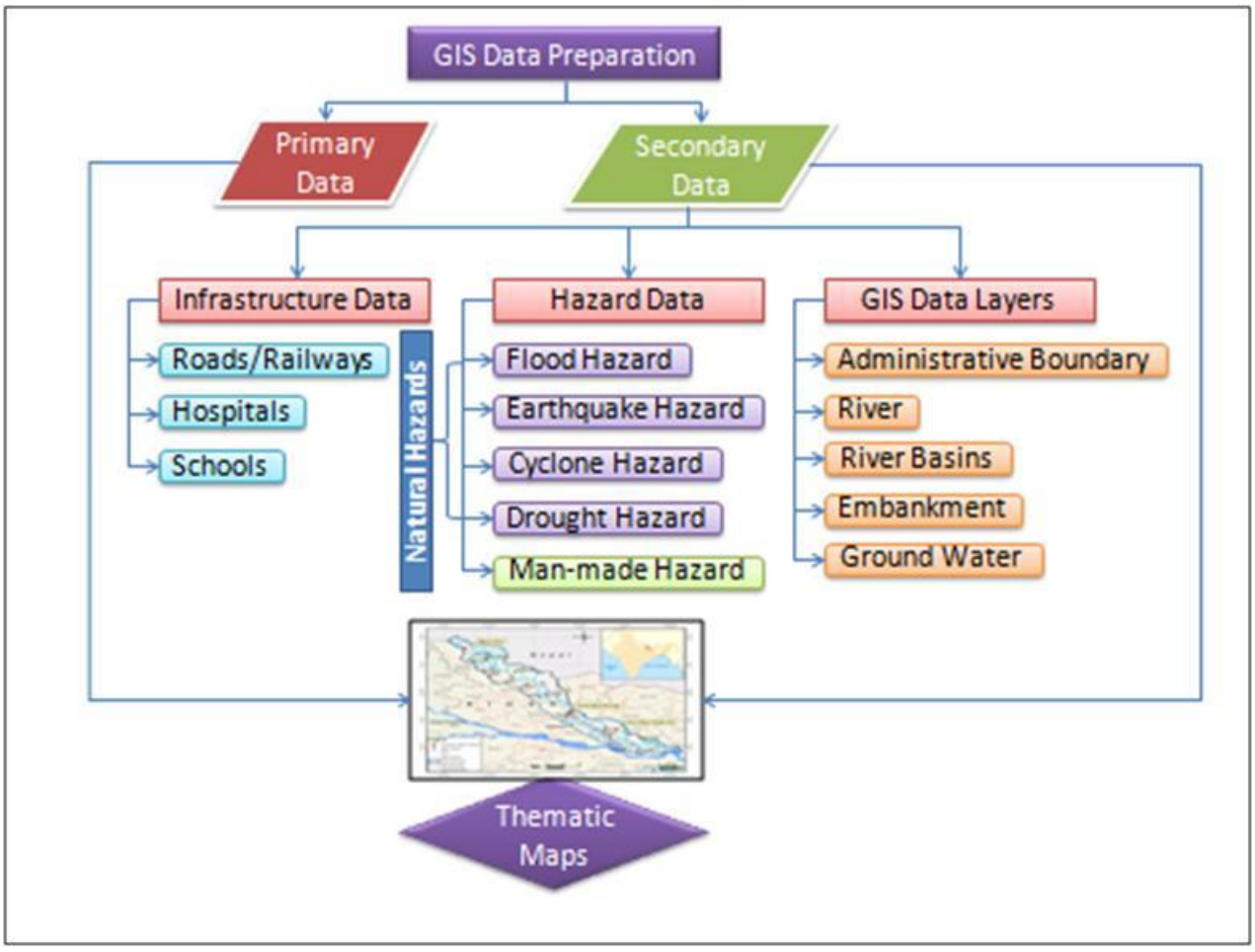


Figure 5-1 Methodology and process for various thematic maps

Flow Diagram for preparation of District Disaster Management Plan in Banka, Bihar

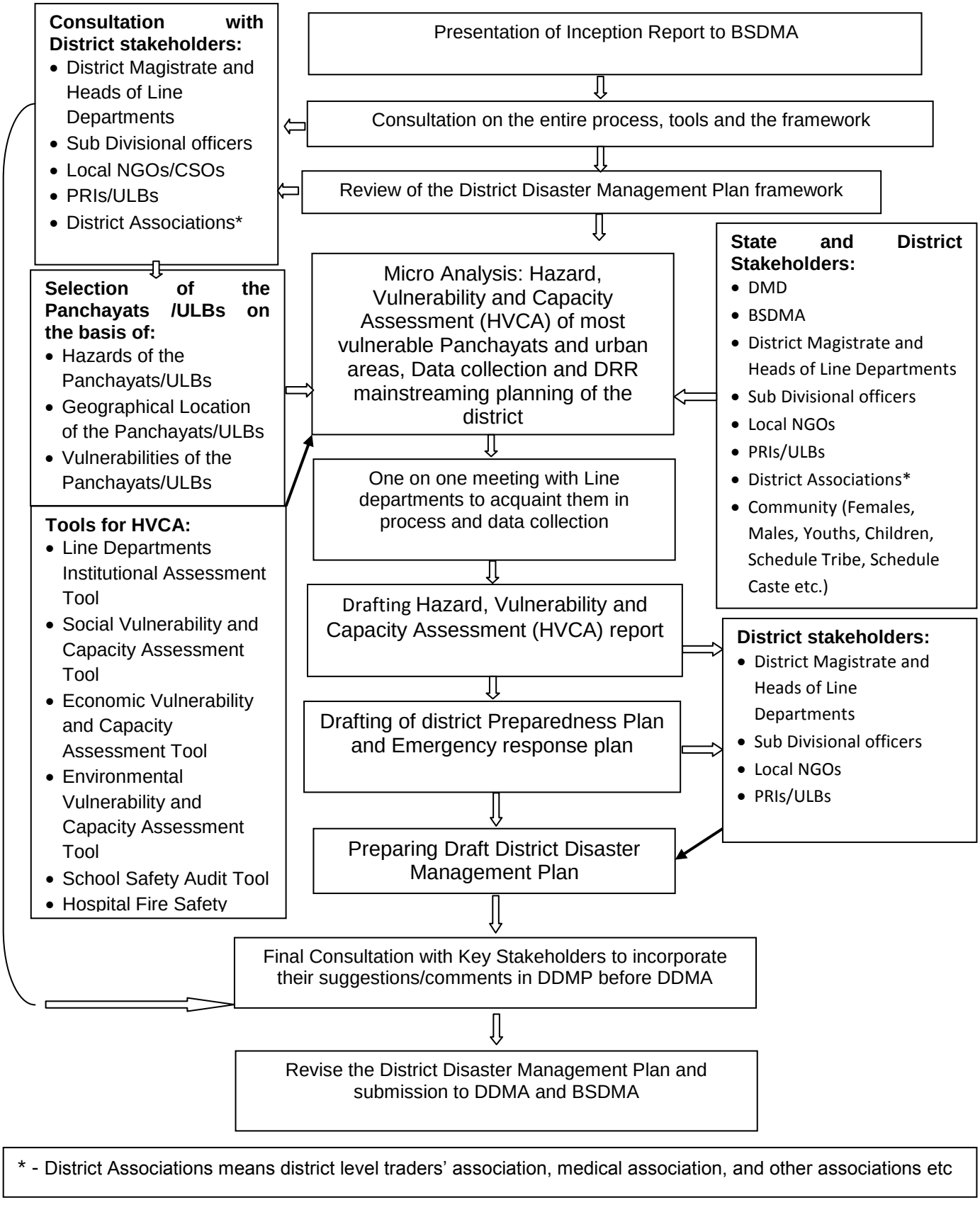


Figure 5-2 Methodology and process map for preparing DDMP

(Source: BSDMA, Patna)

5.3 Activities

Following are the activities involved in the project:

5.3.1 Presentation of Inception Report to BSDMA

RMSI presented the inception report to BSDMA describing the methodology, work plan, project team composition, and deliverables at the inception meeting. The team has incorporated the suggestions and feedbacks given in the meeting to develop the DDMP framework.

5.3.2 Stakeholders' involvement

All departments and institutions that have mandate to play a key role in the development and planning of the district are key stakeholders which include District Magistrate and Heads of line departments; sub-divisional officers; local NGOs; PRIs/ULBs; various district associations; and communities (See Appendix 2 List of Key Stakeholders). The line departments and institutions that are associated with preparedness, response and recovery like police, fire, medical, transportation, etc. are also important stakeholders.

Disaster management related need assessment will be conducted for the most vulnerable Panchayats (rural areas) and Wards (urban areas) through consultation with the concerned stakeholders in Banka district. The DDMP will also provide details of linkages and departments, contact details of the officers particularly from the perspective to development and disaster management, preparedness, response and mitigation at the district level.

Key stakeholders in the district will be consulted and involved in the entire process of DDMP preparation. Resource inventory of man and material, knowledge management, and networking and sharing of information on resources on India Disaster Resource Network (IDRN) will be taken into consideration.

5.3.3 Review of the DDMP Framework

BSDMA feedbacks and approval on DDMP framework prepared by RMSI (provided in Appendix 3 of this report) will be incorporated and finalized for the preparation of DDMP.

5.3.4 Data Collection and Map Preparation

RMSI team will collect secondary data from various Government Departments of the State and the district for this assignment. As part of the study, basic data related to physiography of the region, demography, and other data at Panchayat/Ward level (as per availability) will be collected. Hazard and vulnerability maps of the district will be created. The RMSI project team will prepare a list of data that is needed for this assignment. Apart from the secondary data, RMSI will also prepare a list of probable natural and man-made disasters in the district. The hazards will be categorized (hydro- meteorological, geological, and manmade) and ranked based on the level of intensities for the district.

All the data collected during the process will be from authentic sources and analysis will be based on the latest available data. The DDMPs will include, but not be limited to, following important aspects relating to DDMPs (depending upon the availability of data for GIS format for mapping) -

1. Hazard-vulnerability maps in the DDMP will be prepared based on the following authentic sources:
    i) District wise Infrastructure Map (roads, hospitals, rivers, education institutions etc.)– (Source: http://gis.bih.nic.in/. Designed and developed by NIC Bihar State Centre, Patna).

ii) District wise Flood Hazard Map – (Source: http:www.nrsc.gov.in, National Remote Sensing Centre (NRSC)/Bhuwan, ISRO, Hyderabad.)
iii) District wise Vulnerability Maps: (Source- Vulnerability Atlas of India, Building Materials and Technology Promotion Council (BMTPC) (http://www.bmtpc.org/))
iv) District wise Seismic Map (1934 & 1988): (Seismic Iso-Seismil Map; Source: Bihar State Disaster Management Authority)
v) Table of Seismic Intensity VII, VIII & IX (Source: IS: 1893, part 1, 2002.)
vi) Table of block wise Seismic Risk (Source: Bihar State Disaster Management Authority: publication: Hypothetical Occurrence of 1934 Earthquake Intensity,)
vii) Survey of India Maps (http://www.surveyofindia.gov.in/)
viii) District Maps: (Source: Maps from the website of the districts of Bihar.)
ix) District-wise Flood Maps: (Source: Maps from Flood Management Information System(FMIS), (http://fmis.bih.nic.in/), Water Resource Department, Government of Bihar. (to be coordinated by Shri A. K Samiyar, Sr.Technical Advisor, BSDMA)
x) District wise Road Maps: (Source: Road Construction Department, Government of Bihar/Ministry of Surface Transport, GoI.)
xi) Maps and data from Department of Disaster Management, Government of Bihar.

2. We will also prepare the following district wise GIS maps for the DDMP:

i) Earthquake Vulnerability Tables/Maps.
ii) Ground Water Maps of Districts (Source: Public Health and Engineering Department Website, Government of Bihar)
iii) Flood Plain Zone (Inundation Maps) of Districts
iv) River Basin Maps
v) River Maps
vi) High Wind Hazard Maps of Bihar.
vii) Road Maps of Districts.
viii) Maps of the water logged areas of districts (depending upon the availability of data).
ix) Drought Maps

3. Livestock aspects will be covered in DDMP based on the animal census of Bihar, 2007 and 2012.
4. Important historical heritage sites in the district will be mapped and disaster management and safety aspects of these historical heritage sites will be dealt in the DDMPs.
5. We will try to develop vulnerability and risk maps of Census households per block in the district based on the projections of the number of households present in Earthquake Zone IV and Zone V Seismic Iso-Seismil Map (base of 1938 and 1988), prepared by BSDMA.

5.3.5 Hazard, Vulnerability, and Capacity Assessment (HVCA) of Banka District

HVCA of the district will be done to conduct a comprehensive analysis of various hazards in the district that will have disastrous effect because of prevailing vulnerabilities. The assessment will be undertaken to understand the types of hazards the district is prone to, their history and impact on the area, and people and infrastructure that are exposed to these hazards. The vulnerabilities will cover various aspects, which include social, infrastructural, economic, environmental, attitudinal/behavioral and political, those that enhance the consequences of these hazards. The capacity assessment will highlight the capability and availability of resources with the district administration and the community to reduce disaster risks and to organize effective response.

5.3.5.1 Macro Analysis of Banka District

RMSI project team will carry out macro analysis on issues and challenges in terms of hazards, vulnerability, and capacity of the district. We will describe the analysis on GIS maps with short write-ups on it and explain the details in annexures.

The team will carry out the following assessments for HVCA:

Hazard Assessment: RMSI will prepare a list of hazards in the district. This will consist of the type of hazards that the district is prone to, history of hazards, the area, people, and infrastructure that are exposed to these hazards. This chapter will also capture the issues related to climate variability specific hazards that the district is facing.

Vulnerability Assessment: Vulnerability that increases the susceptibility of a community to hazards in terms of physical, social, economic, and environmental factors or processes will be assessed. The analysis would cover various social groups, infrastructure, properties, and environmental resources that are vulnerable to various hazards in the district. This section will also describe major trends in development that push people to live in unsafe conditions that lead to generation of new vulnerabilities, e.g. population growth, industrialization, environmental degradation, etc.

Capacity Assessment: Capacity assessment will be done to highlight the capabilities and availability of resources with the district administration and other stakeholders to reduce disaster risks and help them in timely and effective response. Capacities could include policies, institutions, equipments; Early Warning Systems (EWS), trained human resources to handle various response and coordination functions, and financial resources that the district stakeholders should have for DRR activities. Data pertaining to the physical, technical, and financial resources that are available with different departments and stakeholders will also be enlisted (number, type, location, condition etc.). The inventory of resources available (equipment and skilled human resources) with each department and stakeholder, including private resources that can be utilized for emergency response, will be prepared. A list of departmental focal points with contact details will also be prepared while doing this analysis.

5.3.5.2 Micro Analysis of the most vulnerable Panchayats/ULBs of Banka District

Various hazards have different impacts and create varying situations at micro-level. It requires different solutions in diverse settings and situations. RMSI will identify the most vulnerable Panchayats/ULBs in the district in consultation with the district authorities and concerned stakeholders. For detailed analysis, selection of the most vulnerable Panchayats/ULBs will be based on hazards, and vulnerabilities indicators related to hazard (intensity and frequency) and vulnerability (social, economic, and environmental) to carry out micro analysis. It will begin with consultations with concerned line departments and district administration. We will carry out an index-based approach for the micro-level analysis of the most vulnerable Panchayats/Wards. Indicators that influence the vulnerability will be mapped and categorized into high, medium, and low.

5.3.6 DRR Mainstreaming in Planning Process

As part of mainstreaming DRR in the planning process, the RMSI team will first identify the national flagship programs - ongoing and proposed in the State and district and suggest the possible integration of DRR components in these programs. We will also discuss with district administration to understand the various development projects in the district and explore the possibilities of integrating DRR in these ongoing development projects.

5.3.7 One-on-one meetings with the Line Departments in Banka District

The RMSI team will have one-on-one meetings with the District Magistrate and the heads of the identified line departments in the district to acquaint them with the DDMP development process, data collection, and to understand the gaps in existing Standard Operating Procedures (SOPs) specific to disaster response. The team will gather and analyze the inputs from them and will incorporate them in the DDMP wherever applicable.

RMSI team will also have stakeholders' meetings at various stages of the DDMP preparation at district headquarter for an inclusive plan development.

5.3.8 Preparation of Draft DDMP Document of Banka District

RMSI will prepare the draft DDMP for Banka district in consultation on the agreed format and will follow the outline suggested by NDMA, New Delhi and the provided specimen of Madhubani DDMP. The information collected from various line departments during the needs assessment and consultation will be used for presenting the resource inventory - resources available at their disposal to deal with disasters. The plan document will also provide the SOPs of departments during various phases of DRM. The DDMP will consist of two volumes – DRR plan (volume 1) and District Response Plan (volume 2). The table of contents and details we propose to cover in these two volumes are detailed in Appendix 3.

5.3.9 Final Consultation with key Stakeholders in Banka District

Once the draft DDMPs are prepared, the project team will conduct the final stakeholder consultations in the district to present the draft DDMP. This will be done in coordination with BSDMA. The team will seek the help of BSDMA to invite the participants for this consultation meeting. During the consultation meeting, the project team will seek the comments and feedbacks from the representatives of key line departments with the support of the District Magistrate of Banka.

5.3.10 Revision of Plan based on comments and feedbacks

Based on the comments and feedbacks, the RMSI project team will revise the draft DDMP documents of Banka District. All comments and suggestions from the district and BSDMA will be considered and the final DDMP will be submitted for acceptance. The final DDMP of Banka will consist of two volumes and will be in Hindi.

6 DDMP Preparation Planning and Reporting Mechanism

- DDMP preparation planning will be done by RMSI in close consultation with BSDMA.
- All the concerned stakeholders including the district administration and line departments will be consulted and involved in the DDMP preparation process.
- The ownership of the DDMP lies with the DDMA of Banka district. We will involve the DDMA of the district in the DDMP preparation planning process.
- Project reporting schedule and mechanism will be as per the TOR.

7 Project Timeline and Delivery Schedule

7.1 Project Schedule

The detailed work plan is presented in Figure 7-1. The assignment will be completed in six months. The project was initiated in the first week of July 2015 and will be completed by end of December 2015. Considering profile of Banka district in DDMP and taki ng into consideration the quantum of fieldwork, an elaborate schedule of activities proposed to be carried out is provided below:

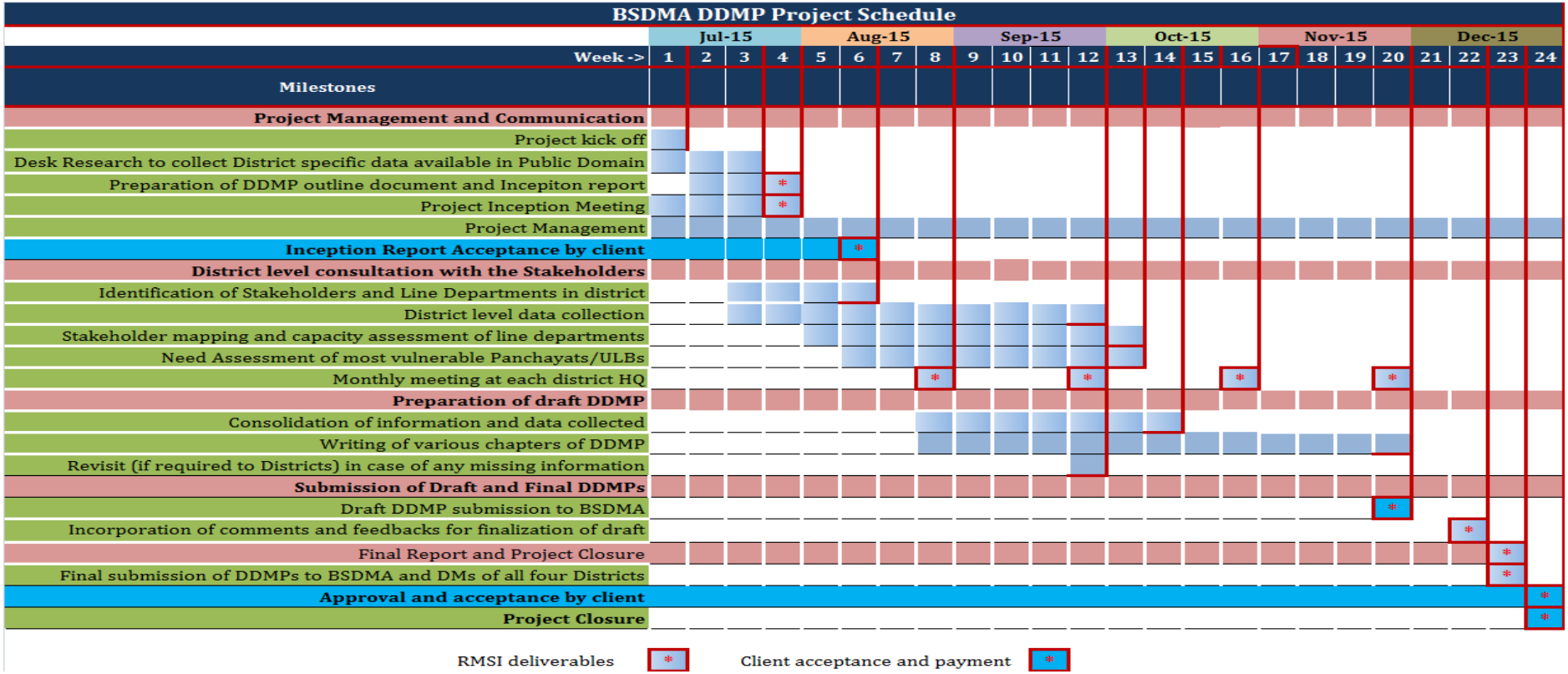


Figure 7-1 Project schedule for DDMP preparation of Banka district

RMSI, with the support of a local NGO - Manav Kalp Jagran (MKJ) based in Patna, will carry out the project activities. The project team will be constituted of two senior DRM experts, one local project manager, and two support staff. We also have senior subject matter experts who will review the DDMP before submission.

We have initiated the field consultation exercise in the district and will present the project methodology at the inception workshop proposed on July 30th 2015. The draft DDMP will be prepared by the end of Nov 2015 and will be submitted for comments and feedback.

7.2 Tentative onsite work Schedule

RMSI project team has planned onsite visits for interacting and meeting various Stakeholders - the DM and other Heads of Line Departments in the district to apprise them of the project progress. Following is the tentative onsite work schedule (Table 7-1):

Table 7-1: Tentative onsite work schedule

Task	Jul-15				Aug-15				Sep-15				Oct-15				Nov-15				Dec-15			
	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15	W16	W17	W18	W19	W20	W21	W22	W23	W24
Stakeholder consultation and data collection at District level																								
Visit to Panchayats/ULBs in the District																								
One on one meeting to Heads of Line Department																								
Monthly Stakeholder meeting at District HQ																								
Report submission and Final Stakeholder meeting at BSDMA																								

7.3 Deliverables

The RMSI project team will deliver the following reports and presentations to BDSMA. BSDMA will review the deliverables and provide comments and acceptance in 2 weeks. The payments will be released against acceptance of all the deliverables.

1. Inception Report (end of 1st month)
2. Monthly meeting to be organized by RMSI in the district headquarter with all stakeholders and BSDMA representative
3. Monthly progress reports in BSDMA prescribed format
4. Draft DDMP document in Hindi (after 5th month) - in one hardcopy and one softcopy in CD
5. Final report in Hindi (in 6th month) incorporating the comments and feedbacks from BSDMA - in two hardcopies and two softcopies in CDs for approval from BSDMA
6. Submission of approved DDMP report (Volume-1 and 2) in Hindi to BSDMA

8 Monitoring and Evaluation System

During project kick off, both RMSI and BSDMA will identify points of contact for the project and define the communication protocol. Email mode will be used as official communication media. Both RMSI and BSDMA will acknowledge the receipt of any communications from the other party. RMSI team leader will provide monthly updates regarding the status of the project. RMSI project team will interact with key stakeholders for collecting data that are required for the project. We will remain connected with BSDMA, stakeholders and all consulting agencies through Google group as well as on Whatsapp. These are all part of the project management procedures and medium for monitoring at client's side.

If any issues or risks arise during project execution, these will be brought to the notice of BSDMA and will be discussed for appropriate solution.

Expert review team consisting of senior experts of RMSI has been formed to provide necessary advice and support during the complete project execution cycle. The review team will spearhead the monitoring and evaluation of the project time to time at our end. We will also work very closely in coordination and support of the resource persons allocated by BSDMA for the districts. BSDMA will also monitor and evaluate the progress of the project. Any gaps identified in project progress will be addressed suitably.

Any additional work, other than mentioned in the contract, will be considered through change management. RMSI team leader will assess the effort for the additional work and communicate the cost for the additional task to BSDMA along with the payment terms. RMSI project team will directly monitor all field activities in the district.

9 Project Team

Taking into consideration the size and timelines of the project, RMSI has structured a project team (Figure 9-1) that comprises of two senior DRM experts, RMSI support team, and two-member local support team. Expert review team of senior experts of RMSI has also been formed to provide necessary advice and support. All the experts positioned have more than 10 years experience working in international DRM projects and have the capability of handling documentation independently.

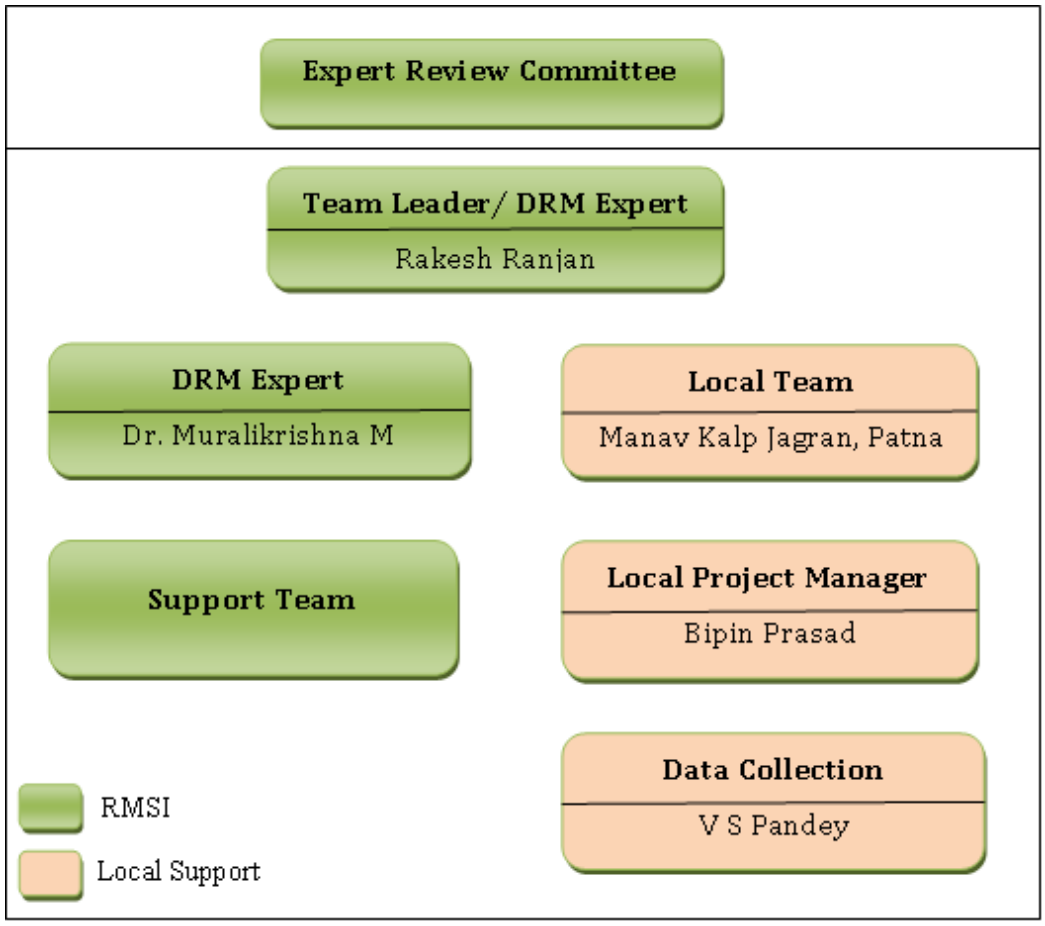


Figure 9-1 Project team

9.1 Team Leaders and Other Team Members

The following table lists the main domains of the assignment, the key experts responsible, and the proposed technical and support staffs to be involved.

Table 9-1: Team composition, roles and responsibilities

S.No.	Key Experts	Domain	Roles and responsibilities
1.	Mr. Rakesh Ranjan	DRM Expert and Team Leader	Project Management including client coordination, stakeholder meeting, team management, monitoring project schedule, ensure TOR compliance Field based information collection

S.No.	Key Experts	Domain	Roles and responsibilities
			District level stakeholder consultation Preparation of relevant chapters of DDMP Ensure timely & quality dispatch of agreed deliverables
2.	Dr. Muralikrishna M	DRM Expert	Development of framework for the DDMP Preparation of relevant chapters of DDMP Conduct HVCA for all the four districts
3.	Mr. Rupesh Sinha	GIS Expert	Field based information collection District level stakeholder consultation GIS data creation; Development of thematic GIS map; Support documentation;
4.	Mr. Kapil Sharma	GIS and Remote Sensing Expert	GIS data creation; Development of thematic GIS map;
5.	Mr. Bipin Prasad	Local Support	Coordinate and arrange meetings with district stakeholders, support data collection from various district offices
6.	Mr. V S Pandey	Local Support	Coordinate and arrange meetings with district stakeholders, support data collection from various district offices
7.	Mr. Pushpendra Johari	Expert Reviewer	Provide advisory support and review of DDMP documents
8.	Dr. MVRL Murthy	Expert Reviewer	Provide advisory support and review of DDMP documents

9.1.1 Rakesh Ranjan

1. **Proposed Position: Team Leader (DRM Expert)**
2. **Employer**: RMSI Pvt. Ltd.
3. **Date of Birth**: 15th June 1974 **Nationality**: Indian
4. **Education**

School, college and/or University Attended	Degree/certificate or other specialized education obtained	Date Obtained
Department of Geography, Delhi School of Economics (DSE), University of Delhi	M.Phil. (Specialization in Environmental and Developmental Geography)	2004

Department of Geography, Delhi School of Economics (DSE), University of Delhi	M.A. (Specialization in Environmental and Urban Geography)	1999
University of Delhi	B.A (Hons), Geography	1997

5. **Professional Certification or Membership in Professional Associations:** PG Diploma in Remote Sensing and GIS from C-DAC, Noida in 2006-07.

6. **Other Relevant Training**:
   - Various Training and Capacity Building Programs Organized by NDMA (National Disaster Management Authority), New Delhi in 2010.
   - Training of Trainers (TOT) organized by SPHERE India for all INGOs, NGOs, and other stakeholders, Inter-Agency Groups (IAGs) at Bhubaneswar, Kolkata, Patna and Guwahati and other places in 2007, 2008, and 2009.
   - Training on Large Scale Sample Surveys in Demographic & Health Research, organized by International Institute of Population Studies (IIPS), Mumbai from 22nd Sept. to 3rd Oct, 2008.
   - Ethnographic Training, organized during August, 2005 at IIPS, Mumbai.
   - GIS and GPS Training, organized at DSE in 2000.

7. **Countries of Work Experience**: India

8. **Languages:**

LANGUAGE	Speaking	Reading	Writing
Hindi	Good	Good	Good
English	Good	Good	Good
Bhojpuri	Good	Good	Good
Vajjika	Good	Good	Good

9. **Employment Record**

From: November, 2014 To: Till date.

Employer: RMSI Pvt. Ltd., Noida, India.

Positions held: Technical Specialist

From: May, 2010 To: October, 2014

Employer: Integrated Research and Action for Development (IRADe), New Delhi, India.

Positions held: Project Manager

From: October, 2007 To: May, 2010

Employer: Agence d´aide á la cooperation technique et au development (ACTED), New Delhi, India.

Positions held: GIS Specialist

From: May, 2002 To: September, 2007

Employer: Developing Countries Research Centre (DCRC), New Delhi, India.

Positions held: Senior Research Associate

10. **Detailed Tasks Assigned**	11. **Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned**
Social and DRM Expert	Name of assignment or project: **Hazard, Risk and Vulnerability Assessment for 13 states and UT's in India** Year: 2015(ongoing) Location: India Employer: National Disaster Management Authority, India Main project features: Cyclone and associated flood risk modeling, exposure database development and development of a Web-GIS based Composite Risk Atlas for all the coastal and inland-districts bordering coastal-districts up to 10 m above sea level coastal elevation line; outreach and conduct training workshops. Positions held: Social and DRM Expert Activities performed: Development of Social Vulnerability data; Analysis of Socio-economic data; Creation of Social Vulnerability Index
Social and DRM Expert	Name of assignment or project: **Operational Research to Support Mainstreaming of Integrated Flood Management under Climate Change - IFM Phase II (in Odisha and Bihar)** Year: 2014 - 2015 Location: India Client: ADB Main project features: Develop strategic framework for flood mitigation and flood plain management for the Burhi Gandak and Brahmani/Baitarani sub-basins in Bihar and Odisha. This will be achieved through designing the mechanisms to mainstream integrated flood management (IFM) and risk informed decision-making under climate change scenario. Positions held: Social and Institutional Expert Activities performed: • Review of community flood issues, practices, needs in the two sub-basins, based on extensive consultations and participatory rural appraisals and field surveys; • Contribute to some project activities
Social and DRM Expert	Name of assignment or project: **Non Lending Technical Assistance to Support Implementation of Odisha State Climate Action Plan-Urban Resilience** Year: 2014-2015 Location: India

Social and DRM Expert	Client: The World Bank Main project features: The key objective of this assignment is to develop a urban resilient action plan for two cities of Odisha – Bhubaneswar, and Cuttack. The activities includes conducting hazard risk vulnerability assessment, understanding ongoing project and gaps, institutional assessment, consultation with various stakeholders and identify location specific and sector specific action plans for developing urban resilience. Positions held: Social Vulnerability Expert Activities performed: • Analysis of institutional capacity building of Bhubaneswar and Cuttack • Carry out hazard risk and vulnerability assessment • Develop some sections of LRAP project Report • Develop the Synthesis Report of the project. Name of assignment or project: **Timor Leste natural hazards risk assessment in communities along Dilli – Ainaro and Linked road corridor.** Year: 2014-2015 Location: India Client: The World Bank Main project features: The key objective of this assignment is to assess and analyze the risks from flood, landslide and strong wind hazards at the Suco level in the districts of Ainaro, Aileu, Ermera and Manufahi of Timor Leste on CBDRM planning. The activities include developing localized hazard data for flood, landslide and strong wind hazards, as an input to the risk assessment process, and complement it with the existing risk data. Positions held: Social and Institutional Expert Activities performed: • Support in data analysis and technical report writing • Analysis of institutional capacity building • Social vulnerability analysis and tool development • Synthesis report writing
Project Management And Research Work	Name of assignment or project: **Vulnerability of Coastal Cities on Rivers to Climate Change: A case study of Surat to Develop Adaptation Framework.** Year: 2011-14 Location: IRADe, New Delhi Client: Ministry of Earth Sciences, Govt. of India. Main project features: Development of an adaptation framework for Urban Vulnerability to Climate Change and analysis of socio-economic impacts of Flood.

Project Management And Research Work	Positions held: Project Manager Activities performed: Project Management, guiding team in GIS mapping, hydrological modelling and development of climate change adaptation framework. Field Survey to analyse the socio-economic vulnerability of the city due to flood. Name of assignment or project: **Analysis of factors Affecting the Agricultural Productivity in the Flood Plains of Eastern Uttar Pradesh.** Year: 2013-16 Location: IRADe, New Delhi Client: Sir Dorabji Tata Trust (SDTT) Main project features: Studies on socio-economic development issues and agriculture and livelihood concerns of the people, mainly rural people, of Eastern Uttar Pradesh. Positions held: Project Manager Activities performed: To conduct PRA surveys, GIS mapping and Identification of socio-economic and livelihood concerns to suggest Livelihood opportunities in eastern UP. Name of assignment or project: **Climate Change, Natural resources and Society: A case study of Himachal Pradesh.** Year: 2012-15 Location: IRADe, New Delhi Client: Department of Science and Tech (DST), Govt. Of India. Main project features: Climate Change Impacts and Vulnerability of Himalayan Ecosystems and Livelihoods of the people. Positions held: Project Manager Activities performed: Study of the vulnerability of HP ecosystem and livelihoods-horticulture (apple farming) of the state due to climate change. Analysis of socio-economic impact on the society due to climate change. Name of assignment or project: **Climate Resilient Urban Development: Vulnerability Profile of 20 Indian Cities.** Year: 2011-12 Location: IRADe, New Delhi Client: The Rockefeller Foundation. Main project features: Vulnerability Profile of the 20 Indian cities Positions held: Project Manager Activities performed: Vulnerability analysis of the cities.

Project Management And Research Work	Name of assignment or project: **Climate Change Impacts and Vulnerability Assessment of Himalayan Ecosystems and Livelihoods: A case study of Uttarakhand** Year: 2010 Location: IRADe, New Delhi Client: Ministry of Environment and Forest (MoEF), Govt. of India Main project features: Vulnerability and climate change impact assessment of Uttarakhand State with respect to ecosystem and livelihoods of the people. Positions held: Project Manager Activities performed: Vulnerability assessment of the State with the mentioned objectives.
Research and Project Support Work	Name of assignment or project: **Emergency Relief to Stranded People and IDPs in Supaul District, Bihar State.** Year: 2008-10 Location: ACTED, New Delhi Client: European Union (EU) Main project features: Help in Emergency relief to flood affected people of the region. Positions held: GIS Specialist Activities performed: Mapping of flood disaster, damage, disaster preparedness, relief, response, etc.
Research and Project Support Work	Name of assignment or project: **Promoting recovery and Disaster Preparedness among Most Vulnerable Flood-Affected Communities in Bihar.** Year: 2007-09 Location: ACTED, New Delhi Client: European Commission for Humanitarian Aid Office (ECHO) Main project features: Flood mapping and plan for disaster preparedness of the local community. Positions held: GIS Specialist Activities performed: Mapping of Flood, its damage, intervention and response
Research Work	Name of assignment or project: "**Water Resource Utilization, Conservation and Management: Case study of Delhi"** Year: 2006-07

	Location: DCRC, New Delhi Client: ICSSR Main project features: Identification of technologies and their impact on agriculture development. Positions held: SRA Activities performed: Mapping of technologies related with agriculture, impacts on agricultural development, socio-economic aspects, etc.

9.1.2 Dr. Muralikrishna M

1) **Proposed Position:** DRM Expert
2) **Name of Firm**: RMSI Private Limited
3) **Date of Birth**: 25th December 1968 **Citizenship**: Indian
4) **Education:**

School, college and/or University Attended	Degree/certificate or other specialized education obtained	Date Obtained
University of Kerala, India	PhD (Geography)	2001
University of Kerala, India	Masters in Geography and regional planning	1991

5) **Membership in Professional Associations:**

Lifetime member of Indian National Cartographic Association (INCA), India

6) **Other Training:**
   - Project Management Program (PMP) from Project Management Institute (PMI) 2010
   - "Workshop on Project Cycle Management (PCM) and Participatory Rural Appraisal (PRA), Gaia Info Systems, India, 2003.
   - Web based training on Watershed Management, Watershed Academy, Environmental Protection agency, United States, 2004.
   - "Workshop on co management and livelihood", Cochin University, India, 2004.
   - "Users workshop in ArcGIS 8.2", ESRI India, 2004.
   - Training program on "Coastal Zone Management as a Sustainable Process" International Ocean Institute, Indian Institute of Technology, Chennai, India, 1996.
   - Training program on "Remote Sensing Technology and Application through Visual Interpretation and Digital Analysis" National Remote Sensing Agency (NRSA), Hyderabad, India, 1994.
   - Training program on "Research Methodology in Social Sciences", School of Social Sciences, Mahatma Gandhi University, Kerala, India, 1993.
7) **Countries of Work Experience:** India, Bangladesh, Yemen, South Africa, Niger, Japan, Timor-Leste
8) **Languages:**

Language	Speaking	Reading	Writing
English	Good	Good	Good
Hindi	Good	Good	Good
Malayalam	Good	Good	Good
Tamil	Good		

9) **Employment Record:**

From: January 2010 To: Present

Employer: RMSI Private Limited, India

Positions held: Associate General Manager

From: January 2006 To: December 2009

Employer: RMSI Private Limited, India

Positions held: Senior Technical Specialist

From: March 2006To: July 2006

Employer: Pasco Corporation Japan

Positions held: Consultant

From: February 2004 To: February 2006

Employer: IC Net, Japan

Positions held: Consultant

From: January 1998 To: January 2004

Employer: Gaia Info System, Kerala

Positions held: Manager (GIS)

From: March 1991To: December 1997

Employer: Centre for Earth Science Studies, Kerala

Positions held: Project Scientist

10) **Detailed Tasks Assigned**	11) **Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned** Name of assignment or project: **Non Lending Technical Assistance to Support Implementation of Odisha State Climate Action Plan-Urban Resilience** Year: 2014-2015 Location: India Client: The World Bank

	Main project features: The key objective of this assignment is to develop a urban resilient action plan for two cities of Odisha – Bhubaneswar, and Cuttack. The activities includes conducting hazard risk vulnerability assessment, understanding ongoing project and gaps, institutional assessment, consultation with various stakeholders and identify location specific and sector specific action plans for developing urban resilience. Positions held: Team Leader Activities performed: • Provide strategic and technical leadership and project management • Creation of work plan and coordinate with various consultants and stakeholders • Finalize methodology, design questionnaires, and other tools for consultation • Analyze institutional capacities and arrangements • Carry out hazard risk and vulnerability assessment • Develop local resilience action plans • Develop the implementation and knowledge sharing material and project reports. Name of assignment or project: **Preparation of Disaster Management Plan for Union Territory (UT) of Puducherry** Year: 2011 Location: India Client: Dept. of Revenue and Disaster Management, Government of Puducherry Main project features: Preparation of Disaster Management Plan for the UT of Puducherry Positions held: Team Leader Activities performed: • Project management including coordination with client, consultant, development of work schedule, monitoring project progress and responsible for delivering all project deliverables • Design and implement Community Based Disaster Management Plan (CBDRM) for 256 local bodies • Review national DM policies, institutional framework of UT and district administration, and preparation of disaster management plan for the UT complying to the National Disaster Management authority guidelines Name of assignment or project: **Private Sector Investment to Build Climate Resilience in Niger's Agricultural Sector: Introducing improved irrigation systems and climate resilient seeds** Year**:** 2013 Location: Niger Client: International Finance Corporation (IFC), The World Bank

	Main project features: Building climate resilience in Niger's agricultural sector through facilitating private sector investment in the improved irrigation and climate-resilient seeds market Positions held: Team Leader and Social expert Activities Performed: - Project management - Private sector stakeholder analysis, community survey, supply chain analysis for agribusinesses - Analysis of survey data and agriculture data and writing of sections of report - Market assessment for demand and supply of agribusiness - Development of financial model for private sector investment in agribusiness Name of assignment or project: **Operational Research to Support Mainstreaming of Integrated Flood Management under Climate Change - IFM Phase II (in Odisha and Bihar)** Year: 2014 - 2015 Location: India Client: ADB Main project features: Develop strategic framework for flood mitigation and flood plain management for the Burhi Gandak and Brahmani/Baitarani sub-basins in Bihar and Odisha. This will be achieved through designing the mechanisms to mainstream integrated flood management (IFM) and risk informed decision-making under climate change scenario. Positions held: Social Specialist and Project Manager Activities performed: • Coordination with national consultants and project administration • Review of community flood issues, practices, needs in the two sub-basins, based on extensive consultations and participatory appraisals; • Identification of potential community IFM pilot projects to increase the flood resilience and coordination with potential implementing partners, • Proposals to mainstream community needs and initiatives into IFM and reflection in an inclusive IFM planning process • Contribute to various sections of the project reports Name of assignment or project: **Scoping and Project Design Work on Climate Resilient Agriculture and Food Security Pilot Program for Climate Resilience (PPCR), Bangladesh** Year: July, 2012 – 2013 Location: Bangladesh, India Client: IFC (The World Bank Group) Main project features: The IFC Advisory Services in South Asia will implement this project through the Pilot Program for Climate Resilience (PPCR) in Bangladesh. The scoping studies aims at providing technical capacity building and facilitating appropriate investments to support climate

	resilience in focus areas of 12 polders in Bangladesh. Positions held: Social Expert and Co-team leader Activities performed: • Conduct socio economic survey, stakeholder consultation (government and private sector) and training • Market analysis and identify the information requirements of the farmers, Government authorities and private sector • Help the Government of Bangladesh and policy makers to draw up preparedness mechanisms that will ensure food security under the climate change scenarios particularly in the coastal regions by introducing modern agricultural technologies such as improved irrigation systems and climate resilient seeds • Identify potential private sector players that can avail loans from IFC for developing the agricultural sector Name of assignment or project: **Hazard Risk and Vulnerability Analysis (HRVA) of three cities in India** Year: 2014 Location: India Client: UNDP Main project features: The main objective of the project is to assess the extent of risk and the vulnerabilities of Bhubaneswar city, particularly to climate related hazards Positions held: Project Manager and Social Vulnerability Expert Activities performed: • Project management including client and team coordination, design and monitor project activities, ensure project schedule and quality deliverables • Supervise exposure data development for risk assessment from various data sources including high resolution satellite data and open street maps (OSM) • Institutional mapping, capacity assessment, and training needs assessment • Develop training plan, development training material and conduct training • Carry out social vulnerability assessment and epidemic risk, contribute to various sections of the report include recommendations for improving disaster resilience Name of assignment or project**: Development of Climate Information Systems for Enhanced Climate Resilience in Yemen** Year: 2013 Location: Yemen Client: Pilot Program for Climate Resilience, Yemen

	Main project features: This assignment will facilitate the development and implementation of a Climate Service within a National Framework for Climate Services, which will function as a focal information point providing data and information to various governmental entities, NGOs, community organizations, and private sector. Positions held: Institutional expert Activities performed: • Stakeholder consultation • Institutional and capacity need assessment • Identified possible adaptation measures and carry out cost benefit analysis Name of assignment or project: **Consulting Services for Hazard, Risk and Vulnerability Assessment for 13 states and UT's in India** Year: 2013 – 2015 (Ongoing) Location: India Employer: National Disaster Management Authority, India Main project features: Cyclone and associated flood risk modeling, exposure database development and development of a Web-GIS based Composite Risk Atlas for all the coastal and inland-districts bordering coastal-districts up to 10 m above sea level coastal elevation line; outreach and conduct training workshops. Positions held: Social expert Activities performed: • Design and conduct stakeholder consultation and socio economic survey • Social vulnerability analysis and identify hotspot to carry out community resilient action plans • Supervise exposure data development for risk assessment from various data sources including high resolution satellite data and open street maps (OSM) • Support training, workshops and contribution to the reports Name of assignment or project: **Private Sector Investment to Build Climate Resilience in Niger's Agricultural Sector: Introducing improved irrigation systems and climate resilient seeds** Year**:** 2012 – 2013 Location: India and Niger Client: International Finance Corporation (IFC), The World Bank Group Main project features: Building climate resilience in Niger's agricultural sector through facilitating private sector investment in the improved irrigation and climate-resilient seeds market Positions held: Team Leader and Socio economist

	Activities Performed: • Project management, client and consultant coordination • Private sector stakeholder analysis, conduct farm level survey, and supply chain analysis for agribusinesses • Market assessment for demand and supply of agribusiness • Development of financial plan for private sector investment in agribusiness Name of assignment or project: **Private Sector Investment to Build Climate Resilience in Niger's Agricultural Sector: Agricultural insurance market assessment** Year**:** 2013 Present Location: India and Niger Client: International Finance Corporation (IFC), The World Bank Group Main project features: Building climate resilience in Niger's agricultural sector through facilitating private sector investment in the agricultural insurance market Positions held: Social and Institutional expert Activities Performed: • Project management, client and consultant coordination • Design and supervise farm community survey • Analysis of survey data and agriculture data and writing of sections of report • Development of business plan for private sector involvement Name of assignment or project: **Synthesis Report: South Asia Region Disaster Risk Management Initiative** Year*:* 2008 Location*:* India Client: UN ISDR Main project features: Preparation of Synthesis Report based on analysing the risk profile of 10 South Asian Countries and derive recommendations for future plan of action country and region level in disaster risk management Positions held: Team Leader and DRM expert Activities performed: • Client coordination and collection and analysis of hazard and loss data • Assessment of risk and vulnerability for the 10 SAR countries • Preparation of hazard maps in GIS • Preparation of country level and regional synthesis report Name of assignment or project: Community based Panchayat Resource Mapping (three Panchayats in Kerala) Year*:* 2003-04 Location: India

	Client: Local Administrative Bodies in Kerala Main project features: Develop panchayat level resource maps through community participation for local bodies for serving the local bodies for the development activities. Positions held: Team Leader Activities performed: • Client interaction, project design, scheduling and delivery of outputs • Training community on mapping techniques and data collection • Coordinate participatory Resource Mapping • Preparation of thematic maps in GIS and report in English and Malayalam

9.1.3 Rupesh Kumar Sinha

1. **Proposed Position:** GIS Expert
2. **Name of Firm:** RMSI Private Limited
3. **Date of Birth**: August 10th, 1986 **Nationality:** Indian
4. **Education:**
   M.GIST. (Master's Of Geographical Information Science and Technology) from Kumaun University SSJ Campus, Almora, Uttarakhand 2010.
   B.A.Hon. Geography (2008) SSN. College Delhi University, New Delhi.
5. **Training:**
   ArcGIS Desktop, ERDAS, MapInfo, HEC RAS, HEC GeoRAS, Quantum GIS, PostgreSQL Server 8.3.4, postgis 2.0.
6. **Countries of Work Experience:** India
7. **Languages:**

Languages	Speaking	Reading	Writing
English	Good	Good	Good
Hindi	Good	Good	Good

8. **Employment Record:**

From: September 2010 – to – Present
Employer: RMSI Pvt. Ltd., Noida India.
Positions held: Senior GIS Engineer.

From: Jan 2010 – to – June 2010
Employer: Spatial Decisions.
Positions held: GIS Specialist.

9. **Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned**

Name of assignment or project: **Flood Management Improvement Support Centre - Conducting River Behavioral Analysis in Kosi River Basin.**
Year: 2014 - Ongoing
Location: Patna, Bihar, India
Client: Flood Management Improvement Support Centre (FMISC) Water Resources Department, Government of Bihar.
Main project features: The main objective of the project is to Review international literature on methods and models for predicting changes in river morphology using multi-year satellite images as a principal source of information on changing morphology and standard computational procedures for predicting the future morphological changes in alluvial rivers.
Positions held: Remote Sensing and GIS Specialist
Activities performed:

- GIS mapping for vulnerable locations and database preparation.

- Satellite image geo-referencing.
- Image classifying (Land-water-sand).
- Bank line delineation.
- Calculating erosion-accretion over time.
- Identification of sandbar movement.

Name of assignment or project: **HVRA for city of Vijayawada (AP) – Hazard Model.**
Year: 2014
Location: Noida, India
Client: UNDP
Main project features: The main objective of this project is to assess the extent of risk and the vulnerabilities of Vijayawada city particularly to climate related hazards (flood and heat wave) and epidemic hazards. The outcome of the study is expected to help identify a set of structural and non-structural steps that UNDP, City Administration and other stakeholders can take to mitigate the risks posed by various hazards. It also aims to consider the future climate change scenarios so that the development activities accommodate this to reduce the impact in the medium and long terms.
Positions held: Senior GIS Engineer
Activities performed:

- Development of hazard map using various data including high resolution satellite data
- Exposure Data Development using high resolution satellite data
- Preparation of Risk Atlas in GIS.

Name of assignment or project: **HVRA for city of Visakhapatnam (AP) – Hazard Model.**
Year: 2014
Location: Noida, India
Client: UNDP
Main project features: The main objective of the project is to assess the extent of risk and the vulnerabilities of Visakhapatnam city, particularly to climate related hazards. The outcomes of the study is expected to help identify a set of structural and non-structural steps that UNDP, City Administration and other stakeholders can take to mitigate the risks posed by various hazards. Positions held: Senior GIS Engineer
Activities performed:

- Development of hazard map using various data including high resolution satellite data
- Exposure Data Development using high resolution satellite data
- Preparation of Risk Atlas in GIS.

Name of assignment or project: **Timor Leste natural hazards risk assessment in communities along Dilli – Ainaro and Linked road corridor.**
Year: 2014-Ongoing
Location: Noida, India
Client: World Bank
Main project features: Assess and analyze the risks from flood, landslide and strong wind hazards at the Suco level in the districts of Ainaro, Aileu, Ermera and Manufahi with the primary purpose of informing Sucos on CBDRM planning. Develop localized hazard data for flood, landslide and strong wind hazards, as an input to the risk assessment process, and complement it with the existing risk data.
Positions held: Senior GIS Engineer
Activities performed:

- Data review, identification of gaps in collected data, and selection of approaches for gap filling

- Prepare data inventory report.
- Develop DEM as input for risk modelling.
- GIS based analysis for input preparation.
- Map creation.

Name of assignment or project: **Developing a comprehensive hazard profile for PNG.**
Year: 2013-2014
Location: Noida, India
Client: World Bank
Main project features: The analysis of the hazards occurrences, in PNG indicates inland and coastal flood as the major hazard in the five provinces of East Sepik, Madang, Morobe, New Ireland and Northern Provinces. In addition, earthquake hazard could not be neglected. The impact of inland flooding is seen in all the five provinces whereas earthquake is associated with 4 provinces - of East Sepik, Madang, Morobe, and New Ireland.
Positions held: Senior GIS Engineer
Activities performed:

- Collate multi-sectoral exposures encompassing buildings, infrastructure and demographics for showing the exposure to various hazards zones
- Delineation and characterization of hazard-prone areas for inland and coastal flood hazard
- Develop comprehensive probabilistic hazard intensity maps based on agreed conceptual/mathematical model for key return periods (2, 5, 10, 25, 50 and 100 years)
- Prepare the set of digital hazard datasets in proper GIS formats.
- Vulnerability and risk mapping.

Name of assignment or project: **Flood model development for India**
Year: 2013-Ongoing
Location: Noida, India
Client: Internal
Main project features: Flood Vulnerability Assessment of 36 Major Agglomerations in India.
Positions held: GIS Engineer
Activities performed:

- Hydraulic model setup for flood wave propagation, one-dimensional un-steady flow analysis, calibration of flood levels and water level simulations for design runoffs.
- Derivation of flood extent and flood depths in the GIS environment.
- Identification of various exposures at risk.

Name of assignment or project: **Preparation of New PMP Atlases and Updation of Existing PMP Atlases.**
Year: 2013-Ongoing
Location: Noida, India
Client: Central Water Commission
Main project features:

- Prepare new PMP atlases and to update PMP atlases of six river basins that have been prepared by the WAPCOS (I), Ltd. in 1998 under Dam Safety Assurance and Rehabilitation Project.
- To provide improved estimates of design storm rainfalls for different return periods as well as the PMP values for durations ranging from 1 to 3 days for stations in each of the river basins using their rainfall records.
- To provide generalized areal and grid point PMP maps for these three durations.

Positions held: GIS Engineer
Activities performed:

- Data review, identification of gaps in collected data, and selection of approaches for gap filling
- GIS analysis for DAD calculation.
- PMP map creation.

Name of assignment or project: **Development of Exposure Database for Public Buildings, Transport Sector and Flood Mitigation System in Belize**
Year: 2013-2014
Location: Noida, India
Client: World Bank
Main project features: To develop an exposure database for the transportation infrastructure, drainage and flood mitigation structures associated with the transportation system, and for public buildings in the country.
Positions held: GIS Engineer
Activities performed:

- Data review, identification of gaps in collected data, and selection of approaches for gap filling
- Designing and developing database structure
- Creation of exposure data for transport infrastructure, flood mitigation structure and public building
- Data migration to required format using Open source platforms

9.1.4 Kapil Sharma

1. **Proposed Position: GIS and Remote Sensing Expert**
2. **Name of Firm:** RMSI Pvt. Ltd. Noida India
3. **Date of Birth**: June 26th, 1990 **Nationality:** Indian
4. **Education:**

   M.Tech. (Master of Technology) in Spatial Information Technology from Devi Ahilya Vishwavidyalaya, Indore, Madhya Pradesh 2013.

   B.Tech. Electronics & Comm. Engineering (2011) IIMT Engg. College UPTU, U.P.
5. **Membership of Professional Associations:** None
6. **Training:**

   ArcGIS Desktop, ERDAS, JAVA, Quantum GIS, PostgreSQL Server 8.3.4, SQL Server.
7. **Countries of Work Experience:** India.
8. **Languages:**

Languages	Speaking	Reading	Writing
English	Good	Good	Good
Hindi	Good	Good	Good

9. **Employment Record:**

From: May 2014 – to – Present
Employer: RMSI Pvt. Ltd., Noida India.
Positions held: GIS Engineer.

From: August 2013 – to – May 2014
Employer: India Meteorological Department (IMD), Delhi.
Positions held: Junior Research Fellow (JRF).

10. **Work Undertaken that Best Illustrates Capability to Handle the Tasks Assigned**

Name of assignment or project: **Conducting River Behavioral Analysis in Kosi River Basin**
Year: 2014 - 2015
Location: Patna,India
Client: Water Resource Department and Center for Environmental and Geographic Information Services (CEGIS), Bangladesh.
Main project features: The main objective of the project is to Review international literature on methods and models for predicting changes in river morphology using multi-year satellite images as a principal source of information on changing morphology and standard computational procedures for predicting the future morphological changes in alluvial rivers . . Select and elaborate on approach/model for understanding morphological behavior of Kosi, Kamla and Bhutahi rivers of North Bihar, to predict annual changes in river courses using historical data on morphological features derived from satellite images.
Positions held: GIS Engineer
Activities performed:

- Image classifying(Land-water-sand)
- Bank line delineation and change analysis in GIS

Name of assignment or project: **HVRA for city of Vijayawada (AP) – Hazard Model.**
Year: 2014
Location: Noida, India
Client: UNDP

Main project features: The main objective of this project is to assess the extent of risk and the vulnerabilities of Vijayawada city particularly to climate related hazards (flood and heat wave) and epidemic hazards. The outcome of the study is expected to help identify a set of structural and non-structural steps that UNDP, City Administration and other stakeholders can take to mitigate the risks posed by various hazards. It also aims to consider the future climate change scenarios so that the development activities accommodate this to reduce the impact in the medium and long terms.
Positions held: GIS Engineer
Activities performed:

- Development of cyclone hazard map
- Exposure Data Development using high resolution satellite data
- Preparation of Risk Atlas in GIS.

Name of assignment or project: **HVRA for city of Visakhapatnam (AP) – Hazard Model.**
Year: 2014
Location: Noida, India
Client: UNDP
Main project features: The main objective of the project is to assess the extent of risk and the vulnerabilities of Visakhapatnam city, particularly to climate related hazards. The outcomes of the study is expected to help identify a set of structural and non-structural steps that UNDP, City Administration and other stakeholders can take to mitigate the risks posed by various hazards. It also aims to consider the future climate change scenarios so that the development activities accommodate this to reduce the impact in the medium and long terms.
Positions held: GIS Engineer
Activities performed:

- Cyclone data preparation
- Development of cyclone hazard map

- Exposure Data Development using high resolution satellite data
- Preparation of Risk Atlas in GIS.
- Risk Assessment.

Name of assignment or project: **Timor Leste natural hazards risk assessment in communities along Dilli – Ainaro and Linked road corridor.**
Year: 2014-Ongoing
Location: Noida, India
Client: World Bank
Main project features: Assess and analyze the risks from flood, landslide and strong wind hazards at the Suco level in the districts of Ainaro, Aileu, Ermera and Manufahi with the primary purpose of informing Sucos on CBDRM planning. Develop localized hazard data for flood, landslide and strong wind hazards, as an input to the risk assessment process, and complement it with the existing risk data.
Positions held: GIS Engineer
Activities performed:

- Data review, identification of gaps in collected data, and selection of approaches for gap filling
- Return Period calculation for Strong Hazard
- Prepare data inventory for Strong Wind Hazard.
- Develop DEM as input for risk modelling.
- GIS based analysis for input preparation.
- Map creation.

Name of assignment or project**: Consulting Services for Hazard, Risk and Vulnerability Assessment for 13 States and UT's in India**
Year: 2013-Ongoing
Location: Noida, India
Client: NDMA
Main project features: assess the extent of risk and the vulnerabilities for 13 state and UT's in India. To develop an exposure database for the transportation infrastructure, drainage and flood mitigation structures associated with the transportation system, and for public buildings in the country.
Positions held: GIS Engineer
Activities performed:

- Data review, identification of gaps in collected data, and selection of approaches for gap filling
- Data development using GIS and high resolution satellite data
- Designing and developing database structure

Name of assignment or project: **Operational Research to support Mainstreaming of Integrated Flood Management under Climate Change-IFM Phase II.**
Year: February 2014 - Ongoing
Location: Bihar ,Odisha
Client: Asian Development Bank (ADB)
Main project features: TO develop strategic framework for flood mitigation and flood management for the Buri Gandak and Brahmani/Baitarani sub-basin in Bihar and Odisha.This will be achieved through designing the mechanisms to mainstream integrated flood management (IFM) and risk informed decision making under climate change scenario. The aim of IFM for a specific river basin or region is to arrive at a well balanced optimal combination of measure (=a strategy) providing a reduction of flood to a societal acceptable level at minimum economic and societal cost.
Positions held: GIS Engineer
Activities performed:

- Flood hazard and risk mapping in selective basin of Bihar and Odisha
- Data collection, topo and bathy survey and DEM creation.

9.1.5 Expert Review Committee

9.1.5.1 Pushpendra Johari

Name: **Pushpendra Johari**
Domain: IT for disaster risk management, ICT early warning
Number of years of experience: 24 years
Key value add to the project: Bring in extensive experience implementing multi hazard risk assessment projects, experience working with FEMA, US and IT skill for automating and decision support for disaster risk reduction
Education: Master in Science from MBM Engineering College, Jodhpur University
Country of experience: India, USA, Belize, Yemen, Morocco
Indian river basin/State experience: Yes

Brief profile:

- Pushpendra has over twenty years of experience in development of GIS based Natural Hazard Risk Assessment Software platforms, and their applications for mitigation, preparedness, response, and recovery. He spearheaded the RMSI **Hazard Risk Profile and Insurance product "PIER",** the award-winning web based application of 2011. He has developed the following desktop/ web abased catastrophic risk modeling software - Hazus-MH (FEMA US's risk assessment system, REMOS (Risk and Emergency Management System operation), RAROC (Risk adjusted return on capital), SLDP (State level disaster profiles), CLIMETRIX (Weather modeling for insurance), etc. He designed the distributed NAT CAT modelling platform for FlagstoneRe with a heterogeneous architecture with Linux based distributed servers and Microsoft technologies based frontend. He is Technical Advisor of the Risk & Insurance Business Unit at RMS and managed and developed a number of Decision support systems (DSS) for various agencies including the World Bank and National governments in India and African countries.

9.1.5.2 Dr. MVRL Murthy

Name: Dr. Murthy MVRL
Domain: Project Management, Hydro geological Studies, Ground Water Development, Water Resources Management and Environmental Management
Number of years of experience: 35 years
Key value add to the project: Strong project management, and domain expertise - water resource management, environment policy and river basin management
Education: Ph.D in Civil Engineering (Water Resources Management and Engineering Geology) from

IIT, Kanpur and M.Tech in Applied Geology from Indian Institute of Technology, Roorkee (IIT, Roorkee)
Country of experience: India, Turkey, Bhutan, Nepal, Maldives, Sri Lanka, Bangladesh, Philippines, Thailand, China, Papua new Guinea, Niger, Timor Leste
India basin/State experience: Yes
Brief profile: Dr. Murthy heads the Risk and Insurance business unit of RMSI and has more than 30 years of experience. He joined RMSI with a strong project management and technical skill gained through working in various reputed organization in India. He has technical expertise in various field including Hydrogeological Studies, Ground Water Development, Groundwater Modeling, Water Resources Management, Watershed Management, and Environmental Management. His modeling and software skills includes Visual MODFLOW, MT3D, FLOW PATH, SUTRA, MOC, GW, IDRISI, AQUIFER TEST PRO, SURFER, CEQAL –II, SWAT, HEC, Soil Vision, FEFLOW, ARC-INFO, Ground Water Vistas and EASIPACE. During his career in government, research institutional and corporate he holds various senior positions and has implemented several large size water resource management projects. He has vast experience implementing risk assessment projects funded by federal, state and multi lateral agencies in India and abroad. His taskmaster and goal driven skill set has fetch him remarkable credibility and reputation in the academic and technical consulting field of water resource management.

9.2 Field Support Team

The Manav Kalp Jagran (MKJ), a local NGO based in Patna is supporting RMSI for local level coordination and field support in all four Districts. Two resource persons are engaged in this project.

9.2.1 Profile of Manav Kalp Jagran

Established in 2002, MKJ is working in the field of Environment, Disaster Management, Agriculture, Health, Education and Culture as well as intervention/relief from Disasters/ Emergency related to Flood, Drought, Epidemic,etc. The organization is registered under Societies Act 21, 1860. It works for continued improvement in society through activities related to disaster management, agriculture, environment, and health & education. In addition to this, it has also a dedicated team who works for the welfare of the society by improving their economic status by way of providing innovative and effective solutions to generate livelihood opportunities like home based organic fertilizer production for their own farm, Dairy farm, Goat farm, Small scale Business, women empowerment centre etc.

Manav Kalp Jagran
Road No. 08, Ashok Nagar, Kankarbagh,
Patna-20, Bihar

Moreover, MKJ also does R&D in the field of Environment and Agriculture. Research programs are largely based on the local issues like Environmental Sustainability, Disaster Risk preparedness & Mitigation, Food Toxicity etc. focusing on grass-root level implementation (**Error! Reference source not found.**).

MKJ has extensively worked among the communities in the Ganges basin of Bihar. Activities include conducting social surveys, FGDs for understanding the community issues and to develop mitigation strategies for IFM.

9.2.1.1 Some of Important Projects Undertaken:

1. Awareness Programs:
    - "Istrii" for Women Empowerment.
    - "Rakhcha and Jan-Jan Surakcha" for Disaster Management.
    - "Rog Mukta Samaj" for Sanitation Awarerness.
    - Sikhcha ka Adhikar for Primary Education. Etc.
2. Technical Programs:
    - Agro Consultancy.
    - Animal treatment program through homeopathy medicine.
    - Plantation program.
    - Vermi Composting program.
3. Research level Program:
    - Agriculture research with farm & farmers.
    - Data Collection for Scientific research and Planning.
    - Training & Research Center for "Environment and Agriculture Interns".
4. Program for Technical training and awareness for Disaster Risk Preparedness & Mitigation -Wing established in Nov, 2014.
5. Some Special Project Undertaken:
    - Research on Effect of Silicon on Monocots plants and its awareness among the farmers.
    - Supported RMSI, NOIDA on ADB funded project in Bihar Operational Research to Support Mainstreaming of IFM under Climate Change - Phase II .
    - Rain water harvesting Planning of A. N. College, Campus, Patna.

9.2.2 Local Project Manager

Mr. Bipin Prasad working as a Project Manager in MKJ, Patna (Bihar) will represent the RMSI at local level. Following are the activities he will support RMSI:

i. Coordinate with State and District Stakeholders and all concerned line departments;

ii. Attend all the required Stakeholder meetings at local level along with RMSI team;

iii. Arrange and attend meetings with all the concerned Line Departments in the Districts for one on one meeting; and

iv. Collect all the required data and information related to the project.

9.2.3 Associate (Field Support Team)

Mr. Vibhav Shankar Pandey, associated with MKJ, Patna (Bihar) will assist field data collection related tasks at District level in all four Districts.

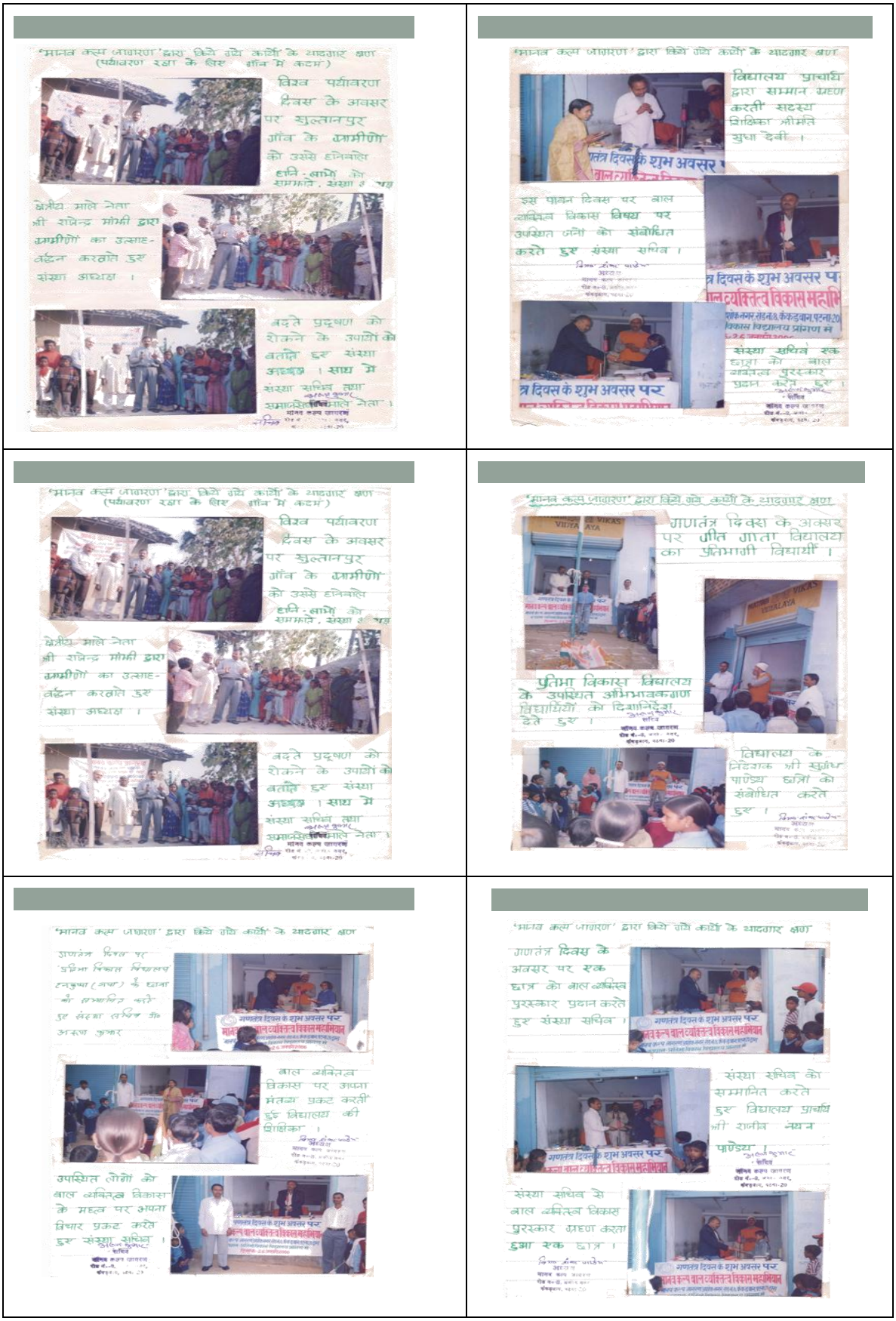
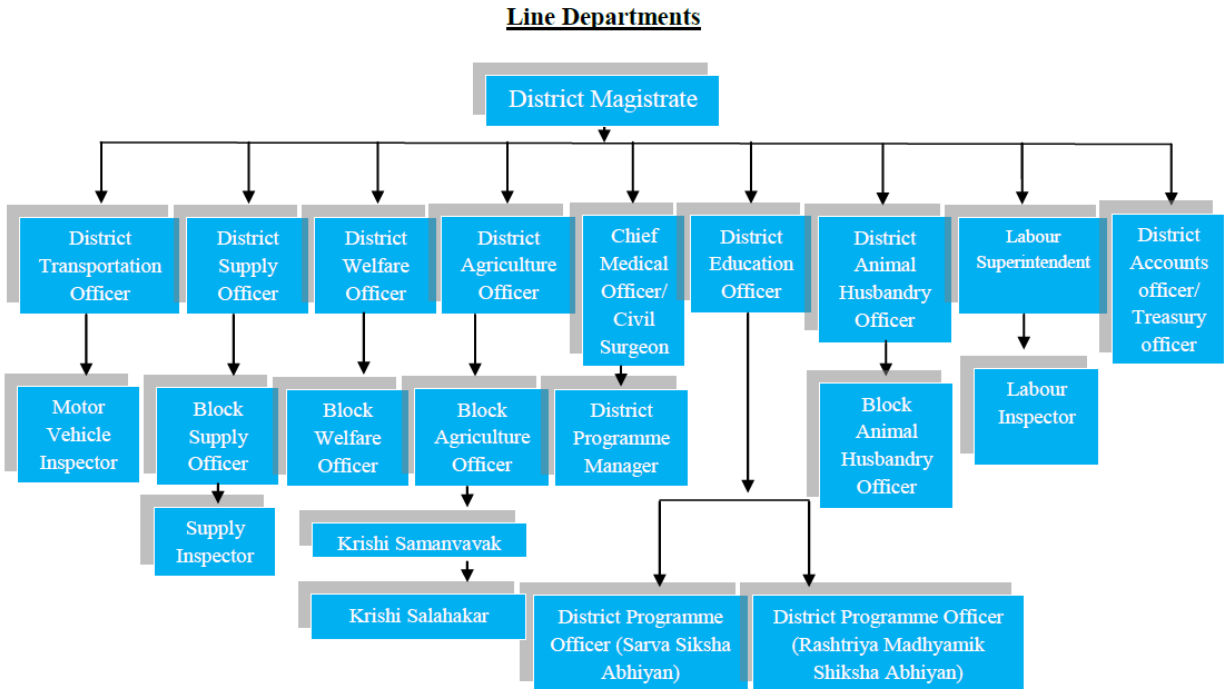


Figure 9-2 MKJ's Project Case Studies

10Appendix

Appendix 1: List of Key Stakeholders/ Line Departments in Bihar for Meeting

1.	Bihar State Disaster Management Authority
2.	Disaster Management Department
3.	Public Work Department
4.	Irrigation Department
5.	Health Department
6.	Fire Service Department
7.	Planning and Research Department
8.	Transport Department
9.	Police Department
10.	Local Administration Department
11.	Animal Husbandry Department
12.	Department of Agriculture
13.	Department of Education
14.	Department of Telecom
15.	Department of Science and Technology and Environment
16.	Department of Rural Development
17.	Town and Country Planning Department
18.	Electricity Department
19.	Department Women and Child Development
20.	Directorate of Accounts and Treasuries
21.	Fisheries Department
22.	Civil Supplies Department
23.	Finance Department
24.	Industry Department – factories and broilers
25.	Department of Civil Defense/Home Guard
26.	Civil Societies and Communities



In addition to the above-mentioned key departments, we will also consult with organizations and departments who are involved in preparation and mitigation of disaster at State/local level.

Appendix 2: Draft Table of Contents with outline for DRR Plan (Vol. 1) and District Response Plan (Vol. 2) for BSDMA Approval

Note: the text in *Italics* in parenthesis is the guide notes to show case the content of the respective section.

DISTRICT DISASTER MANAGEMENT PLAN OF BANKA DISTRICT

VOLUME-1
DISASTER RISK REDUCTION PLAN (Including Capacity Building and Mitigation)

Table of Contents

3.1 Macro Analysis

3.2 Micro Analysis *(Provide micro-analysis of the most vulnerable Panchayats/Wards in the district)*

Chapter 4: DDMP Development Strategy

Chapter 5: Stakeholder Analysis

Section II: Disaster Risk Reduction Plan (including Capacity Building and Mitigation)

District Disaster Management Authority (DDMA) of *Banka*

Chapter 6: Preparedness and DRR Plan of DDMA (This will be district specific as per the district situation)

6.1 DRR Mainstreaming Actions

6.2 Capacity Building Actions

6.3 Functional Continuity Actions

6.4 Emergency Preparedness Actions

Chapter 7: Mitigation and Development Planning (This will be district specific as per the district situation)

7.1 Mitigation Plans

7.2 Multi-Hazard Mitigation Actions

7.3 Specific Hazard Mitigation Actions

7.4 Specific Strategies and Projects for Mitigation

7.5 Development Plan

7.6 Advocacy of Emerging Issues for Strengthening Mitigation and Disaster Plan

Section III: Institutional Mechanism and Implementation Plan in District

Chapter 8: Institutional Mechanism for Disaster Management in Banka District (This will be district specific)

8.1 Introduction

8.1.1 Classification of the Institutions at District Level

8.1.2 Best Practices (Example) for Coordination and Integration at District Level (This will be district specific as per the district situation)

8.2 Role and Responsibilities of Stakeholders (This will be district specific)

8.2.1 Government Stakeholders (This will be district specific)

8.2.2 Non-Government Stakeholders

8.3 Mechanisms and Best Practices (Example) for Coordination and Integration at District Level (This will be district specific)

8.3.1 Essential Services Function (ESF) (This will be district specific)

8.3.1.1 Works of ESF (This will be district specific)

8.3.1.2 ESF Management Committee (This will be district specific)

8.3.2 Incident Response System (IRS) (This will be district specific)

8.3.3 Unified Response System (URS) (This will be district specific)

8.3.4 Quick Response Team/ Disaster Management Team (QRT/DMT) (This will be district specific)

8.4 Integration and Coordination at Various Levels (This will be district specific)

8.4.1 Vertical Integration from District to Gram Panchayat Level (This will be district specific)

8.4.2 Stakeholders Action Plans (This will be district specific)

Chapter 9: Linkages with District, Division, State, and National Plans (This will be district specific)

9.1 State and National Linkages

9.2 Management of Level 2 Disaster

9.3 Management of Level 3 Disaster

Chapter 10: Implementation of Plan (This will be district specific)

10.1 Authority/ Officials

10.2 Responsibility and Accountability

10.3 Financial Provisions for District

10.3.1 Funds Available at National and State level

10.3.2 Follow-up Actions

Annexure

Specific Action Plans for Line Departments (This will be district specific)

Department of Agriculture

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Animal Husbandry and Fisheries

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Bharat Sanchar Nigam Limited

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Building

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Education

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Energy

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Fire Services/Stations

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Food Corporation

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Food Supplies and Consumer Protection

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Health

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Industries

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Information and Public Relations

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Labour Resources

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Panchayati Raj Institutions

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Public Health Engineering/PHED

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Planning and Development

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Police

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Post and Telegraph

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Rural Development

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Science and Technology

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Social Security

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Statistics

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Local Area Engineering Organization

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Transport

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Urban Development

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Department of Water Resources

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Specific Action Plans for Gram Panchayat Committees (This will be district specific)

Gram Panchayat Children Council

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Gram Panchayat Disaster Management Committee

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Gram Panchayat Education Council

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Food and Nutrition Team

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Gram Panchayat Livestock Management Committee

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Gram Panchayat Shelter Team

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Gram Panchayat Social Protection Committee

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Gram Panchayat Water Sanitation and Cleanliness (WASH) Committee

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Gram Panchayat Health Committee

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Gram Panchayat Family Committee

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Learning Centre Committee

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Gram Panchayat Search and Rescue Committee

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Gram Panchayat Ward Member

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Specific Action Plans for other Non-Governmental Stakeholders (This will be district specific)

Educational Institutions

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Architect, Engineer, Diploma holder and Mason

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Worker and Artisan Group

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Business Groups (including Public Sector Corporate, Industry, SME, Traders); and Market and Market Union

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

SC and ST Union

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Former Army and Retired Professional Union

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Health Union (Medical association, Chemist and Druggist Association, RVC, Nurses)

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

(Name of District) Inter-Agency Group

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

National and International Media

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Local NGOs, International NGOs, UN Agencies, Red Cross, National NGOs

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Self-Help Group (SHG), Women, Farmers and Livelihood Groups

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Transporter Groups (Rail, Road, and Waterways)

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

Youth, NSS, NCC, Scout and Guide Group

1. Disaster Response and Rehabilitation Actions
2. DRR and Capacity Building Actions

VOLUME-2

DISTRICT RESPONSE PLAN of Banka District

(Including Checklists, Formats, and Resource Database)

Table of Contents

DEMOGRAPHIC AND CONTEXT DETAILS *(Provide details of demography, socio-economic data, hydro-climatological data of the district)*

RESOURCE DETAILS: *(Provide resource details in the district)*

VULNERABILITY RELATED DETAILS: *(Provide vulnerability related details of the district)*

DDMP ADVISORY BODIES

LIST OF MAPS

Formats and Questionnaire

Important Websites

Additional Information:

REFERENCES

- END OF INCEPTION REPORT --