Guideline for Formulation of a Upazila Disaster Risk Reduction (DRR) Action Plan

June 2025

The Project for Capacity Enhancement on Formulation and Implementation of Local Disaster Risk Reduction Plan (LDRRP)

Executive Summary: Guidelines for Formulation of a Upazila Disaster Risk Reduction Action Plan (UzDRRAP)

Date: April 2025

1. Overall Framework

1-1. Purpose and Scope of the Guidelines

Outlines the intent and scope of the UzDRRAP Guidelines, targeting Upazila-level planners to systematically reduce disaster risks through integrated planning, budgeting, implementing, monitoring & supervision.

2. Legal and Policy Framework

The “UzDRRAP” aligns with national and international frameworks such as SOD 2019, NPDM (National Plan for Disaster Management), Delta Plan 2100, and SFDRR.

2-1. Key Features of the UzDRRAP

The plan highlights the three key pillars like scientific risk analysis, risk-based target setting, and multi-agency coordination.

2-2. Benefit of the UzDRRAP

The appealing points to develop UzDRRAPs in the context both of local and national governance.

Key Benefit	Description
Efficiency	Coordinated actions reduce time, duplication and cost.
Risk Awareness	Shared understanding of hazard and vulnerability.
Project Preparation	DRR priorities help develop fundable projects (DPPs).
Local Ownership	Stakeholder participation ensures resilience and sustainability.
Global Reporting	Supports SFDRR and SDG monitoring.

2-3. Disaster Management Policy in Bangladesh

The UzDRRAP is aligned with major national policies in Bangladesh, like the Delta Plan 2100, 8th Five Year Plan, NPDM 2021–2025, and NSDS. These policies emphasize integrating disaster risk reduction into development planning, strengthening local government capacity, and promoting climate-resilient infrastructure. Strategic actions include climate-proofing polders, afforestation, adaptive agriculture, and increased investment in DRR.

2-4. Administrative Context and Integration

Explains the administrative framework under the Upazila Parishad Act, and how UzDRRAP bridges vertical and horizontal coordination gaps.

2-5. Alignment with the Sendai Framework

UzDRRAP aligns with SFDRR's four priorities: understanding risk, governance, investment in resilience, and building back better.

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3. Plan Structure and Contents

3-1 The table of Contents of the UzDRRAP

1. Introduction
2. General information (Upazila Profile)
3. Hazard and Risk Assessment
4. DRR Targets
5. Action Plan and Monitoring

3-2 Details the five chapters of the UzDRRAP

Chapter 1 - Introduction outlines the plan's objectives, legal status, and methodology.

Chapter 2 - General information describes Geographic, socioeconomic, and meteorological context.

Chapter 3 – Hazard Characteristic and Disaster risk focuses on Disaster risk assessment using hazard maps, past records, exposure analysis, stakeholder consultation, and scatter plots.

Chapter 4- Disaster Risk Reduction Target establishes Short-, medium-, and long-term DRR targets based on assessed risk and feasibility.

Chapter 5 – Action Plan for DRR Measures outlines structural and non-structural measures, responsible agencies, and monitoring mechanisms.

Overall, the guidelines promote evidence-based, participatory DRR planning at the Upazila level, integrating scientific analysis with local knowledge to develop practical and actionable plans.

Key Elements in Plan Formulation

1) Risk Assessment

Risk assessment follows the formula "Hazard × Vulnerability × Exposure," focusing on floods, storm surges, landslides, and earthquakes. The key steps include:

- Hazard Analysis using disaster records, hazard maps, and geographic data;
- Exposure Identification of people, housing, agricultural products, infrastructure, and critical facilities, especially in densely populated zones like city centers;
- Vulnerability Consideration based on socioeconomic and accessibility factors;

- Prioritization via Scatter Plots to highlight high-risk unions;
- Incorporation of Local Knowledge through meetings, workshops and fieldwork.

These elements together create the risk profile that guides DRR target setting and action planning.

2) Setting DRR Targets

DRR targets are defined based on the results of risk assessment and the local context. Each target considers the following perspectives:

- **Geographic Focus**: Identification of priority unions and critical assets.
- **Time Horizon**: Short to medium term (up to 10 years) / Long term (beyond 10 years)
- **Outcome Indicators**: For example, reduction in flood-affected households or increased community preparedness.
- **Prioritization Criteria**: Based on risk levels, technical feasibility, and social considerations. For instance, in case of river bank erosion, DRR target is described as follows:

Hazard	Area	DRR Target (Short and mid) term)	DRR Target (Long term)
Riverbank Erosion	Along rivers	Control the progress of riverbank erosion by emergency measures at riverbanks, revetment, revetment maintenance and dredging in areas with significant erosion damage.	Reduce the risk of riverbank erosion in the entire riverfront area through riverbank revetment and channel improvement, etc.
	Char area	Control the progress of riverbank erosion by emergency measures for riverbanks and dredging in areas with significant erosion damage	Reduce the risk of riverbank erosion in administrative and commercial centers through emergency measures and dredging of revetments in some areas

Targets are finalized through consensus among stakeholders and serve as the basis for program formulation in the action plan.

3) Action Plan and Implementation Framework

The action plan illustrates DRR targets into operational strategies using a logical framework of Objectives and Programs:

- **Objectives**: Medium-term results derived from DRR targets (e.g., reduction of flood-related crops and housing loss).
- **Programs**: Sets of structural and non-structural measures organized to achieve each objective. A single objective may be supported by multiple programs.

Key components of the action plan include:

1. Classification of Measures:
   - Structural (e.g., embankments, shelters, drainage)
   - Non-structural (e.g., awareness campaigns, evacuation planning, early warning systems)

2. Prioritization:
   - Based on risk levels, vulnerability, feasibility, and cost-effectiveness
3. Implementation Responsibilities:
   - Each program is assigned to lead and supporting agencies (e.g., LGED, BWDB, DDM, PWD, NGOs)
4. Timeframe:
   - Implementation phases are categorized as short-, medium-, or long-term
5. Budget Alignment and Integration:
   - Ensures coordination with DPPs, ADPs, and national funding mechanisms

Objective	Related Program Example	Lead Agency	Timeframe
Reduce earthquake-related fatalities	Shelter retrofitting	LGED + PWD	1-3 years
Improve evacuation readiness	Public awareness campaign	DDM + NGOs	Ongoing
Reduce flood-affected area	Embankment construction	BWDB	5-10 years

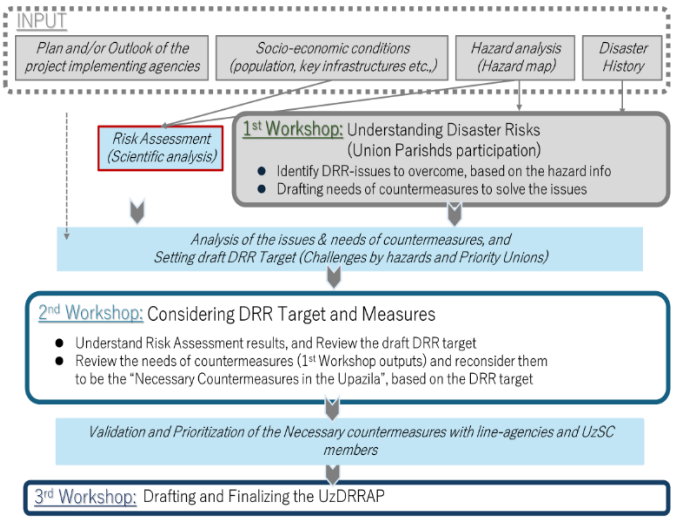
The action plan is continuously updated through coordinated efforts among UzDMC, UzSC, and Union DMCs, ensuring alignment with development priorities.

3-3. Planning Process Based on Field Activities

Chronologically outlines the entire planning process:

1. Inception and institutional setup
2. Data collection (hazard, baseline, GIS)
3. Risk analysis and issue identification
4. Community consultations and initial DRR targets
5. Development and refinement of countermeasures
6. Validation through UzSC and UzDMC meetings
7. Finalization and approval
8. Integration with development plans and monitoring

The above steps will be as follows in an event-based workflow:



Work flow of UzDRRAP elaboration

Conclusion

The guidelines reaffirms that UzDRRAP provides a structured, practical approach to mainstream DRR into local planning, enabling Bangladesh to achieve long-term resilience.

Prepared by: The Project for Capacity Enhancement on Formulation and Implementation of Local Disaster Risk Reduction Plan (LDRRP)

Date: April 2025

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Chapter 1 Introduction

1-1 Purpose of the Guidelines

This Guideline contains a concrete and simple explanation of the procedures and methods required for the development of a Upazila Diaster Risk Reduction Action Plan (hereinafter referred to as “UzDRRAP”), to support the officials of local-level administrative organizations and relevant agencies in Bangladesh to develop a UzDRRAP.

In this guideline, Upazila administration is a important target to enhance the UZDRRAP.

1-2 Scope of the Guidelines

The Disaster Risk Reduction Plan addressed in these guidelines is part of the Comprehensive Disaster Management Plan. The purpose of this guideline is to strengthen the capacity to develop a DRR plan in addition to the Contingency Plan that has been addressed in Bangladesh.

Figure-1-1 Risk Reduction Action Plan.

Therefore, the target users of this guideline are mainly DDM managers who are involved in the practical development of the Upazila DRR Action Plan and local consultants who manage workshops, collect and analyze information, and write the plan.

These Guidelines consist of the following four chapters.

Chapter 1: Purpose of the Guidelines
Chapter 2: DRR Planning Approach and Legal Background
Chapter 3: Planning Process and method

Chapters 1 and 2 are chapters designed to confirm a basic understanding of Local Disaster Risk Reduction Plan.

Chapters 3 provides a guidance for practitioners who actually formulate the plans, explaining the specific objectives of each chapter in UzDRRAP and necessary steps to organize the description.

Chapter 2: DRR Planning Approach and Legal Background

2-1 DRR Planning Concept and Legal Status of Bangladesh

1) What is the Disaster Risk Reduction Plan by Upazila DMC?

This Plan corresponds to the Risk Reduction Action Plan (RRAP) that is required to be developed as a part of the Disaster Risk Management Plan (DRMP) by Disaster Management Committees (DMC) at District, Upazila and Union DMCs, according to the Standing Orders on Disaster 2019 (SOD). In the SOD, it is recommended to prepare a RRAP by local DMCs, as well as a Contingency Plan. While the disaster response which is covered by the Contingency Plan has been relatively conducted as required in emergencies, risk reduction measures based on the objective hazard and risk assessment had not been sufficiently implemented at the Upazila level. In consideration of this situation and the importance of the DRR investment for the further development of the country, this plan, therefore, emphasises disaster risk reduction and proposes the necessary actions as a master plan corresponding to the RRAP of the Upazila Disaster Management Plan (UzDMP), which directly leads to the preparation of Development Project Proposals (DPPs) and Annual Development Programmes (ADPs).

While the UzDRRAP plays an advisory role to each implementing agency, it is also unique in that it is not the plan of the implementing agency itself. This is due to the special circumstance that the plan is developed by the UzDMC, a coordinating committee.

The Objective of UzDRRAP

The UzDRRAP is a document that organizes and expresses the Upazila administration's policy on disaster risk reduction based on objective hazard information and the sector plans of each Line Ministry.

The effective development and implementation of the plan require sustained coordination with implementing agencies. In this context, the roles of the Upazila Sub-Committee for Disaster Risk Reduction Planning (UzSC)-a local level body under the UzDMC and the Focal Point Operational Coordination Group (FPOCG)-a central-level advisory body led by LDRRAP Unit in DDM both defined in the Standing Orders on Disaster (SoD)—are crucial. These bodies are instrumental not only in shaping the content of the plan but also in ensuring its practical advancement through continuous inter-agency coordination and follow-up.

2) Features of the Plan

The features of this plan are 1) Scientific Analysis for Local Hazards, 2) Setting DRR Targets

based on Risk Quantification, and 3) Involvement of Project Implementing Agencies, which are expected to contribute to the actual execution of the effective countermeasures.

Feature 1: Scientific Analysis for Local Hazards:

The hazard maps are developed by technical analysis, which processes differ from the Community Risk Assessment (CRA) under the Comprehensive Disaster Management Programme (CDMP), using disaster records, Digital Elevation Model (DEM), and current hazard maps. The developed hazard maps represent the vulnerable areas of the Upazila, and help promote to objectively understand the hazard potential.

Feature 2: Setting DRR Targets based on Risk Quantification:

Risks in Upazila area are quantified based on risk quantification using the hazard maps and various factors such as natural conditions and socio-economic factors and visualized to share with relevant agencies. A DRR target is set based on the result of identifying which areas are mostly affected by hazards, by these risk quantifications.

Feature 3: Involvement of Project Implementing Agencies:

The Upazila Sub-Committee (UzSC), which is composed of the Upazila chairman, UNO, PIO, engineers from LGED, BWDB, and DPHE in the Upazila, Upazila officials, Union Parishad chairman, is established to identify disaster risks and consider priorities of countermeasures against the disasters at the Upazila level. Since the committee at the Upazila level does not have the authority to determine the countermeasures listed in the plan to be implemented, the members from the line ministries at the central level are involved in the planning processes to promote the schemes/projects listed in the UzDRRP and secure budgets.

2-2 Benefit of the Upazila Disaster Risk Reduction Action Plans

Participation of potential stakeholders, in particular responsible agency like Line ministries and various kinds of development project partners such as urban planning and infrastructures such as roads, bridges, and riverbanks as well as health and education sectors must be a key element to establish a subcommittee that is planned in the Upazila DRR Action Plan Formulation Project initiated by DDM.

To encourage those stakeholders to be involved in the planning process of DRR Action Plan in Upazilas, DDM, DRRO and PIO as main organizers of planning session, is expected to explain the benefits of making DRR Action Plans at the time of inception.

The benefits and advantages of making DRR plan at local administration level will also be one of the necessary topics of discussion at the beginning of the planning process when UzSC is established.

Although it will be identified in detail in the local context, in general, at least three benefits should be shared among stakeholders as a consensus.

First,

Cost efficiency for disaster management

Investment to the disaster prevention, such as installing permanent dykes against flood instead of putting sand-bags temporarily on the riverside, it will reduce the cost of disaster response and recovery, so that DDM and DMC are able to transfer their limited resources to much more vulnerable area. Eventually, more lives would be saved. Therefore, investment to DRR will help those who are committed to DM activity as well.

Second,

More available information on Hazard and vulnerability

Sharing information about disaster risk and vulnerability in local area, it will encourage the other sector's participation, and involvement of line ministries and line departments which are related to DRR issues. In addition to utilizing existing guidelines such as the CRA, more scientific approaches can be applied when the LDDRP project could collaborate with line ministries like LGED or DWDB. For example, in case of planning in Sunamganj, 2023, flood analysis method by BWDB has been applied in the UZDRRAP.

Using same information, same hazard maps, also helps stakeholders to encourage a common understanding among those line departments and ministries.

Information on local risk and vulnerability will also help the people in other sectors who have not been familiar with and accustomed to making projects in consideration of DRR. Those stakeholders become able to refer those risk information. For them, the DRR document can provide good reasoning of how the DRR project is important and can give some good explanation to them. Or it could provide accurate explanation on their DPP that avoid certain disaster risk there.

And furthermore,

Appealing to international society on DRR progress in Bangladesh

Compiling the DRR plans by DDM shall help MoDMR and Planning Commission to monitor the progress of DRR at national government level.

The disclosure of the progress of DRR as a monitoring of administrative execution of the GoB would lead Line ministries and international donors to get much more attentions to DRR related developments. Once the information on DRR related projects that the GoB have addressed through ADPs are openly share to the public, the information on UzDRRAPs enables them to obtain necessary information for future project design that they require before start seeking possibility to make DRR projects. The information of what they need is the ones, such as which projects have already done, how much the progress has been made in terms of DRR, and which areas remain to be developed as an area more vulnerable to natural disaster for the next challenges. Such information is always required for decision making. In this regard, UzDRRAP is expected to function as a master plan in general term.

2-3 Disaster Management Policy in Bangladesh

The formulation of the UzDRRAP and the implementation of the countermeasures against disasters are in line with government strategies, policies, and plans of the country, as listed below.

The Bangladesh Delta Plan 2100 mentions the importance of strengthening the disaster risk management and combating the effects of climate change.

8th Five Year Plan (July 2020-June 2025) emphasises appropriate policy and institutional capacity building to address their concerns on climate-resilient development and disaster management at all levels of the government, especially at the local government level where most of the programmes are to be implemented.

The National Plan for Disaster Management (NPDM 2021-2025) focuses on "Making disaster risk reduction a development practice to achieve resilient public investment and the SDGs" and "Building capacity and leadership to implement NPDM 2021-2025 at the national and local level".

National Sustainable Development Strategy (2010-2021), NSDS identifies disaster risk reduction and climate change as one of the three cross-cutting areas that are critical to achieve sustainability in Bangladesh. The NSDS emphasizes the need to scale up investments in disaster risk reduction so that a suitable environment for the economic and social development of the country can be created in the face of climate change. Some of the specific strategies include the rehabilitation and climate proofing of coastal polders, disaster risk reduction, mainstreaming disaster risk reduction and climate change, coastal char land afforestation, development of climate stress tolerant crop varieties and utilization of climate change funds.

*more information on NSDS P.235-238

2-4 Disaster Risk Reduction Considerations in Local Administration

1) Overview of the local administration system in Bangladesh

The highest administrative unit in Bangladesh is the Division, which divides the country into eight divisions and 64 districts. Under each division are some-Districts, under each Districts are some Upazilas, and under each Upazilas are some unions.

In urban areas, however, there are two types of cities: core cities (City Corporation) and regional cities (Paurashava). Core cities are located in large cities that lead economic development as industrial clusters, and as of 2024, there are 12 core cities in the country. Regional cities are established in rural areas where the population is concentrated and the center of economic and social activities, and as of 2024, there are 392 regional cities in Bangladesh.

There are 495 Upazilas nationwide; Upazilas encompass unions and pourashavas and are located in the middle of the local administration hierarchy.

Upazilas coordinate and prioritize the development needs of unions and local cities within their area and implement them.

Seventeen project implementing agencies (including LGED and DPHE) were transferred to Upazila Parishad under the Upazila Parishad Act (2009), however, at this moment the budgets of the line departments transferred to Upazila continue to be allocated from the headquarters of the respective project implementing agencies, and work instructions are generally given by the higher-level line project implementing agencies' organizations.

Upazila's administration is headed by the Chief Executive Officer (Upazila Nirbahi Officer: UNO). The staff of the 17 implementing agencies were transferred by the Upazila Parishad act to the Upazila Council, which is composed of elected members of the Upazila community, to carry out their duties under the direction of the Upazila Council. However, the staff of each implementing agency is still working under the vertical line of command of their respective central line agencies. Against this background, there is generally not enough coordination among implementing agencies within Upazila.

Table 2-1 Transferred Line Department Office

Upazila Nirbani Officer (UNO)

Transferred Line Department Office

1) Upazila Agriculture Office – Department of Agricultural Extension (DAE)
2) Livestock Office – Department of Livestock Services (DLS)
3) Fisheries Office – Department of Fisheries (DoF)
4) Family Planning Office – Directorate General of Family Planning
5) Health and Family Welfare Center – Ministry of Health and Family Welfare
6) Engineering Office (LGED) – Local Government Engineering Department
7) Public Health Engineering Office – Department of Public Health Engineering (DPHE)
8) Social Services Office – Department of Social Services
9) Women Affairs Office – Department of Women Affairs
10) Youth Development Office – Department of Youth Development
11) Cooperative Office – Department of Cooperatives
12) Rural Development Office – Bangladesh Rural Development Board (BRDB)
13) Primary Education Office – Directorate of Primary Education
14) Secondary Education Office – Directorate of Secondary and Higher Education
15) Technical Education Office – Directorate of Technical Education (in some Upazilas)
16) Forestry Office – Department of Forest (in forested Upazilas)
17) Irrigation Office – Bangladesh Agricultural Development Corporation (BADC) (in agricultural areas)

*Sourcce: Upazila Parishad Act

*Accountability for disaster management projects of 17 implementing agencies transferred to the Upazila Council (but not BWDB)

Thus, given the current state of reform in the Upazila Parishads, there are still many challenges for Upazila initiatives, even though 17-line departments have been transferred to the Upazila.

In this DRR plan formulation, it is expected to play a role in promoting horizontal collaboration and communication in the Upazila administration in the DRR field through the process of plan formulation.

Since the UzDRRAP will be prepared by the Disaster Management Committee (UzDMC) of Upazila, of which Paurashava is one of the members, the projects in the plan will encompass those of Paurashava and the City Corporation mentioned above.

In particular, road bridges, drainage management, water supply, waste, and other public facilities (shelters, hospitals, schools) in the Porushova urban plan are important from the perspective of disaster management, and collaboration and coordination with other line departments such as LGED will help to prevent duplication of projects.

2) Disaster Risk Reduction Considerations in the Upazila Parishad Act

The role of disaster risk reduction (DRR) in the Upazila Parishad Act, 2009 is to enhance the capacity and resilience of the local government bodies and the communities to cope with natural and man-made disasters. According to the Act, the Upazila Parishad has the following functions and responsibilities related to DRR[1]:

- To prepare and implement disaster management plans for the Upazila area in coordination with the district and national authorities.
- To mobilize resources and allocate funds for disaster prevention, preparedness, response and recovery activities.
- To coordinate with the relevant government agencies, non-government organizations, civil society groups and local people for disaster risk reduction and emergency relief operations.
- To establish and maintain early warning systems, shelters, evacuation routes, communication networks and other facilities for disaster management.
- To conduct awareness campaigns, training programs and drills on disaster risk reduction and safety measures for the Upazila officials, staff and residents.
- To monitor and evaluate the disaster management activities and report to the higher authorities on a regular basis.

The Upazila Parishad Act, 2009 also empowers the Upazila Nirbahi Officer (UNO) as the chief executive officer of the Upazila Parishad and the head of the Upazila Disaster Management Committee (UDMC). The UNO is responsible for following issues:

- Implementing the decisions and directives of the Upazila Parishad and the UzDMC regarding disaster management.
- Supervising and coordinating the activities of the Upazila administration, the Upazila project implementation officer, the Upazila engineer, the Upazila health and family planning officer, the Upazila education officer, the Upazila agriculture officer, the Upazila livestock officer, the Upazila fisheries officer, the Upazila social welfare officer and other officers related to disaster management.
- Liaising with the district administration, the national disaster management authority, the armed forces, the police, the fire service and other agencies involved in disaster management.
- Ensuring timely delivery of relief materials, medical services, water supply, sanitation and other essential services to the affected people.
- Maintaining law and order, security and public order during and after disasters.

[1] http://bdlaws.minlaw.gov.bd/act-details-760.html

3) Relationship between the development plans of District, Upazila, Pourashava and the UzDRRAP

The two main relevant laws for urban planning and infrastructure development in local administration are the "Local Government Act, 2009" and the "Urban and Regional Planning Act, 2015".

The "Local Government Act (Paurashava), 2009" defines the duties of local cities and empowers them to formulate urban planning master plans and develop infrastructure.

Meanwhile, the "Urban and Regional Planning Act, 2015" presents the necessary permits for the use of all public and private lands and provides discipline in land management to prevent unplanned urbanization.

Development policies and DRR need to be consistent. In particular, knowing land use policies is very important for DRR. However, in Upazila, financial and human resources are generally scarce and budgets are limited, and there are only a few Upazilas in the country that have master plans or five-year plans. If a master plan or Upazila development plan can be referenced, it is important to check the status of infrastructure development. The plans may also include the disaster management strategies and roles of Upazilas mentioned above.

Meanwhile, the Divisions and Districts in Bangladesh have master plans or development plans that guide their socio-economic and environmental development. These plans are prepared by the respective local government bodies, such as the city corporations, the district councils, the upazila parishads and the union parishads, in consultation with the relevant stakeholders and experts.

In case of the areas where Bangladesh Economic Zone Act is adopted (EZ), such as Mohenshkhali Upazila in Cox’s Bazar District, Chattogram division, three EZs are designated based on Mohenshkhali-Matarbari Integrated Infrastructure Development Initiative (MIDI). Those initiatives also helps to understand land use strategies in target Upazila and see the impact of the natural disasters.

Master plan also can be obtained by some Pourashavas, which currently, there are 392 Pourashavas in Bangladesh. However, not all the Pourashavas have master plans.

4) Inter-Upazila Coordination and Infrastructure Consistency

DRR countermeasures should not be confined to a single Upazila but require coordination with adjacent Upazilas and District-level initiatives. Especially for infrastructure development, consistency must be ensured through prior coordination, such as:

- **Embankment continuity (e.g., between Ramu and Cox's Bazar)**
- **Road elevation and drainage systems**

Institutionalize pre-consultation mechanisms through UzSC, District DMCs and DDM.

2-4 DRR as global agenda - SFDRR and SDGs

SENDAI Framework on Disaster Risk Reduction (SFDRR)

The SFDRR represents exactly the meaningfulness of preparing and implementing Local Disaster Risk Reduction Plans in which the guidelines are aiming to.

In 2015, the UN World Conference on Disaster Risk Reduction was held in Sendai, Japan, with the participation of about 180 countries, including Bangladesh. The Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR) was adopted as the outcome document of this meeting.

SFDRR and World Conference on Disaster Risk Reduction in Sendai

The SFDRR has upheld 4 priority actions and 38 targets and indicators.

Table 2-2 Four priority actions in SFDRR

Four priority actions	
Priority 1.	Understanding disaster risk
Priority 2.	Strengthening disaster risk governance to manage disaster risk
Priority 3.	Investing in disaster risk reduction for resilience
Priority 4.	Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation, and reconstruction

As indicators, a set of 38 indicators was identified to measure global progress in the implementation of the Sendai Framework for Disaster Risk Reduction. The indicators will measure progress in achieving the global targets of the SFDRR and determine global trends in the reduction of risk and losses. Indicators such as disaster mortality by 2030, reduction of number of affected people, economic loss and damage to infrastructures have been monitored at the initiative of UNISDR.

In terms of the priority 1-4, one of the most important indicators is Global Target E (GT-E), shown below.

Table 2-3. Global target (E) in SFDRR

Global target E: Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020.	
E-1	Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030.
E-2	Percentage of local governments that adopt and implement local disaster risk reduction strategies in line with national strategies. *Information should be provided on the appropriate levels of government below the national level with responsibility for disaster risk reduction.*

From the point of making UzDRRAP, every priority of actions of the SFDRR requires when any DRR strategy and plans are prepared.

First, ***understanding risks*** is a key to start planning and a fundamental part of the DRR Plan. Disaster risk management should be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment. Such knowledge can be used for risk assessment, prevention, mitigation, preparedness, and response.

Risk Governance is a second priority action in SFDRR. Disaster risk governance at the national, regional, and global levels is very important for prevention, mitigation, preparedness, response, recovery, and rehabilitation since tackling on DRR is not a single issue but in most case, cross-cutting issues. DRR must become every sector's concern. Disaster Mitigating projects which are mostly initiated by MoDMR, DDM, BWDB or LGED are not only projects which contribute to DRR, but also reexamination of the current development projects that might affect environment and might harm to the people should contribute to DRR through disaster and environmental impact assessment (EIA/DIA).

Without fostering collaboration and partnership among multiple sectors in the government and private sectors, comprehensive DRR plan cannot be done.

Furthermore, when it comes to the priority 3, ***investment for DRR***, country-wide disaster risk assessment and damage assessment is indispensable to make appropriate interventions to specific area which has disaster risk, avoiding biased and disorganized information created by mass media and social media. For instance, it might happen that domestic and international agencies rush into the one location as it is broadcasted as severely affected area right after disasters if there is not enough DRR information in advance. Strengthening the capacity of disaster risk assessment would lead both the GoB and international donors to efficiently allocate their resources. In this sense, priority

1 and 3 have close connection.

No.4 priority action of SFDRR is ***Building Better Society through Investment for Disaster Prevention***. It is important to determine the specific countermeasures of DRR into current every development plan when we make future design of the area, considering the disaster risk reduction during peacetime before disaster happens. Although the recovery, rehabilitation and reconstruction phase provide a critical opportunity to build back better, including through integrating disaster risk reduction into development measures, it would not be easy to start investigation for build back better development right after the disaster.

Therefore, the UzDRRAP would be a best document as a master plan to include broader and future perspective of DRR in the region.

Recently, year 2022, the Bangladesh Government published latest updates on the progress of the SFDRR, “

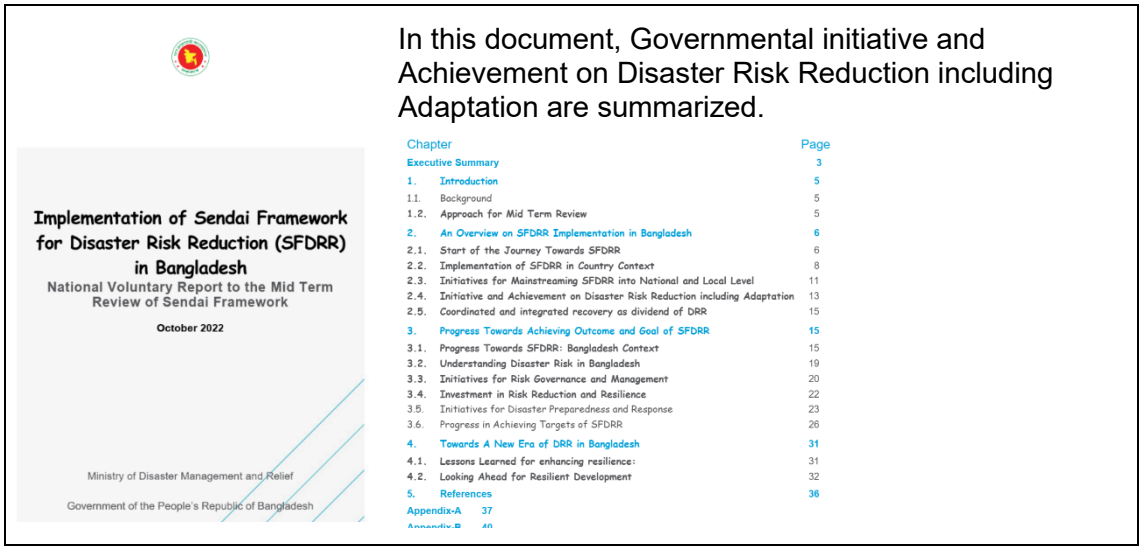


Figure 2-1 Mid-term review of SFDRR in Bangladesh

With regard to the investment to DRR, according to the document above, DRR and adaptation Fund: Total 8.8 % of National Budget was allocated to DRR Sector for last 5 years. In the 8th Five Year Plan from 2021 to 2025, around 9 to 11% of National Budget has been allocated to DRR which are closely link with climate adaptation.

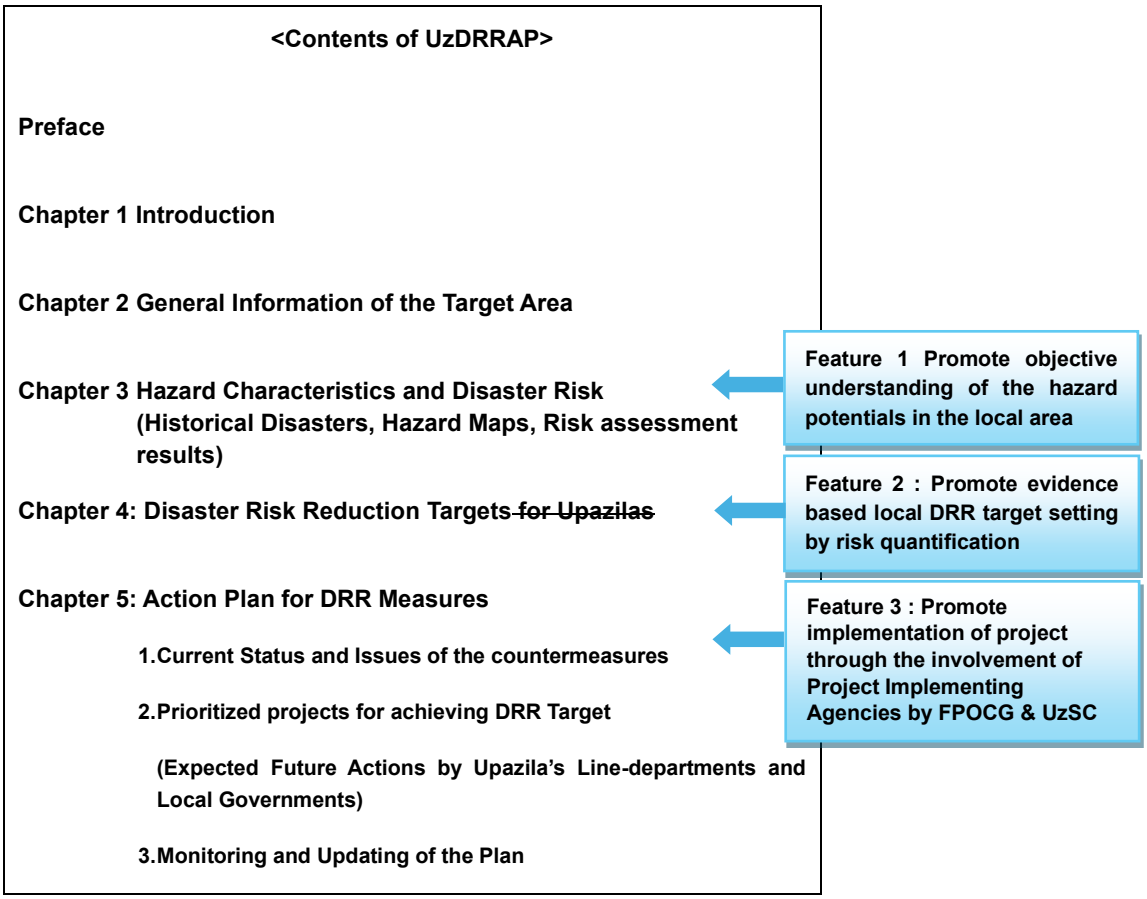
It is no doubt that SFDRR is the most influential global agenda while the Bangladesh Government is committed to some other initiatives.

Chapter 3 Planning Process and method

3-1 Structure of the Upazila Disaster Risk Reduction Action Plan

1) Structure of the Upazila Disaster Risk Reduction Action Plan

The structure of the Upazilla DRR plan is as follows



The Preface will contain the expression to authorize the plan. Usually, the UNO, the leader of the UzDMC, is asked to describe it.

Chapter 1describes the objectives, scope, legal status in Bangladesh, and characteristics of the Plan.

Chapter 2 describes the geographic and socioeconomic conditions of the target area. This information is essential for understanding the hazards analyzed in Chapter 3.

Chapter 3 presents an overview of the major hazards in Bangladesh: flood, storm surge (in coastal areas), landslide, and earthquake hazards.–This chapter identifies the damage caused by the hazard based on the hazard analysis and identifies the more vulnerable areas where DRR measures are needed from the point of both scientific risk assessment and the problematic issues that local people recognize.

Chapter 4 proclaims the mission and targets that should be achieved through the countermeasures detailed in Chapter 5.

Chapter 5 analyzes the DRR measures needed in the target areas and presents a list of action plans sorted by respective policies and programs based on DRR Target in Chapter 4.

Since this plan is not made by the implementing agencies, project promotion activities, such as DPP approval, will be undertaken by each line ministry, and the FPOCG and UzSC will involve in the development of the plan, and a process for updating and monitoring project promotion.

This guideline in Chapter 3 will provide guidance on what information to include, in what volume, and in what level of detail, when describing the contents of the plan.

In describing the plan, please refer to the description of six Upazilas in Cox's Bazar district, Sunamganji and Kurigram, which have been developed prior to this guideline, as well as the guidance by this document.

The order and content of the descriptions in Chapter 1 and 2 in UzDRRAP are, in many parts, common, and the logic of those plan can be re-utilized. Many parts can be described by simply replacing proper nouns while local context must be carefully considered in Chapter 3 to 5.

2) Data Reliability and Sources

Data used in the UzDRRAP should be collected and verified through the following three layers:

- **Initial information collection at the community level (e.g., CRA[2])**
- **Verification at the Union DMC and local government workshops**
- **Scientific validation using public data sources (e.g.,DRIP[3], GIS, remote sensing)**

All figures and tables must cite data sources, including year and institution.

[2] Community Based Risk Assessment
[3] Disaster and Climate Risk Information Platform, managed by DDM

3-2 DRR plan description

This section 3-2 introduces specific objectives and intentions of each chapter of the DRR plan, showing example statements as described in Section 3-1 “Structure of the Upazila Disaster Risk Reduction Plan”.

In addition, the notes, and description method of each item in each chapter of the UZDRRAP are also outlined in this section.

Throughout whole document, important practice of reporting must be emphasized. Whatever the contents are, in all chapters, whenever possible, sources should be clearly indicated (especially figures and tables).

UzDRRAP Chapter 1 Introduction

Chapter 1 of the UzDRRAP describes the objectives of the planning.

It shall include a summary description of the information provided in Chapters 1 and 2 of this guideline.

The sections of Chapter I are as follows.

1.1	**Purpose and aim of the Plan**
1.2	**Rationale for the formulation of the Plan**
1.3	**Legal Position of the Plan**
1.4	**Features of the Plan**
1.5	**Methodology for the development of the Plan**
1.5.1	**Institutional Arrangement**
1.5.2	**Planning Process**

The planning process in Chapters 1-5 of the UzDRRAP includes a parallel record of actual workshops held right next to the general 8-step flow diagram for DRR planning. The following are examples of UzDRRAP descriptions in Cox's Bazar (2023).

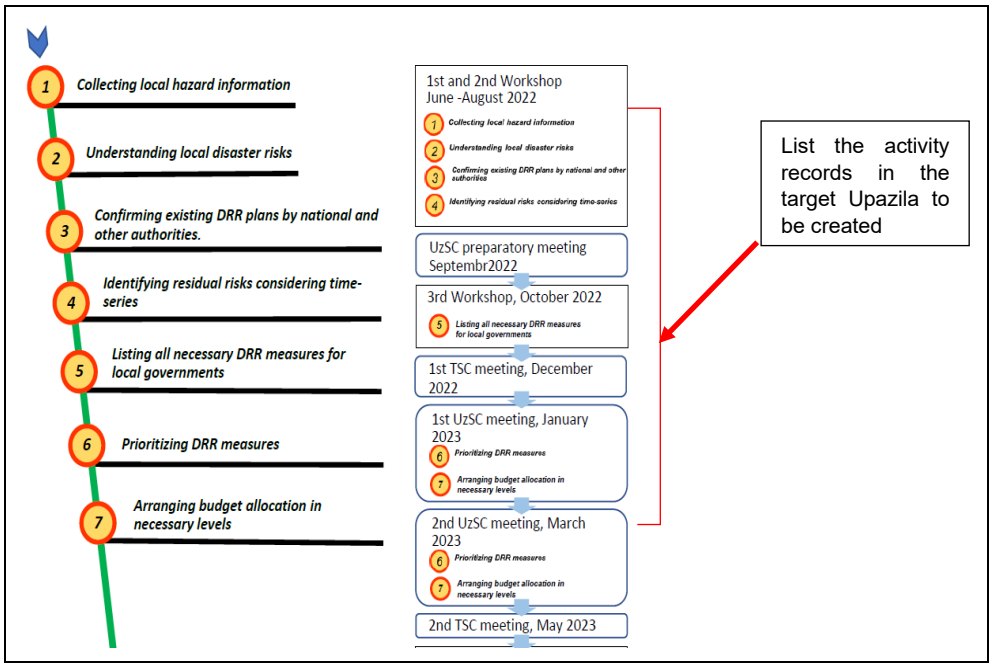


Figure 3-1 8 steps flow

UzDRRAP Chapter 1 can be identical in all Upazilas, except for the information on the history of workshops held since the purpose of the plan and legal background must be common in every plan.

Regarding the common description, please refer the document prepared in Cox's Bazar, Sunamganj and Kurigram.

UzDRRAP Chapter 2 General Information of the Target Area

Chapter 2 of the UzDRRAP describes the geographic, socioeconomic, and meteorological conditions of the target area, respectively.

These are the information that could cause the occurrence of a disaster or the spread of damage.

Each section in this chapter is organized as follows.

2.1	**Location and Geographic Conditions**
2.1.1	**Location of Upazila**
2.1.2	**Topography of the Upazila**
2.1.3	**River system of the Upazila**
2.2	**Socio-economic Conditions**
2.2.1	**Demography**
2.2.2	**Economy and industry**
2.2.3	**Urbanization**
2.3	**Meteorological Conditions**

UzDRRAP 2.1.1 Location of Upazila

Information on the location and Geographic Conditions of target Upazila can be found through National Spatial Data Infrastructure (NSDI), Bangladesh Geospatial Data Infrastructure (BGDI) and web research.

UzDRRAP 2.1.2 Topography of the Upazila

Topography (2.1.2) is an important information to analyze the cause of the hazards such as flood and sediment disaster. In this case, information is not necessarily limited to the rivers flowing within the boundaries of the Upazila, but if the flood-causing river is a transboundary river, information from a broader map that also shows the upstream areas originating in India is also needed.

UzDRRAP 2.1.3 River system of the Upazila

In DRR plans for frequently flooded areas, a schematic map of the basin is shown, as in the case of floods caused by large rivers that flow from their source in the Indian mountains, such as the Surma River (Sunamganj), the main cause of flooding may be the volume of water upstream, far from the affected area.

The description and maps of the basin shall be used as the information provided by the DDM initiative during the first and second planning workshops.

UzDRRAP 2.2 Socio-economic Conditions

Population statistics (UZDRRAP 2.2.1) is obtained from the most recent information from the statistical office in Upazila.

The year of the statistics obtained, such as 2011 or 2021, should be noted.

The reason for the Union's population is to determine the population of areas vulnerable to flooding and landslides. Human life is the most important factor to be protected in disaster management.

Therefore, it is desirable if it is able to collect information on the number of households, population, number of houses, and type of houses, not only in the Union but also at the ward level.

In addition, the number of people working in the ward level should be organized by occupation, so that the scale of the damage to coastal fishermen and farmers, for example, can be better understood. It is necessary to collect as much detailed population information as possible to be able to anlyaze affected population in Chapter 3.

Economic and industrial information (UzDRRAP 2.2.2) and urbanization (UZDRRAP 2.2.3) are important for understanding the size of industrial assets to be protected from hazards. Collected information is to be utilize when UzSC prepare Diaster Risk reduction Target in Chapter 4.

For example, in Cox's Bazar, special economic zones and coastal tourist areas emerge as damage potentials.

In other cases, reclamation of wetlands due to economic development causes the land to lose its function of storing and flowing water, increasing the flow into rivers and increasing the impact of flooding.

Such changes in land use due to development can be reflected in hazard analysis. Therefore, it is advisable to obtain a land use zoning map from the Ministry of Land when available; in the case of the plan for two Upazilas in Cox's Bazar, prepared in 2023, the map developed under the Coastal Land Zoning project was used.

Box-1

In Bangladesh, the Ministry of Land has been conducting land use zoning projects to ensure the planned and proper use of land. Under the Coastal Land Zoning project, digital land zoning maps have been prepared for 152 upazilas of 21 districts, covering the coastal areas of Bangladesh. Under the National Land Zoning (2nd Phase) project, digital land zoning maps have been prepared for 274 upazilas of 40 districts, covering the rest of the country. The land zoning maps take into account the quality and characteristics of land for various uses, such as agriculture, livestock, forestry, shrimp culture, industry, and biodiversity conservation.

In addition, according to the mid-term review of SFDRR, following governmental initiative is

undergoing;
Disaster Risk Integrated City Level Master Plan/ Land Use Plan under the initiatives by the Ministry of Housing and Public Works and Local Government Division under the Ministry of Local Government Rural Development & Cooperatives (LGRD &C) of the Government of Bangladesh.
One of the examples is available online below;
http://www.mudp.gov.bd/documents/reports/Structure_Plan_MUDP.pdf

However, it might sometimes be difficult to obtain economic and industrial plans at the level of the Upazila administration because they are often created by the district administration. In such cases, it is advisable to contact the administrative office or conduct web research to find the District Development Plan or Division Development Plan for the target area.

For example, in the case of Cox's Bazar, the Cox's Bazar Development Authority has published a development plan, which can be referred to.

*Notes: The Japanese government also supports development plans and master plans as economic cooperation to the Bangladesh government. For example, in Cox's Bazar, the Moheshkhali-Matarbari Development Initiative (MMDI) and other related documents can be referred to.

https://www.bd.emb-japan.go.jp/files/100130581.pdf

Thus, economic and industrial information can be organized from the documents of international donors investing in the region.

The following are some points to keep in mind when summarizing this information as Chapter 2.2.

- The information in 2.2 may identify an enormous amount of documentation. However, we must not forget the purpose of describing the impact of hazards on society and the mechanisms by which social conditions could promote disasters.
- To avoid unnecessarily long lists of economic plans and detailed analyses, the entire 2.2 should be summarized and described in two to three pages.
- At a minimum, it is sufficient to list the important key industries of the region.
- In Upazila, where the population is heavily concentrated in rural areas, "Urbanization" (Chapter 2.2.3) may be omitted in some cases.

UzDRRAP 2.3 Meteorological Conditions

UzDRRAP Chapter 2.3 Information on weather conditions is important for rainfall, which can trigger flooding and landslides.

Information on rainfall and temperature is not available at the Upazila level, but at the District or Division level. Since this information is subject to change due to climate change, the year of the information relied upon must not be forgotten.

UzDRRAP Chapter 3: Hazard Characteristics and Disaster Risk

Chapter 3 describes the types and characteristics of hazards in the target area and disaster risk.

For Chapters 3 through 5, quantitative analysis based on scientific data is important while for Chapters 1 and 2, information obtained on a document basis can be organized.

One of the features of this planning process is to share this analysis with stakeholders and to take advantage of the knowledge of local residents obtained during the planning workshops.

What is a hazard?

A natural hazard is a natural phenomenon or event that has the potential to cause harm to people, property, or the environment. Natural hazards often seen in Bangladesh are earthquakes, volcanoes, landslides, floods, droughts, storms, heat waves, wildfires, epidemics, and asteroid impacts.

Hazards in the target area shall be identified during the planning workshop.

In planning workshops, it is important not only to collect disaster history information from the community, but also to share with stakeholders in the workshop information on the scientific and objective analysis of the hazard potential of the area. That is one major aspect of this planning process.

Hazard maps that have been analyzed in advance by DDM-led experts in each hazard shall be used.

The hazard maps should be verified with local stakeholders such as unions, and may be added or modified based on the hazard information that local people have in their experience.

For this hazard map, JICA experts assisted in its preparation during the JICA project. After the project is completed, the hazard maps will be obtained by utilizing the hazard data provided by DDM or by requesting experts via DDM.

A simple method of hazard and risk analysis and utilization is proposed that can be applied at the level of local disaster management planning in Bangladesh (for details, please refer to the Hazard and Risk Analysis Guidelines in the separate paper).

＊The hazard analysis methodology shall be explained at the planning workshop. However, local information should be verified through workshop opportunities whenever possible.

It is important to ensure that no mistakes in the hazard analysis are pointed out later, when it comes time to analyze risks and prioritize countermeasures based on the hazard maps.

Suggested revisions based on additional data obtained are as follows.

At this time, the results of the analysis using the simplified method will be used as the basis for the plan, and the evaluation of priorities will also be used as the basis for the plan.

If additional data is submitted by workshop participants, it will be verified (at least until the second workshop).

If Union Parishads other than Priority Union Parishads **submits information that can be objectively evaluated as clearly indicating that significant damage** has occurred, those Union parishads may be included in the selection of Priority Projects, **regardless of the High Risk Union rating in the scatter plot in the Chapter 3.4.5**.

The damage that local people claim is evaluated from four aspects of the vulnerability, namely, environmental, physical, social, and economic vulnerability.

https://www.undrr.org/terminology/vulnerability

The sections of this chapter are generally organized as follows.

UzDRRAP 3.1 Disaster Record of the Upazila

Past disaster history shall be collected through questionnaires to Union Parishads, BWDB, LGED, and DPHE, and local disasters are extracted from the disaster database through DDM. 1st workshop for formulation of UzDRRAP is a good opportunity to start work.

Since the objective is to identify trends in disasters, the disaster history should not be limited to records of disasters in Upazila, but should be broadly described at the District or Region level, including the target Upazila。

UzDRRAP 3.2 Target Hazards of this Plan

It is clear that floods are the major disaster in Bangladesh, but the risk of occurrence of storm surge and landslide disasters varies from region to region.

For example, storm surge is a disaster specific to coastal areas, so it is not listed in Upazila,

which is located in an inland region.

Earthquakes, although a rare hazard in Bangladesh, are pointed out by experts as a potential risk because the interior of Bangladesh lies along a huge fault line formed by the collision of the Indian subcontinent and the Eurasian continent.

In some areas, lightning strikes, wind gusts, and droughts are considered major disasters. Therefore, items can be added as necessary to describe past disaster history for disasters that are difficult to organize as hazard maps.

Discussions on what to list as target disasters will be held with unions and other stakeholders through workshops.

The results of the workshop shall be compiled and included in this section.

UzDRRAP 3.3 Hazard map and disaster-prone areas by each hazard

For the 3.3 hazard map, the map prepared by the simplified analysis method will be utilized and a revised and additional map and outline will be included based on the results of the workshop.

Therefore, it is important for the person in charge of the Chapter 3 description (assumed here to be the local consultants) to summarize what was explained and discussed in the workshop on hazard and risk analysis in preparation for the Chapter 3 description.

The description should be concise, with at most one or two paragraphs of general description per disaster type. For an example, please refer to the DRR plan developed in Upazilas in Cox's Bazar district.

UzDRRAP Chapter 3.4: Disaster Risks

Chapter 3.4 of the UzDRRAP analyzes the human and economic damage caused by hazards such as flooding.

Terminology "Risk" is often used in connection with the term "hazard," but it is distinct from hazard.

While "Hazard" refers to the existence and magnitude of a potentially threatening phenomenon, such as a flood, landslide, or storm surge, "Risk" refers to the likelihood that a hazard will cause damage to society.

In other words, "Disaster Risk" is to be defined" the potential loss of life, injury, or destroyed or damaged assets"

It is characterized by the ability to measure damage quantitatively, such as the number of expected damages.

Hazard analysis" can be thought of as the analysis of the mechanisms of natural phenomena, and "risk analysis" as the analysis of the damage caused by such phenomena.

In these UzDRRAP Guidelines, the most basic element of risk is considered to be hazard exposure.

This is because most disaster vulnerabilities do not emerge without hazard exposure.

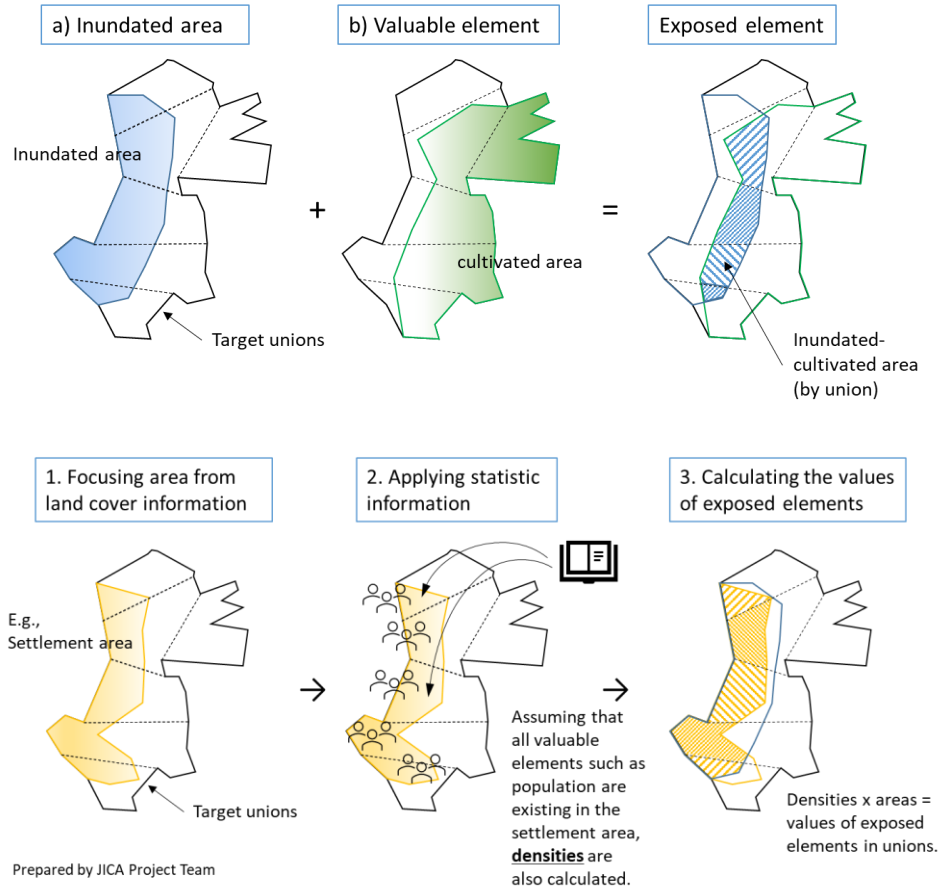


Figure 3-2 Exposure analysis

However, while it is correct to say that without hazard exposure, disaster vulnerability will not surface as damage, hazard exposure alone does not provide a full understanding of disaster vulnerability.

Disaster vulnerability must take into account not only hazard exposure, but also the underlying social, economic, and environmental factors.

In addition, disaster vulnerability is not constant; it varies with time and place. Therefore, to reduce disaster vulnerability, it is important not only to reduce hazard exposure, but also to enhance people's disaster preparedness and resilience.

Figure 3-3 Concept of risk

By analyzing the causes of hazards and the socioeconomic areas affected by floods and other damage, it is possible to consider what measures can be taken to reduce risk.

BOX-2 Nature-based & Impact-based Forecasting

In planning areas, DDM recommends to introduce the following forecasting methods:

- Estimation of inundation zones using vegetative and topographic changes (e.g., planting Hizal and Koros in haor areas)
- Impact-based forecasting that evaluates consequences on asset value and evacuation facility functionality

It is recommended to Integrate scientific forecasting with local knowledge to improve hazard and risk mapping if resources are sufficient and methods are developed enough. Further domestic and international cooperation in this field is expected.

In this connection, the moment right after the disaster is a good chance to observe the vulnerability in the affected area.

Mid Term Review of SFDRR 2022 pointed out the importance of strengthening this work as follows.

> *2.5. Coordinated and integrated recovery as dividend of DRR*
>
> *Damage and loss assessment Form called D-Form is such an instrument which facilitates to collect Gender, age, disability disaggregated data to use in recovery and development planning process. The data collection, analysis, validation and response and recovery planning crated a strong linkage from local to national through existing platform called disaster management committees. The higher-level policy decision making platform inter-ministerial committee is integral part for short-, medium- and long-term recovery through a multi-sector and stakeholders' engagement which fully aligned with Sendai Framework DRR planning frame from local to national, regional and international level. This is known as PDNA tool is mostly relevant with the first four targets of Sendai Framework and with other targets for recovery to promote build back better BBB) approach for recovery and DRR as well as tong term dividend for resilience.*
>
> *However, recovery with its full potential yet remained unexplored for a one and coordinated planning there need more transformational and coordinated efforts to make the one and sector integrated process for full and resilient recovery with credible data and adequate resource mobilization.*
>
> *Implementation of Sendai Framework for Disaster Risk Reduction (SFDRR) in Bangladesh*
> *National Voluntary Report to the Mid Term Review of Sendai Framework*
> *October 2022*

UzDRRAP 3.4.1	**Flood**
UzDRRAP 3.4.2	**Storm surge**

The risk of flooding and storm surge in UzDRRAP Chapter 3.4.1 and 3.4.2 is assessed by the area of agricultural land and residential area exposed to flooding and storm surge.

The planning in the two Upazila of Cox's Bazar was assessed in terms of paddy fields, residential areas, and population, assuming a 20-year probability of flooding, with maps and bar charts showing the area of inundated agricultural land in each union.

Box-3 Lesson learnt from the past project activity

*The analysis was limited to agricultural and residential areas in the planning of Cox's Bazar. One reason for this is that the baseline survey emphasized that agriculture is the main industry in Cox's Bazar's Upazila.

Another reason was that the Cox's Bazar plan was the first planning exercise attempted in the UZDRRAP project, and the planning process was initiated without launching the Technical Sub Committee[4] or UzSC. It is undeniable that the major agencies involved did not fully understand the UZDRRAP formulation at that time. Therefore, much had to be spent on time and costs to request their cooperation in the project. The result was that resources for research activities were limited to a few targeted surveys, and priority was given to sharing the results of the project UZDRRAP as soon as possible.

Risk assessment essentially requires a comprehensive risk vulnerability assessment that includes not only specific land cover conditions such as rice paddies and residential areas, but also socioeconomic infrastructure and social conditions in Upazila. While this should be the case, the actual planning process must take into account the availability of information necessary for the assessment, the time required for the planning process, and the level of capacity of the participants involved in the planning process.

At the same time, it is important to pay attention to ensure that the needs of stakeholders are not overlooked and that, at a minimum, the plan's objective of contributing to the promotion of DRR investment is secured. At the same time, however, a certain degree of compromise is required.

The amount of agricultural damage is calculated to identify priority areas to be addressed. It is important to quantify the amount of agricultural damage caused by flooding.

An example created in Cox's Bazar Sadar Upazila in 2023 is shown below.

[4] Technical Sub Committee was the entity established in the JICA LDRRP Project (2021-2025) to promote coordination among line agencies at the central government level for the preparation, the implementation, and the monitoring of the UzDRRAPs.

Table 4-1. Estimated Economic Loss by Flood

Union	Area of Inundated Paddy Field (≥ 0.3m) [ha]	Ratio (Inundated Area / All Paddy Field)	Estimated Economic Loss [Thousand Taka]
Bharuakhali	116.31	30.8%	22,674
Chaufaldandi	0.32	0.1%	63
Cox's Bazar Pourashava	0.00	-	0
Idgaon	73.86	9.3%	14,399
Islamabad	2.18	0.5%	426
Islampur	0.37	0.3%	73
Jalalabad	0.00	0.0%	0
Jhilwanja	**388.83**	**69.8%**	75,802
Khurushkul	1.54	0.3%	301
Patali Machhuakhali	**491.90**	**42.2%**	95,896
Pokkhali	0.00	0.0%	0
Total	1,075.32	30.8%	209,633

Notes: 1. 5.57 ton/ha of rice yield was used to estimate amount of affected rice production, which is based on data in "Yearly Production and Damage Report on Agriculture of Cox's Bazar Sadar Upazila, DAE" (2019, 2020 and 2021). https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0261128
2. The Unit price of rice was calculated with the data above (Note 1), to be 35 Taka/kg.

Table 4-1. Estimated Economic Loss by Storm Surge

Union	Area of Inundated Paddy Field (≥ 0.3m) [ha]	Ratio (Inundated Area / All Faddy Field)	Estimated Economic Loss [Thousand Taka]
Bharuakhali	194.32	51.4%	37,882
Chaufaldandi	170.43	29.2%	33,225
Cox's Bazar Pourashava	0.00	-	0
Idgaon	92.32	11.6%	17,997
Islamabad	38.98	9.5%	7,600
Islampur	36.09	28.7%	7,036
Jalalabad	27.11	9.8%	5,286
Jhilwanja	**404.92**	72.7%	78,939
Khurushkul	98.48	18.0%	19,198
Patali Machhuakhali	**673.11**	57.8%	131,223
Pokkhali	59.00	15.6%	11,502
Total	1,794.76	34.4%	349,888

Notes: 1. 5.57 ton/ha of rice yield was used to estimate amount of affected rice production, which is based on data in "Yearly Production and Damage Report on Agriculture of Cox's Bazar Sadar Upazila, DAE" (2019, 2020 and 2021). https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0261128
2. The Unit price of rice was calculated with the data above (Note 1), to be 35 Taka/kg.

Potential economic losses (flooding and storm surge) (Cox's Bazar Sadar, 2023)

As with agricultural damage, damage to residential areas is assumed to be caused by a 20-year probability of flooding, and the area of inundated residential areas in each union is shown in the map and bar chart.

As for the distribution maps and tables of the affected population, as with the agricultural damage, they basically refer to the materials used in the Hazard Risk Analysis workshop.

If necessary, please contact the hazard map creator via DDM.

Unlike agricultural damage, human damage (population) is not expressed in terms of the amount of damage because it is difficult to calculate the amount of damage.

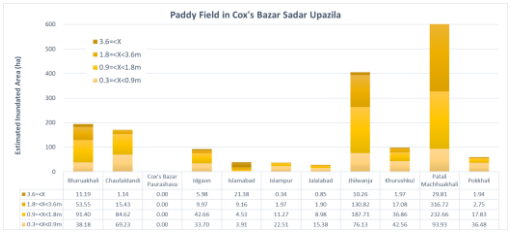


Figure 4-1. Inundated Area of Paddy Field by 20-year Return Period Storm Surge

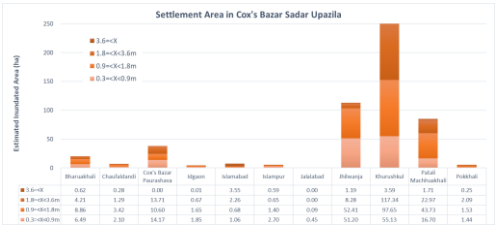


Figure 4-1. Inundated Area of Settlement by 20-year Return Period Storm Surge

Flooded areas (paddy fields and residential areas) during storm surge (Cox's Bazar Sadar, 2023)

GIS software shall be utilized to calculate this area. For this bar chart, basically the material used in the hazard risk analysis workshop can be utilized, but if there are any modifications, please refer to the risk analysis guidelines and contact the hazard map creator via DDM.

For the assumption of economic damage amount, rice crop is used as the target crop, and the yield per unit and unit cost are obtained from the Department of Agriculture（DAE), and this information is then multiplied by the damaged area (calculated using Excel).

UzDRRAP 3.4.3 Sediment Disaster

3.4.3 Regarding landslides, in the case of Cox's Bazar, only damage to residential areas was extracted, without assessing damage to agricultural land, due to the characteristics of the localized disaster and the most important risk of damage to houses.

However, this was based on consideration of the hazard characteristics of the target Upazila and is not necessarily applicable to other Upazilas.

As in the case of flooding storm surge, a bar chart and map of the residential land area to be affected, as presented in the workshop, are shown, and a table and map comparing the number of affected population by union is provided.

The amount of damage is more difficult to calculate than for agricultural land because it depends on the size of the impact of the disaster.

The plan developed in Cox's Bazar in 2023 does not calculate the amount of damage due to the relatively small size of the affected human settlements and agricultural lands considered from the previous disaster history and hazard maps, but if the damage from landslides is extensive, in order to compare the cost-benefit of countermeasures, the Union and Upazila, there is room to consider the amount of damage.

In such cases, the FPOCG should take advantage of the opportunity to discuss technical guidelines.

UzDRRAP 3.4.4 Earthquake Shaking

Earthquake damage has not often been evaluated in local disaster management planning in Bangladesh, although risk analysis has been done at the university research level in the past.

The risks associated with earthquakes have not been well understood until now, especially at local context. In contrast, the seismic risk assessments that the Bangladesh government has conducted in 12 major cities are noteworthy.

BOX-4 Understanding Disaster Risk in Bangladesh

Since 2007 more prominently in 2009 government of Bangladesh has started the culture of understanding disaster risk in order to take initiatives for better preparedness. In this regard, risk assessment process started in the country aimingthe prominent hazards in the context. Ministry of Disaster Management and Relief and Ministry of Housing and Public Works with the technical cooperation of development partners to initiatives for conducting Seismic risk assessment conducted (during 2007 to 2020) for 12 major cities in the country including Dhaka, Chattogram, Bandarban, Rangamati, Khagrachori, Bogra, Tangail, Dinajpur, Rajshahi, Mymenshingh, Tangail. Later on through National Resilience

Programme (NRP): DDM part of MoDMR with the technical assistance of UNDP the risk assessment are done in 4 earthquake prone cities/town – Rangpur City Corporation and Tangail, Rangamati, Sunamganj Municipality. Main focus of the assessment was to understand the existence of active faults, recurrence period of earthquake based on historical events, infrastructure/building and socio-economic vulnerabilities of elements in the cities and probable damage and loss from scenario earthquakes, areas with liquification potential.

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In addition, the Government of Bangladesh established the Earthquake Preparedness and Awareness Committee (EPAC) in line with SFDRR Priority Action 1: Understanding Risk in 2009.EPAC headed by Minister for MoDMR is one of the major information resources in Bangladesh.[5]

Research findings should be utilized in local disaster management planning. In workshops on hazard risk assessment in planning, it is desirable to introduce the findings of earthquake experts, and based on them, it is important to at least specify the damage assumptions of earthquakes caused by vulnerable house structures and consider countermeasures.

Considering the formulation of UZDRRAP, one important perspective in describing earthquake risk is the map showing the area's susceptibility to shaking (Chapter 3) as well as the governmental effort to start risk analysis described above. Another is the earthquake resistance of buildings.

Building structures in Bangladesh can be classified into the following four categories in terms of seismic hazards.

[5]https://ddm.portal.gov.bd/sites/default/files/files/ddm.portal.gov.bd/page/a3f4cc27_7f7d_4c2b_a1b0_166fe6bef73b/epac-1.pdf

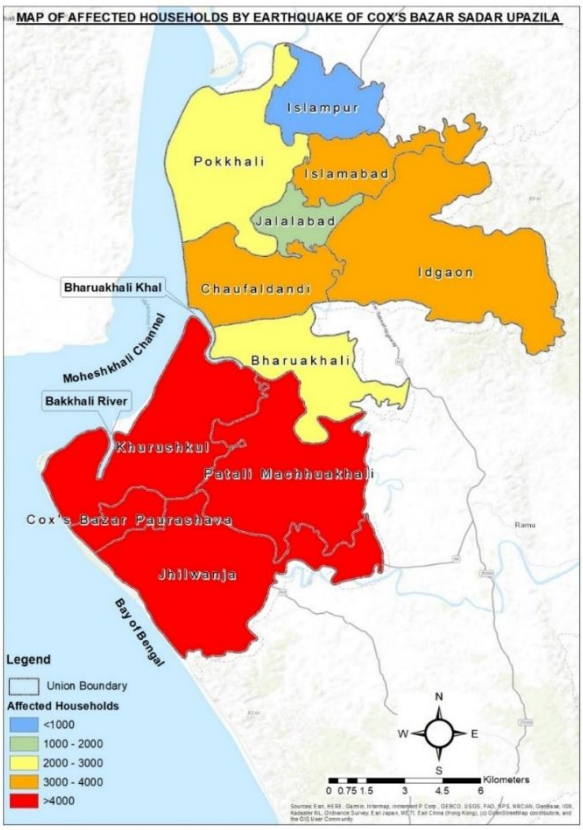
Type of structure

Type of structure	Characteristics
Pucca,	Pucca: A permanent, durable dwelling built of materials such as brick, cement, iron, wood, board, or asbestos. Characterized by flat or pitched roofs, solid walls, and cement or tiled floors. Usually has sanitary and electrical facilities. The most common type of housing in urban areas and the most expensive to build and maintain.
Semi-pucca	Semi-Pucca: Semi-permanent, durable houses built of a combination of pucca and kucha materials. They feature tiled, asbestos-thatched, or thatched roofs, brick or bamboo walls, and cement or clay floors. They may have sanitary and electrical facilities. It is the most common type of housing in semi-urban and rural areas and the most affordable for the majority of the population.
Kutcha	- Kutcha: Temporary housing built with natural and inexpensive materials such as bamboo, thatch, mud, tree leaves, and mats, which are not very durable. They have sloping roofs of thatch or leaves, walls of bamboo or mud, and earthen floors. There are no sanitary or electrical facilities. It is the most common type of housing in rural areas and the easiest to construct and replace.
jhupri	- Jhupri: Very temporary and unstable dwellings built from recycled or discarded materials such as cardboard, plastic, metal, and cloth. They have irregular roofs made of ready-made materials, flimsy walls, and floors of dirt and garbage. There are no sanitary or electrical facilities. This type of housing is most common in marginalized and extremely poor areas and is the most vulnerable to natural and social disasters.

As noted above, the building structure most vulnerable to earthquakes in terms of durability is Jhupri.

In describing seismic risk, a table of the number of households by building type for each union and a map representing that risk are organized based on information from the Bureau of Statistics.

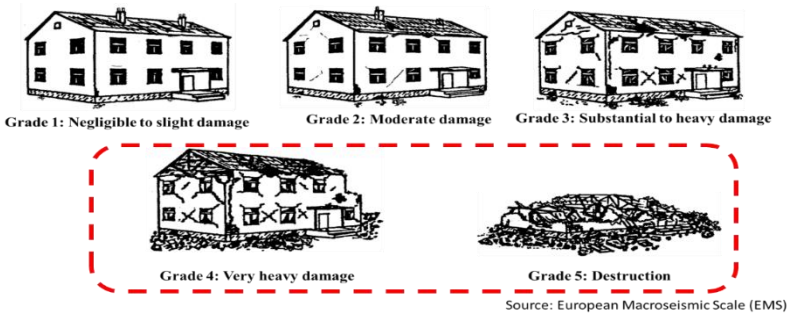
The following is an example of the preparation in Cox's Bazar Sadar.



Number of Affected Households

Notes:

1. The concrete values of the average PGA on unions are estimated with variation between 2.84 m/s2 and 3.29 m/s^2.
2. Grade 4 and 5 of the building damage degree in Figure 4-15., was used for estimation of the earthquake risk.



Building Damage Degree

3. The number of affected households was estimated by assuming that one household uses one building based on the number of households and ratio of house types in the Population & Housing Census 2011 below.

Percentage of Type of Structure and Number of Households

Administrative Unit Residence Community	Number of Households	Percentage of Type of Structure			
		Pucca	Semi-pucca	Kutcha	Jhupri
Cox's Bazar Sadar Upazila Total	81523	11.8	20.4	58.2	9.6
Cox's Bazar Paurashava	30374	23.8	30.1	34.7	11.3
Bharuakhali Union Total	3939	6.9	10.6	76.2	6.4
Chaufaldandi Union Total	5195	5.2	13.7	78.8	2.3
Idgaon Union Total	5984	8.5	24.6	58.1	8.8
Islampur Union Total	3626	5.3	8.6	73.6	12.5
Islamabad Union Total	5275	5.8	16.0	76.2	2.0
Jalalabad Union Total	3048	11.4	21.0	60.6	7.0
Jhilwanja Union Total	7352	9.1	20.5	56.3	14.1
Khurushkul Union Total	6807	3.6	10.2	78.3	7.9
Patali Machhuakhali Union Total	6103	5.9	21.9	68.1	4.1
Pokkhali Union Total	3820	7.6	16.0	69.6	6.8

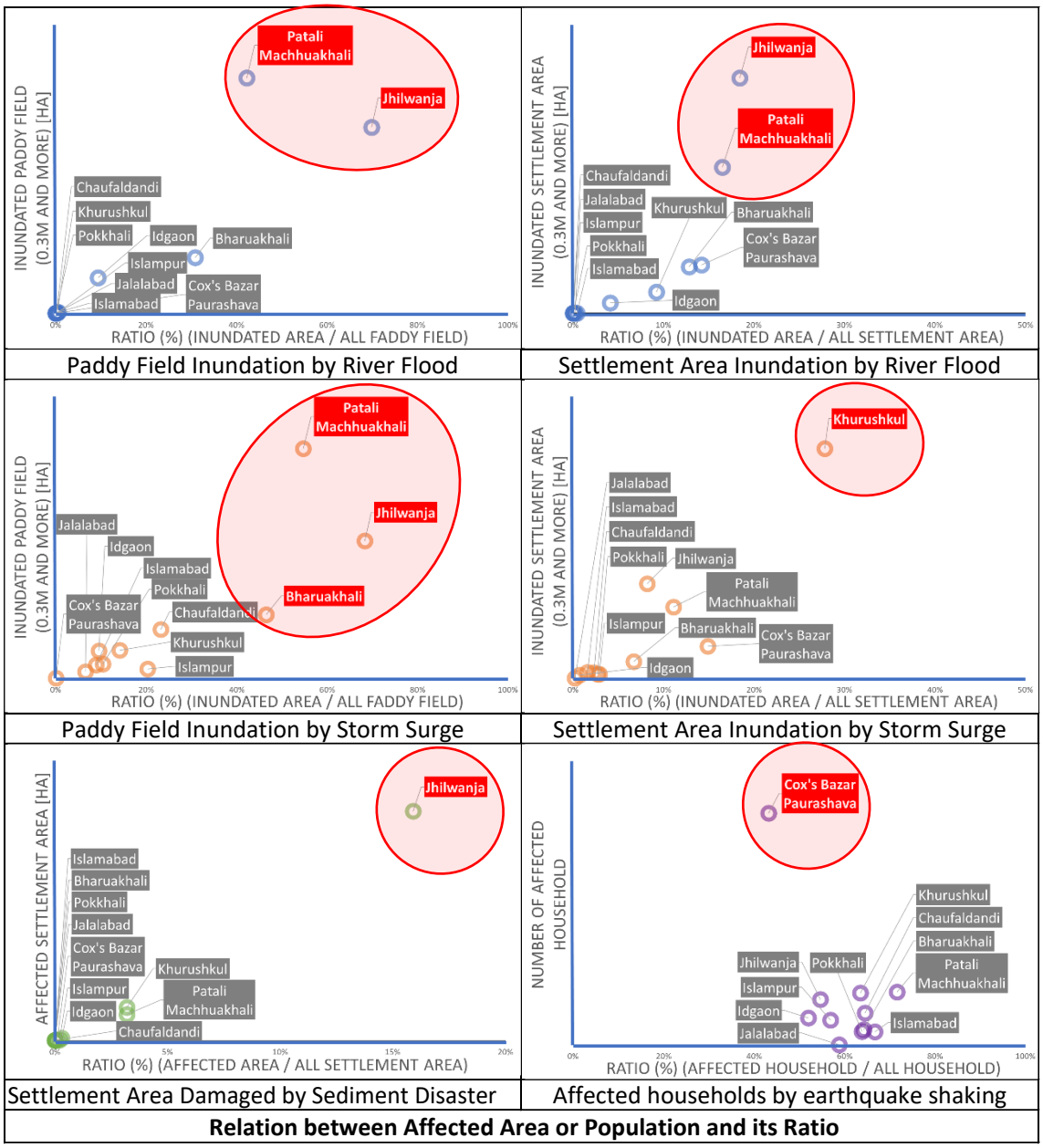
UzDRRAP 3.4.5 High Risk Union Parishads

In this section (Chapter 3.4.5), higher risk unions that should be prioritized based on quantified risk analysis which is put in this chapter are identified as a conclusion.

Scatter plots are to be used to represent the affected area and the percentage of affected area for rice crop lands and residential lands, respectively, by Union. An example of a scatter diagram for Cox's Bazar Sadar is shown below.

As in the case of the percentage of damaged area, the area of the union with the largest damaged area is normalized to "1" in order to make a relative evaluation.

The following scatterplots are examples created in Cox's Bazar Sadar (2023).



Relation between Affected Area or Population and its Ratio

Vulnerable unions are identified using this scatterplot.

In the example in Cox's Bazar above, no specific quantitative threshold was set because it was relatively clear to distinguish between groups of unions with both a low percentage of affected area and a high percentage of affected area. However, without a threshold, vulnerable unions would not necessarily be clearly identified and extracted as clusters.

In addition, only rice cropping areas and residential areas were included in the risk assessment for convenience, as geographical information on rice cropping areas and residential areas is readily available.

Important public facilities and social infrastructure such as roads and hospitals are not represented in this scatterplot.

Therefore, it is important to share such information through those workshops, and then in the second workshop to identify risks, it is important to set reasonable threshold values based on the scatter plots created, together with workshop participants, and to reach a consensus among the parties involved.

For example, high risk unions could be identified based on the following approach.

- If the contrast between vulnerable and nonvulnerable areas is large enough to clearly group them, the contrast is used.
- If the contrast between vulnerable and nonvulnerable areas is not clear, the union with a damaged area of 0.5 or more in both size and ratio is uniformly selected as the high risk union,
- If the ratio of damaged area is low, but the damaged area is far larger than that of the other unions, the union is selected as a high risk union.
- In addition to the above methods, the impact of damage to public infrastructure such as livestock, salt fields, important industrial centers, roads and bridges, schools and hospitals, and shelters is discussed before selecting unions, taking into account risks other than rice production and housing.

It should be noted that any assessment of risk outside of rice paddies and residential areas must be based on quantitative data that is comparable across Upazila to the extent possible.

For example, if a shelter exists/should exist that is relatively low risk for the affected area but has a large capacity, it may be a priority project, and the rehabilitation of roads accessing that shelter may also be a priority.

If a reasonable explanation can be made that those projects will contribute to the relief of people in vulnerable areas, compared to the capacity of shelters in surrounding vulnerable areas, the capacity of that shelter, etc., then a decision can be made at the workshop or UzSC to add the priority of a particular union, regardless of the results of the scatterplot is possible.

In other words, prioritization is one of the most important roles of the UzSC.

Box-5 Time frame consideration

*The importance of preparation time in this explanation is a lesson learned in the planning process in Cox's Bazar. The two Upazilas in Cox's Bazar in 2022 did not allow sufficient consultation time. In future national roll-outs of DRR planning, it is important to explain the risk assessment policy from the first workshop.
The proposed explanations are as follows.
Start risk assessment with paddy fields and residential areas/population as a matter of convenience, but if there is other quantitative information available, it should be used; if it is difficult to obtain, no matter how dire the Union's request is, those that cannot be accurately risk assessed cannot be added to the plan, etc.

Based on the above discussion, priority unions are shown in the table by disaster type.

Below is an example from Cox's Bazar Sadar

High Risk Unions for Disaster

Disaster	Priority Union
Flood	Jhilwanja and Patali Machhuakhali, Cox's Bazar Pourashava
Storm Surge	Bharuakhali, Cox's Bazar Pourashava, Jhilwanja, Khurushkul and Patali Machhuakhali,
Sediment Disaster	Jhilwanja
Earthquake Shaking	Cox's Bazar Pourashava

UzDRRAP Chapter 4: Disaster Risk Reducton Target

The DRR (disaster risk reduction) Target explained in this chapter are based on the results of specific and quantitative risk analysis in the previous chapter. The targets are set by hazard type as short-, medium- and long-term strategies for disaster risk reduction actions to be taken in the area where the plan will cover.

Key points of the DRR Target setting

- Target setting will lay the foundation for reducing disaster risk and minimizing human suffering and property loss.
- The significance of the DRR Targets lies in the fact that they provide specific policies for disaster reduction measures for each risk (e.g. floods, landslides, riverbank erosion). Measures based on these policies are detailed in Chapter 5.
- DRR targets shall be set in three phases: short/medium-, and long-term, based on the disaster risk assessments described in Chapter 3. For each risk (e.g., flood, landslide, storm surge), the area, facilities, and population to be protected should be clearly identified, and realistic, phased measures should be proposed.
- This makes it possible to clarify realistic countermeasures that are tailored to the characteristics and conditions of the area, and to implement them in stages. This phased approach is important for increasing the effectiveness of disaster mitigation measures.

Example DRR Target for riverbank erosion（Ulipur, Kurigram）

Hazard	Area	DRR Target (Short and mid) term)	DRR Target (Long term)
River Erosion	Along rivers	Control the progress of riverbank erosion by emergency measures at riverbanks, revetment, revetment maintenance and dredging in areas with significant erosion damage.	Reduce the risk of riverbank erosion in the entire riverfront area through riverbank revetment and channel improvement, etc.
	Char area	Control the progress of riverbank erosion by emergency measures for riverbanks and dredging in areas with significant erosion damage	Reduce the risk of riverbank erosion in administrative and commercial centers through emergency measures and dredging of revetments in some areas

See the example composition of the DRR Target in case of along the river below, Ulipur, Kurigram.

Control the progress of riverbank erosion ***by*** emergency measures at riverbanks, revetment, revetment maintenance and dredging in areas with significant erosion damage.

1. Describe what to do First in the paragraph
2. Then describe the means of the action

“What to do” is Control the progress of river bank erosion here, and the means of the action is emergency measures at riverbank revetment.

★ Considerations for Setting DRR Targets

When setting Disaster Risk Reduction (DRR) targets, it is crucial to evaluate which measures are effective and technically feasible for each risk, considering available resources and the technical capacities of government agencies. Additionally, determining the priority and sequencing of measures for each implementing agency requires informed technical judgment.

Notably, there may be a disconnect between residents' expectations and the feasible measures implementing agencies can undertake, particularly in addressing riverbank erosion in large rivers. For example, residents may not realize that stabilizing riverbanks is a prerequisite for establishing effective irrigation facilities in coastal areas to mitigate drought. Therefore, understanding the perspectives of line agencies responsible for structural measures and recognizing the interdependencies of these measures is essential when assessing residents’ expectations.

The case study above in Kurigram district (Ulipur and Chilmari) illustrates this challenge. Located along the Jamuna and Teesta Rivers, and in the Char area, addressing flooding and riverbank erosion—the primary disasters in this region—through comprehensive structural measures is technically difficult. While the BWDB promotes coastal embankment maintenance as a fundamental structural approach, technical and budgetary limitations require prioritizing scalable coastal measures within a 10-year planning period.

To set realistic DRR targets, it is necessary to:

1) Outline measures that have been implemented, those pending implementation, and those that are technically or resource-constrained*.*The result will be stated in the Chapter 5-1

2) Avoid basing targets solely on residents' expectations, which may not align with practical feasibility or effectiveness.

3) Setting DRR targets demands specialized technical expertise and must be approached separately from bottom-up decision-making processes to ensure effectiveness and feasibility.

Steps for Formulating DRR Targets

Consultations with implementing agencies will be conducted both individually and through the UzSC. The steps vary based on the type of measures:

The steps in case of flood risk reduction are shown below.

1) Flood control and Riverbank erosion measures

Step 1: Develop a hazard map that incorporates risk analysis results and residents' disaster experiences.

Step 2: Compile information on current measures and future plans for each location under the BWDB's jurisdiction, distinguishing between short-term actions and long-term challenges.

Step 3: Identify residual risk based on the expected solution by means of flood control.

2) Infrastructure (Evacuation Centers, Roads, Deep Wells)

Step 1: Identify the expected solution for the residual risk based on the expected solution by means of flood control.

For high-risk areas (e.g., Char areas) where structural flood control measures are insufficient, explore alternative solutions in a short and mid-term, such as:

- Expanding evacuation routes and shelters,
- Enhancing early warning systems, and
- Relocating residents in collaboration with DDM, LGED, and other agencies.

Step 2: Ensure the Upazila government and implementing agencies share a common understanding of priority urban areas and industrial bases for protection which are not to be protected sufficiently.

Step 3: Through consultations, establish a consensus on feasible short-term and long-term measures.

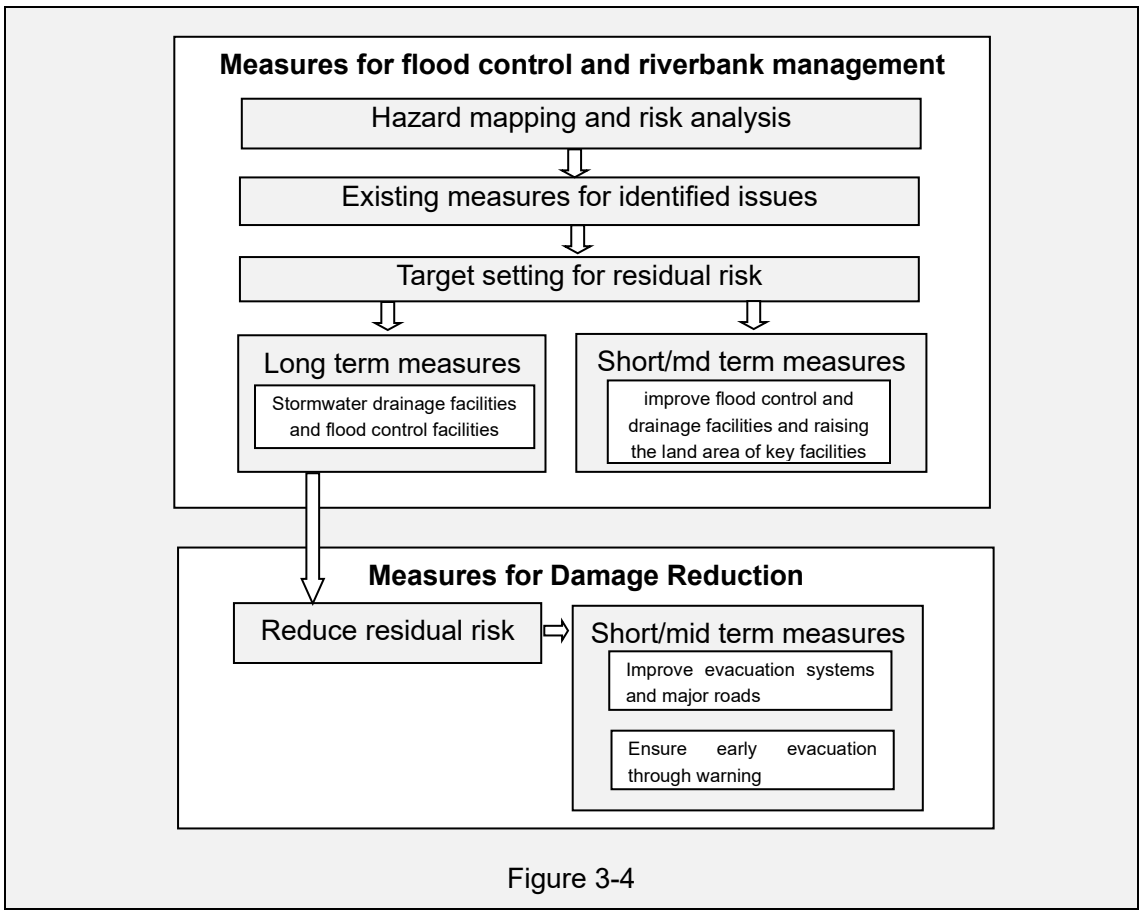

Measures for flood control and riverbank management
Hazard mapping and risk analysis
Existing measures for identified issues
Target setting for residual risk
Long term measures
Stormwater drainage facilities and flood control facilities
Short/md term measures
improve flood control and drainage facilities and raising the land area of key facilities
Measures for Damage Reduction
Reduce residual risk
Short/mid term measures
Improve evacuation systems and major roads
Ensure early evacuation through warning

Figure 3-4

UzDRRAP Chapter 5: Action Plan for DRR Measures

Chapter 5, based on the contents of Chapters 3 and 4, summarizes the action plan for disaster reduction measures toward the DRR target as Upazila.

The sections of this chapter are generally organized as follows.

5.1 Current status of the structural and non-structural countermeasures

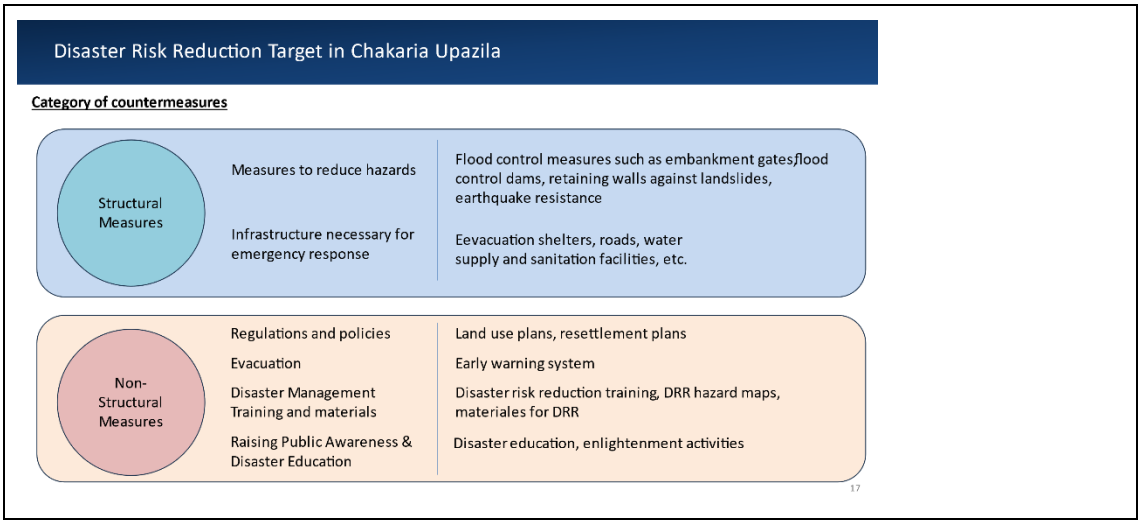
5.2 Action Plans for DRR Target

5.3 Monitoring and Updating of the Plan

The first section, Chapter 5.1, is an overview of the types of structural and non-structural DRR measures that are actually being implemented in Upazila.

Chapter 5.1 is not merely a list of measures that have already been implemented or proposed, but also a menu of DRR measures that should be taken as a whole, with the objective of confirming which measures have been taken and which have not been taken from a general perspective.

In addition, by indicating the assumed implementing agencies for the countermeasures, it will serve as an explanation for the Upazila Council and line ministries to have a common understanding of what implementing agencies are responsible for implementing which disaster countermeasures in Upazila.



UzDRRAP Chapter 5-1 Current Condition of Structural and Non-Structural Measures

Overview

Chapter 5-1 provides a comprehensive overview of structural and non-structural DRR measures implemented by local governments. The aim of Chapter 5-1 is to clarify which measures are being taken and which are not being taken in order to achieve the DRR targets set out in Chapter 4. Rather than simply listing measures, it will confirm the residual risk based on the disaster reduction goals and present an overall picture of the DRR measures that should be adopted by the District Disaster Management Committee (DMC).

Implementing agencies for DRR measures

This section clearly identifies the implementing agencies for the disaster management measures. This information serves as a reference document to help Upazila Councils and line ministries clearly understand which agencies are responsible for each disaster management measure and to build a common understanding.

Importance of measures that have not yet been implemented or proposed

Chapter 5-1 also presents measures that have not yet been implemented or proposed by the Upazila government or line ministries. This provides an opportunity for those involved in planning to learn about a variety of options, both soft and hard, in addition to conventional DRR measures such as embankments and shelters. This is expected to promote the proposal of new measures at the next plan update.

Un-proposed measures and issues

Some of the un-proposed measures include issues that could become important in the long term. The reason for these not being proposed is not necessarily because they are not important, but often because of a lack of technical capacity in the implementing agencies, budget constraints, or institutional and political bottlenecks. The purpose of this section is to identify appropriate measures to address residual risks and to utilize them in future plan updates. It is hoped that the central government will use this information to further promote the efforts of Upazila DMCs.

Case in Cox's Bazar

For example, in Cox's Bazar, the land use plan has not yet been implemented. The reason for this is the issue of inter-organizational collaboration, which arose because the Urban Development Department (UDD) was not included in the composition of the Upazila Disaster Risk Management Committee (UzDMC) when the UzDRRAP was being formulated. In order to clarify such issues and address them in the next planning phase, it is important to present the proposed measures to stakeholders.

Notes on the description

- **Emphasize the role of the implementing agencies**: The roles and cooperation of the implementing agencies are essential for the implementation of the plan. Therefore, it is desirable to describe specific methods of cooperation between the implementing agencies (e.g. regular meetings of DMCs and improved communication). This will clarify the direction for formulating a specific implementation plan.
- **Prioritization of DRR**: It is useful to include an explanation of the priority and urgency of implementation in the list of measures. This will make it easier to monitor the implementation of the plan when updating it, and improve its effectiveness.

In this way, this section plays an important role in providing guidelines for understanding the overall picture of current DRR measures and addressing remaining risks.

An example of Cox's Bazar Sadar in the overall image is shown below.

<table>
<tr><th>Category</th><th>Current status of the countermeasures by type</th></tr>
<tr><td>Infrastructures for Protection & Control against Flood</td><td>As efforts of flood prevention, BWDB is making inspections to identify vulnerable embankments, and has implemented the embankment development plan (66/1, 66/2 and 66/3) in this region. This embankment development process includes sluice gates construction and rehabilitation.
Meanwhile, retarding basins and reservoirs are not commonly applied, and there is no reservoir in Cox's Bazar Sadar Upazila.
Pumping stations are not installed in Cox's Bazar Sadar Upazila while some are installed along the Reju Khal Canal. It depends on basin-wise strategy by BWDB whether those countermeasures are better applied or not.
<table>
<tr><th>Type</th><th>Undertaken</th><th>Agency</th></tr>
<tr><td>Embankments/Dike</td><td>✓</td><td>BWDB</td></tr>
<tr><td>Canal Excavation and other river improvements (Widening and Deepening)</td><td>✓</td><td>BWDB</td></tr>
<tr><td>Sluice gates</td><td>✓</td><td>BWDB</td></tr>
<tr><td>Retarding Basin/Reservoir</td><td>Not undertaken</td><td>BWDB</td></tr>
<tr><td>Drainage Facilities (Pumping Station etc)</td><td>Not undertaken</td><td>BWDB</td></tr>
<tr><td>Dam</td><td>✓</td><td>BWDB/LGED</td></tr>
</table></td></tr>
<tr><td>Infrastructures for Protection & Control against Coastal Disasters</td><td>BWDB plays a key role to construct and maintain the polders while guide walls have been constructed by the efforts of LGED, DDM, and Cox's Bazar Pourashava.
Some of the coastal forests with pine trees have been developed by the BWDB efforts, however, due to the lack of awareness and poor coordination, those forests are not properly maintained, and some are deforested.
<table>
<tr><th>Type</th><th>Undertaken</th><th>Agency</th></tr>
<tr><td>Dike (Polder)/Coastal Revetment</td><td>✓</td><td>BWDB</td></tr>
<tr><td>Seawall/Guide walls</td><td>✓</td><td>BWDB</td></tr>
</table></td></tr>
<tr><td>Infrastructures for Protection & Control against Sediment Disasters</td><td>LGED and Cox's Bazar Pourashava are the responsible agencies to cope with sediment disasters such as rock failure. At this moment, LGED/DDM implemented some retaining wall construction along the beachside area to protect road infrastructure from rock falls. However, most of the rest of the area is left to be undertaken.
<table>
<tr><th>Type</th><th>Undertaken</th><th>Agency</th></tr>
<tr><td>Slope stabilization/Retaining walls</td><td>✓</td><td>LGED/DDM</td></tr>
<tr><td>Rock-Fall Prevention</td><td>Not undertaken</td><td>LGED/DDM/Cox's Bazar Pourashava</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Category</th><th>Current status of the countermeasures by type</th></tr>
<tr><td>Infrastructure for Emergency Operation</td><td>Shelter: 90 shelters are listed for cyclones and flood response in Cox's Bazar Sadar Upazila by UzDMC. 21 of the total shelter was constructed by the governmental authorities, while the rest of the facilities were constructed by various domestic and international foundations including government auxiliary, NGOs, and donors such as BDRCS, CARITAS, EU, World Vision, Red Crescent, World Bank, and Islamic Development Bank.
Transportation: LGED is the main responsible agency to develop and maintain the road and transportation infrastructure.
Drainage system: Improvement of drainage system is important to prevent prolonged inland flooding. Cox's Bazar Pourashava and Cox Bazar Development Authority cope with the challenges of installing and rehabilitating drainage systems in urban areas. For rural areas, LGED is responsible for the development of the required drainage systems.
Water and sanitation: Water and sanitation infrastructures are critical to provide safe water and keep the living environment hygiene. DPHE is the main agency to cope with water-related issues to prevent the secondary effects of the disaster.
<table>
<tr><th>Type</th><th>Undertaken</th><th>Agency</th></tr>
<tr><td>Shelters/Mujib Killah</td><td>✓</td><td>LGED/DDM/Cox's Bazar Pourashava/Private agencies&donors</td></tr>
<tr><td>Roads</td><td>✓</td><td rowspan="3">LGED/ DDM/ Cox's Bazar Pourashava</td></tr>
<tr><td>Bridges</td><td>✓</td></tr>
<tr><td>Culverts</td><td>✓</td></tr>
<tr><td>Drains</td><td>✓</td><td>Cox's Bazar Pourashava</td></tr>
<tr><td>Facilities for Water (Tube well, Pipe) and sanitation (Latrine)</td><td>✓</td><td>DPHE</td></tr>
</table></td></tr>
<tr><td>Infrastructures for Prevention of Other Disasters (Lightning, etc)</td><td>There have been some cases of lightning disasters. However, no measures are taken in most of the area.
<table>
<tr><th>Type</th><th>Undertaken</th><th>Agency</th></tr>
<tr><td>Lightning conductor</td><td>Unknown</td><td>LGED/Cox's Bazar Pourashava/DDM</td></tr>
</table></td></tr>
<tr><td>Structural Measures against Earthquake Shaking</td><td>Retrofitting to cope with earthquake shaking is the process of modifying existing structures to make them more resistant to seismic activity, ground motion, or soil failure due to earthquakes.
<table>
<tr><th>Type</th><th>Undertaken</th><th>agency</th></tr>
<tr><td>Retrofitting of important facilities and Infrastructures</td><td>Partly by International Donor</td><td>LGED/PWDB/Cox's Bazar Pourashava/DDM</td></tr>
</table></td></tr>
</table>

Structural Measures Which are Undertaken / not Undertaken

Category	Current status of countermeasures by type		
Land Use Planning	Promoting land use planning in local administrations in Bangladesh is now under process by the effort of the central ministry (UDD) and Cox's Bazar Development Authority. However, at this moment, no Upazila Governments in Bangladesh have specific regulations or tools for DRR purposes. Land use strategy such as resettlement of inhabitants and industries around vulnerable areas is an important tool to mitigate the socio-economic impact. To apply this, more vertical coordination and connection between governmental policy, District plan and strategy, and stakeholders in Union Parishads and Upazila administration is needed. Therefore, it must be a consideration in the long term though it is worth discussing in the UzSC continuously.		
	Type	**Undertaken**	**Agency**
	Urbanization Control	Unknown	Cox's Bazar Development Authority/ UDD
	Resettlement	Unknown	
	Designating Special Warning Area	Unknown	
Early Warning Information and Communication	Early warning system in coastal areas in Bangladesh has been developed with CPP and other NGOs coordination since 1990's.		
	Type	**Undertaken**	**Agency**
	Installation of Monitoring System of Rainfall &Water Level	✓	Upazila/BWDB/ BMD/BIWTA
	Flood Forecasting and Warning System, including community radio	✓	CPP and NGOs, Community Radio
	Cyclone Warning System	✓	CPP and NGOs
	Strategy making and basic study for cropping, harvesting and choice of the variety adopted to global warning	✓	DAE
Disaster Management Training and Materials	Emergency Operations SOPs are in place for disasters at the District level. Disaster preparedness and response drills are conducted prior to the flood season. Regional evacuation drills are conducted once a year at the Union level. Disaster management training for members of DMC is conducted once at least a year.		
	Type	**Undertaken**	**Agency**
	Preparation of SOP for emergency operation	✓	DDM
	Simulation and Exercise	✓	DDM/FSCD
	Evacuation drill / Shelter and evacuation route	✓	DDM/FSCD
	Training on DRR	✓	DDM/INGOs/NGOs
	Preparation for the emergency operation - Ambulance	✓	Central Level: NEOC & DDM Field Level: UDMC/UzDMC/ DDMC and BDRCS

Category	Current status of countermeasures by type		
Raising Public Awareness & Disaster Education	Disaster education is provided irregularly in both primary and secondary school classes. Awareness raising for disaster risk reduction is mainly conducted through TV and RADIO, however, in some areas NGOs conduct courtyard meetings, simulations, drills etc. when support by donors is available. There are no publicly available hazard maps to identify disaster risks at the Upazila level. There are also no visualization programmes such as billboards, posters, and leaflets for disaster education. Several unions have emergency disaster preparedness equipment and emergency warehouses for stockpiled materials in the event of a disaster, and they are not functioning well. Critical infrastructure facilities in the District are listed. Few classifications of hazards and priorities by disaster type has been made.		
	Type	**Undertaken**	**Agency**
	Publication of DRR Maps	Unknown	MoDMR/DDM
	Material and emergency goods in the Warehouse	✓	MoDMR/DDM
	Inventory preparation on vulnerable infrastructure such as hospitals, water wells, and schools based on the risk map	Unknown	UDD/PWD/FSCD/ DMC
	Disaster preparedness education in school	Unknown	MOE
	DRR Awareness Related Billboard	Unknown	DDM/BDRCS

Non-Structural Measures Which are Undertaken / not Undertaken

5.2 Action Plans for DRR Target

Chapter 5, Section 2: Action Plan Based on the DRR Targets

Purpose of Chapter 5-2

Chapter 5-2 outlines the necessary actions for achieving the Disaster Risk Reduction (DRR) targets from a short-term and medium-term perspective, focusing on a 10-year timeframe. While the primary actions are intended for this period, it is also beneficial to include any specific long-term actions aimed at disaster reduction.

Whereas Chapter 4 presents the principles of disaster reduction in both short and long terms, Chapter 5-2 organizes these measures into programs that address the characteristics of each disaster. This chapter provides an overview of the expected results of the action plan, the programs designed to achieve these results, and the target areas.

Structure of the Action Plan

The action plan's structure serves as a practical breakdown of the DRR targets. For example, in the case of Upazilas in the Kurigram district, the “Vision,” “Target Hazard,” and “Target Area” align directly with the DRR targets. The action plan then translates the “Countermeasures Objectives” for short- and medium-term targets into two distinct components:

Objectives: Objectives that guide disaster reduction efforts.

Program: Clusters of countermeasures organized by specific disaster scenarios.

For instance, in the context of flooding, a program might be titled “Improvement of flood control facilities in priority areas.” This program groups various countermeasures into a cohesive framework. The specific actions within this program are determined through consultation with relevant organizations and stakeholders.

Structure of the Action Plan

Vision	Target hazard	Challenges by Hazard		
		Objectives	Programs	Target area
The estimated human and economic damages by each disaster are reduced by 50% within 10 years	**1. Flood:** To ensure protection of human lives and properties (livestock) from flooding	1-1. Reduce at least inundation risks of DRR-related facilities and Central city areas	A. Improvement of flood control facilities in some priority areas	Inland areas, areas along rivers
			B. Improvement of drainage facilities in some priority areas	Inland areas
			C. Raising of land area of key facilities/ Relocation to elevation areas	Inland areas, areas along rivers
		1-2. Reduce/minimize damage to at least people and assets	A. Construction and maintenance (incl. raising lands) of multi-purpose shelters	Inland areas, areas along rivers, Char areas

Vision	Target hazard	Challenges by Hazard		
		Objectives	**Programs**	**Target area**
(from 2025 to 2035).		by improving evacuation systems and maintaining transportation networks	B. Improvement and renovation of major roads, bridges, and culvert for evacuation and emergency operations	
		1-3. Ensure early evacuation through warning	A. Development and operation of early warning networks	
	2. River Erosion: To mitigate direct damage to residence and properties against river erosion	2-1. Urgently control the progress of riverbank erosion by emergency measures	A. Introduction of emergency measures (e.g., sandbags) for revetment, and dredging	Areas with recent significant erosion damage along rivers
	3. Earthquake Shaking: To establish a resilient Upazila to withstand earthquakes	3-1. Enhance earthquake resistance	A. Promotion of the compliance with the building standard (BNBC 2020)	All areas
			B. Implementation of the seismic diagnosis	All areas
		3-2. Promote earthquake preparedness at home and in the community	A. Awareness raising of earthquake risks and preparedness at home, schools, and communities	All areas
	4. Lightning: To reduce direct damage to people and livestock caused by lightning strikes	4-1. Promote appropriate response and evacuation for lightning strikes	A. Installation and maintenance of lightning arresters / evacuation shelters for people and livestock	All areas
	5. Drought: To mitigate the impact of **drought** on people and livestock	5-1. Provide stable water supply for the fields and livestock	A. Expansion and improvement of irrigation facilities (e.g., pumps, well development) / water storage facilities (e.g., reservoir)	All areas
		5-2. Promote drought-resistant crops and agricultural methods	A. Conversion and/or introduction of the drought-resistant crops and agricultural methods	All areas
	6. Common: To build communities capable to quick and	6-1. Foster human resources and prepare equipment to enable rapid disaster response	A. Implementation of disaster management training and drills	All areas
			B. Preparedness of the materials and equipment for disaster response	All areas

Vision	Target hazard	Challenges by Hazard		
		Objectives	Programs	Target area
	appropriate disaster response	6-2. Encourage people to prepare for the evacuation and disaster response	A. Provide DRR education and public awareness raising activities	All areas

How to prepare an action plan

An action plan is structured based on the following components:

1. Target Hazard:

The issues and corresponding countermeasures for each hazard are outlined at the beginning of the plan. These countermeasure **Objectives** are developed by analyzing:

- Issues identified by union participants during the planning process, particularly through workshops.
- Problem recognition and insights provided by implementing agencies.

2. Countermeasure Map

The countermeasure map provides a visual summary of relevant programs for a specific target hazard. To effectively prioritize actions, the map should clearly indicate critical locations, such as:

- Evacuation centers.
- Densely populated areas (e.g., central urban areas).
- Boat terminals (Ghats).
- Main roads.

However, for hazards like earthquakes that affect wide areas or for non-structural measures where specific locations cannot be pinpointed, a location map is not necessary. As a result, location maps may only be required for localized hazards, such as floods or riverbank erosion.

3. Actions

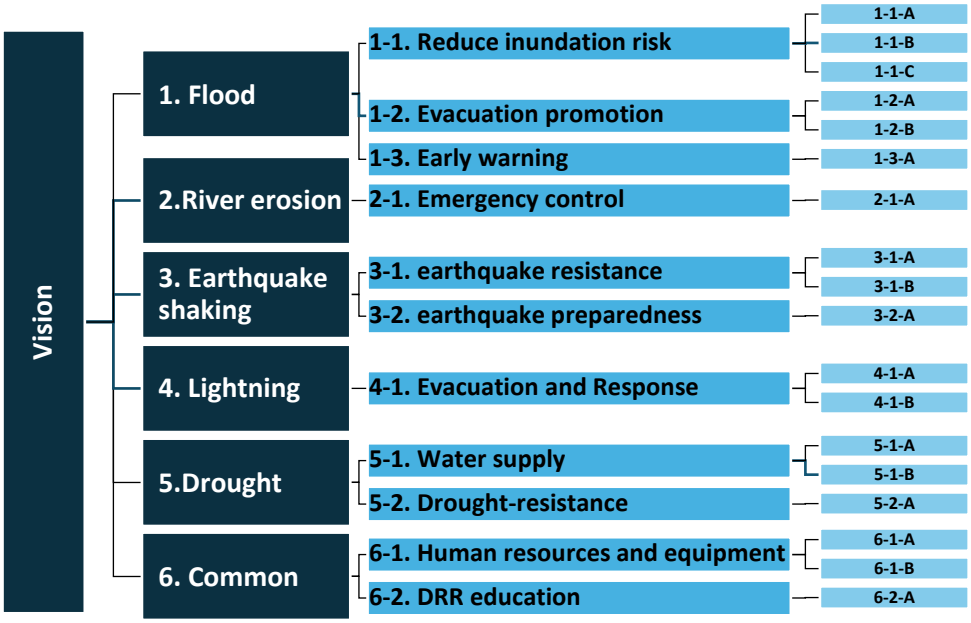
Actions should be categorized under two main headings:

- Objectives: The strategic objectives to address the hazard.
- Program: Clusters of countermeasures designed to achieve the objectives.

The table can be divided by Objectives, such as 1-1, 1-2, 1-3… .

Target hazard	Objectives
Flood	1-1 Reduce at least inundation risks of DRR-related facilities and Central city areas
	1-2 Reduce/minimize damage to at least people and assets by improving evacuation systems and maintaining transportation networks
	1-3 Ensure early evacuation through warning
Riverbank erosion	2-1 Urgently control the progress of riverbank erosion by emergency measures
Earthquake shaking	3-1 Enhance earthquake resistance
	3-2 Promote earthquake preparedness at home and in the community

Target hazard	Objectives
Lightning	4-1 Promote appropriate response and evacuation for lightning strikes
Drought	5-1 Provide stable water supply for the fields and livestock
	5-2 Promote drought-resistant crops and agricultural methods
Common	6-1oster human resources and prepare equipment to enable rapid disaster response
	6-2 Encourage people to prepare for the evacuation and disaster response



The action plan for each program, organized by Objectives, consists of two parts: the action name and the action implementation plan.

The following are examples of actions taken to improve and repair major roads, bridges and culverts for evacuation and emergency activities in 1-1-A and 1-2-B (Krigam District).

Objectives	**1-1- Reduce at least inundation risks of DRR-related facilities and Central city area**				
Program	**1-1-A Improvement of flood control facilities in some priority areas**				
Target area	**Inland areas, areas along rivers**				
Action and Implementation plan	**Action**	**Implementation plan**			
		Responsible agency	**Ongoing activity/Current status**	**Actions to be taken**	**Timeframe for achieving the Action**
	Action along the Teesta River				
	1) Riverbank protection works on the left bank of the Teesta River [First priority] Revetment work both in Ulipur and Chilmari (15.450 km)	**BWDB**	**DPP has been submitted although not Approved yet Official project ID: T_LB-09. 10, and 11)**	**Securing the fund (5,500 million TK)**	
	2) Flood Control Embankment (Left Bank of Teesta river) [First priority] Embankment from	**BWDB**	**DPP has not been submitted although not Approved yet Official project ID: N/A yet**		**3 years**

	Bajra to Teesta bridge toll plaza (30km)				
	3) Riverbank protection works on the left bank of the Teesta River [Second priority] Revetment work (13.550 km)	BWDB	DPP has not been submitted. Official project ID: T_LB-10, 11,and 12	Securing the fund (4,000 million TK)	6 years
	4) Flood Control Embankment on the left bank of the Teesta River [Second priority] Embankment from Bajra to Teesta bridge toll plaza (16 km)	BWDB	DPP has not been submitted. Official project ID: N/A yet		6 years

Objectives	1-2 Reduce/minimize damage to at least people and assets by improving evacuation systems and maintaining transportation networks				
Program	1-2-B Improvement and renovation of major roads, bridges, and culvert for evacuation and emergency operations				
Target area	Inland areas, areas along rivers, Char areas				
Action and Implementation plan	Action	Implementation plan			
		Responsible agency	Ongoing activity/Current status	Actions to be taken	Timeframe for achieving the Action
	Establishment of the evacuation routes in the Upazila, including the access route to the shelters near the central city areas and economically important area (Along riverside and inland areas) [First Priority Roads] • Highway linking U09 to U06 which is connected with Hatia Ghat (local riverport) • Highway linking U03 to U02 • Highway linking U05 to U07 which is connected to Thetrai Union Ghat • Highway linking U10 to U11 [Second priority roads] • Road linking Fokarerhat Ghat to U08(*economically important as well) • Other economically important roads connected to waterlogging area	LGED	The condition of roads as evacuation routes is as follows. Good condition: 149942002, 149943001 and 149943021 Need to be rehabilitated with protection work : 149943017, 149943002, 149943005, 149943019, 149943003, 149943022, and 149942006 149943016 is on going DPP 149943009 has been in tender	DRR consideration←more concretely in both design and construction, following the "Build Back Better" to be sustainable. *More concretely Slope protection or strengthening Increasing road height Sufficient water passing structure like bridge, Culvert, U-Drain etc. Sand Piling or piling for road strengthening RCC	10 years

	[Third priority roads] ▲ **Roads in the inundated settlement area which are connected to first and second priority roads**			**Pavement Road Side Drain Approach Road Slope protection**	

The guidelines for each item are as follows.

Action	✓ This column is for clearly stating the specific actions and activities that should be carried out. The aim is to identify the specific steps needed to achieve the project's objectives and results, and to ensure that the agencies in charge have a shared mutual understanding. It is important that the actions are consistent with each other. The plan needs to be adjusted so that one action does not prevent another action from being carried out.* **Ideally, actions that are closely related to each other, such as the construction of flood prevention facilities and the development of evacuation routes in the surrounding area, should be planned as a single unit, but in light of the coordination capabilities of the UzDMC, this has not yet been achieved.* ✓ If possible, indicate the priority of each action to make it clear which actions are important. For each action, clearly indicate its "related actions" and "dependencies". For example, Action B can only begin once Action A has been completed. For some issues, the action to be taken may be an early stage one, such as a survey that is a preliminary step for the project. For example, it may be identified as the formulation of a master plan, preliminary survey, or overall project design.
Responsible agency	✓ This item clarifies the organizations and institutions responsible for implementing the action. ✓ By designating the ministry responsible for implementing each action, the location of responsibility is clarified, making progress management easier. When multiple line agencies are involved, the main responsible agency is identified, and the supporting agencies are stated as well.
On-going activity/Current status	✓ A section for describing the current progress and activities in progress. ✓ Grasp the current situation and show the basis for the next action to be taken. ✓ Clearly describe existing plans (e.g. DPP and funding status) and current issues. Include statuses such as "not yet approved".
Action to be taken	✓ This is an item for describing specific actions to be taken in the next step, and for arranging the next steps in a logical manner in order to move the project forward. ✓ List feasible and specific actions, such as securing funding and starting construction work. Arrange the steps based on priority and urgency.
Timeframe for achieving the Action	✓ This is an item that indicates the estimated time until each action is completed. It provides a measure of progress management, and contributes to clarifying schedules and

	examining achievability. ✓ This item should clearly indicate a time period, such as by classifying it into short-term, medium-term, and long-term.

Points to consider when formulating an action plan

1. **Synergy between actions:**

   Each action should be designed to work in coordination with other actions, not as independent functions. For example, it is possible to significantly improve disaster response capabilities by simultaneously implementing road maintenance (ensuring evacuation routes) and strengthening evacuation shelters.

2. **Coordination between actions:**

   When actions are related to each other, it is possible to eliminate waste by efficiently sharing resources rather than duplicating them. For example, if there are multiple construction projects in the same area, sharing the survey and planning phases can lead to cost reductions. One of the issues to be discussed is how to coordinate schedules and budgets between related actions that are handled by different organizations, and eliminate unnecessary duplication.

3. **Risk management:**

   It is also important to consider the risk of some actions being delayed or not carried out. In such cases, it is necessary to plan for the possibility of delays or non-implementation, as the impact of such delays could spread to other actions. It is useful to clarify the “critical path” and prioritize the management of progress for important actions. It is also useful to visualize the dependencies between actions (e.g. using flowcharts or Gantt charts). In particular, when planning public buildings in flood-prone areas, it is important to take into account whether or not structural measures to mitigate flood damage have been implemented in advance, so it is important to be able to see the schedule and implementation status of each action.

The list of priority projects in Section 5.2 above is described in detail in Chapter 4 in this guideline.

5.3 Monitoring and Updating of the Plan

In 5.3, the proposed projects shall be organized in terms of how they will be implemented in the implementing agencies and how this plan will be updated based on the status of implementation. The policy for updating the plan shall be confirmed at the UzSC just prior to the last workshop, and is described in this section.

The proposed description is as follows.

5.3 Monitoring and Updating of the Plan

For appropriate implementation of the projects by project implementing agencies, this plan is to be monitored and updated by UzDMC and DDMC, with the support of DDM and the Focal Point Operational Coordination Group (FPOCG; a group to advise coordination of DMC activities and provide recommendations for future actions at the central level, defined in SoD), in the following steps.

Step 1: Monthly Monitoring by UzDMC

The UzDMC reviews the status of each Action in Chapter 5.2 in the monthly Upazila Development Coordination Meeting, specifically "Ongoing activity/Current status", with reference to the typical steps of the project implementation below, and report it to DDMC. Findings are recorded and shared with DDMC.

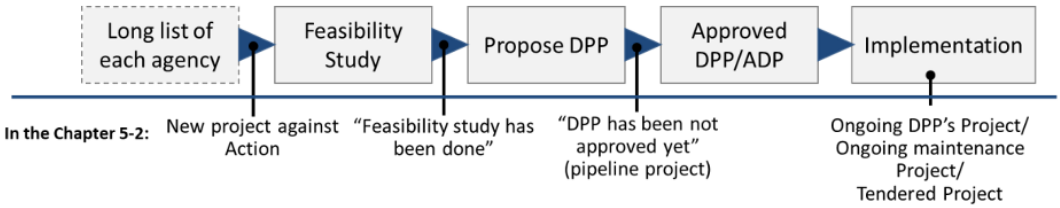


Figure. Typical Steps for reviewing the Current Implementation Status[1]

Notes:
The figure above illustrates typical steps for structural countermeasures like roads and embankments. However, the exact project flow varies significantly depending on the specific project's requirements. Consequently, this general flow won't always be directly applicable to every situation.

Step 2: Consolidation by DDMC

DDMC compiles reports from UzDMCs, summarizes progress and key issues through a Monthly Development Coordination Meeting of the District, and prepares and submits a brief to DDM. DDM then compiles the reports, summarizes the progress and gaps in project implementation, and organizes information for discussion in FPOCG.

Step 3: Quarterly FPOCG Review and Coordination

FPOCG reviews and discusses the DDMC's inputs presented by DDM.
This discussion includes:

- Highlighting projects facing delays in DPP processing
- Identifying coordination needs (e.g., between road improvement and drainage system design)
- Notifying relevant stakeholders about missing feasibility studies or land acquisition issues as well as their budgets

[1] **Ongoing DPP's Project/Tendered Project:** Those projects/Schemes are listed in DPP. Project funds come from ADP/Annual Budget/development partners. This type of project requires F/S and DPP approval. "Ongoing" in this context refers to projects that are currently in the implementation stage or have completed the tendering process.
Ongoing Maintenance Project: These projects or schemes are included in a specific maintenance list and receive annual approval as part of the Annual Development Plan (ADP). Unlike DPP projects, these do not require a Feasibility Study.

Step 4: Information Sharing and Dialogue

FPOCG shares the discussion results with MoDMR, implementing agencies, specifically their respective planning units, for taking necessary actions for implementation by them. Feedback is also provided to DDMCs, who are encouraged to follow up with UzDMCs and local line agencies.

Step 5: Recommendation to Review the Plan

If significant issues or changes are identified, DDM recommends DDMC to suggest reviewing the plan, based on the discussion in FPOCG. DDMC informs UzDMC for further action.

Step 6: Plan Updating and Documentation

UzDMC updates this UzDRRAP if needed, with DDMC validation. Updates are shared with DDM and FPOCG for record and continued monitoring.

The conceptual model for monitoring and updating this plan is shown below.

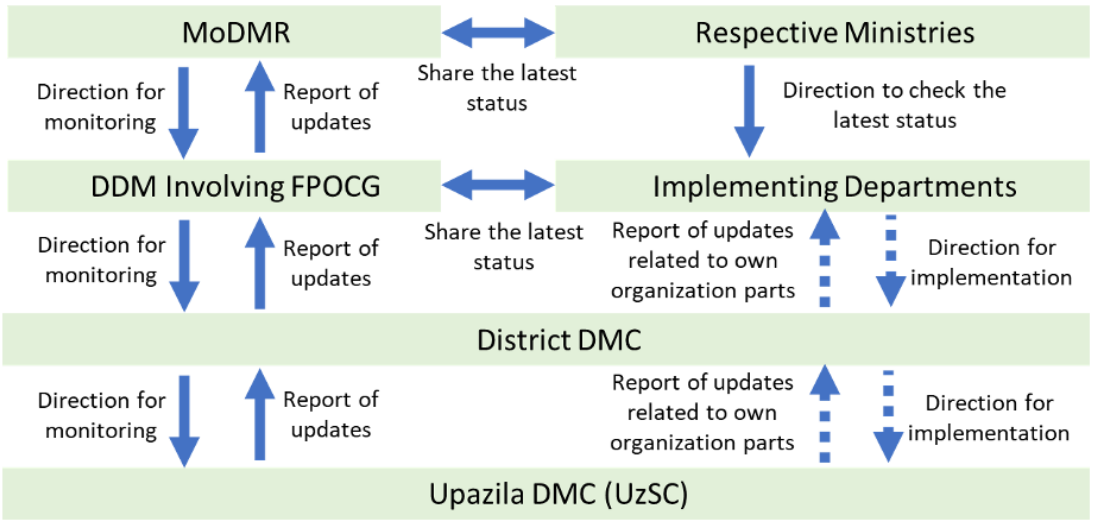


Figure. Conceptual diagram for monitoring and updating the plan

3-3 Planning and Implementation Work flow

1) Guide for the UzDRRAPs by JICA's 8-Step method

The "8-Step method" which was compiled by JICA, is a practical and feasible method to develop a local DRR strategy/plan with concrete measures for investment. It is based on the idea of SFDRR.

Very few developing countries had already completed local DRR plans. Even though, majority of plans consider only actions targeting "responses" or "preparation" for emergencies and risks, but not to "reduce" risks by themselves.

The "8-Step Guide" enables leaders and planners of local administrative organizations especially in potential risk areas, to formulate or improve their Local DRR Plans to promote investment in DRR and to ensure the steady implementation of countermeasures to reduce residual risks.

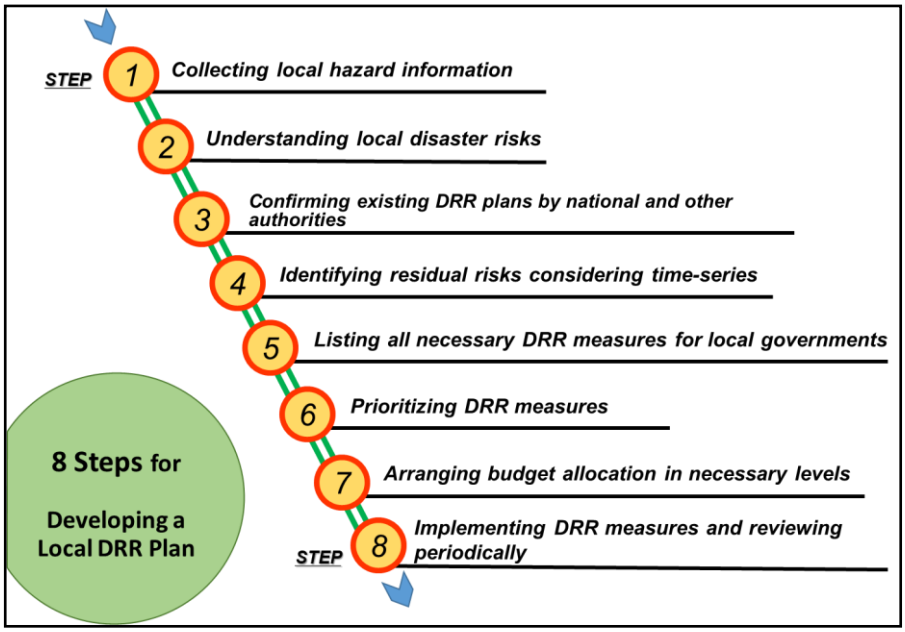
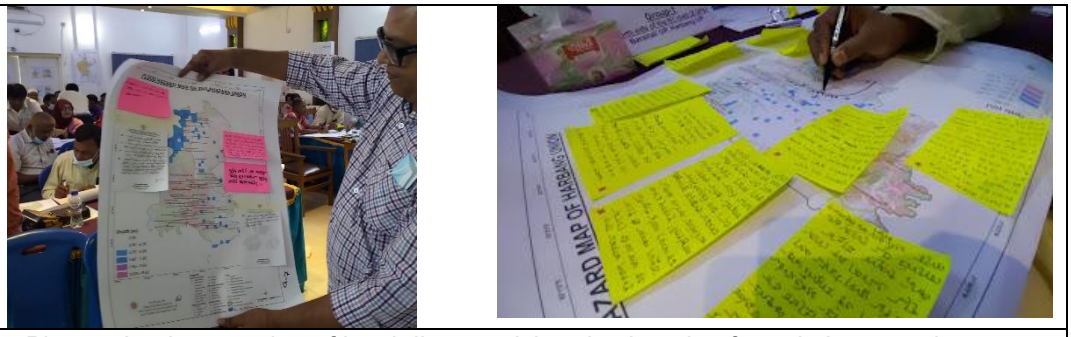


Figure 3-5 8 STEPS for developing a Local DRR Plan

2) Planning Work Flow

Local disaster risk reduction plan will be carried out by holding a workshop using a table-top exercise method. The activity aims to build a collaborative system between related organizations and to promote common awareness of cross-sectoral Disaster risk reduction.



Photos: Implementation of local disaster risk reduction plan formulation exercises

Workshops for developing local disaster risk reduction plan will be implemented through three (3) divided phases by steps. 1st workshop phase is understanding risks including "Step 1, 2, 3, 4" of the "8 step method" mentioned in 2-3. It is important to participate union DMC in the workshop to clarify local risks and actual situation. After summarizing and documentation of the result of the workshop phase 1, the workshop phase 2 will be carried out. 2nd workshop phase is considering measures including "Step 4, 5, 6" of the "8 step method". After summarizing and documentation of the whole result of the workshops, 3rd workshop for drafting the UzDRRAP will be held to share to governmental authorities and related line ministries.

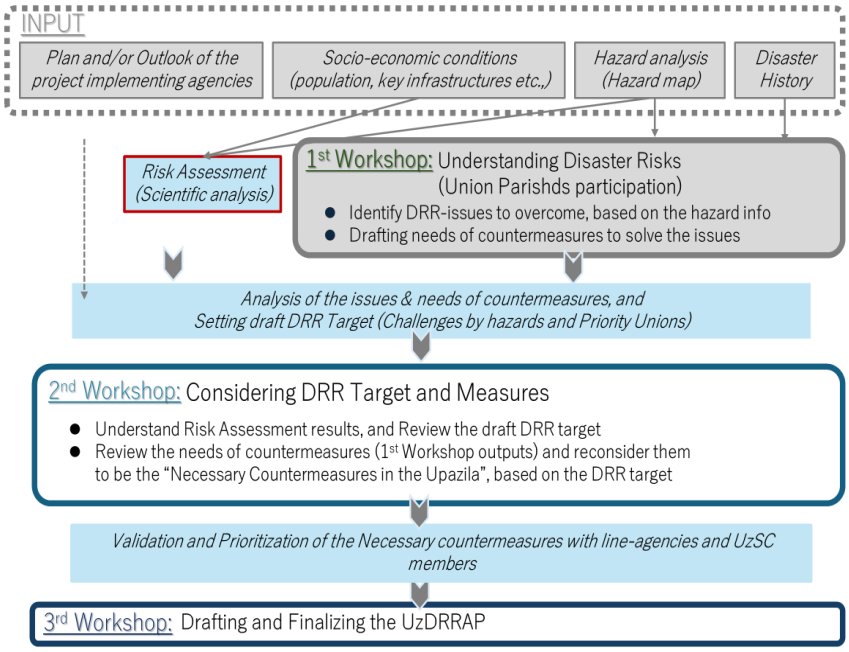


Figure 3-6 Flow of the Implementation of the Local Disaster Risk Reduction Planning

3) Implementation Schedule

The implementation schedule for formulating a Upazila Disaster Risk Reduction Plan in the target Upazila is expected to be about 6 months through the holding of 3 UzDRRP formulation workshop and at least two Upazila Sub Committee (UzSC) meetings. The implementation period can be adjusted appropriately according to the social scale of Upazila, the situation of disasters, and the structure of the implementing organization. The schedule table is shown in Figure.3-3.

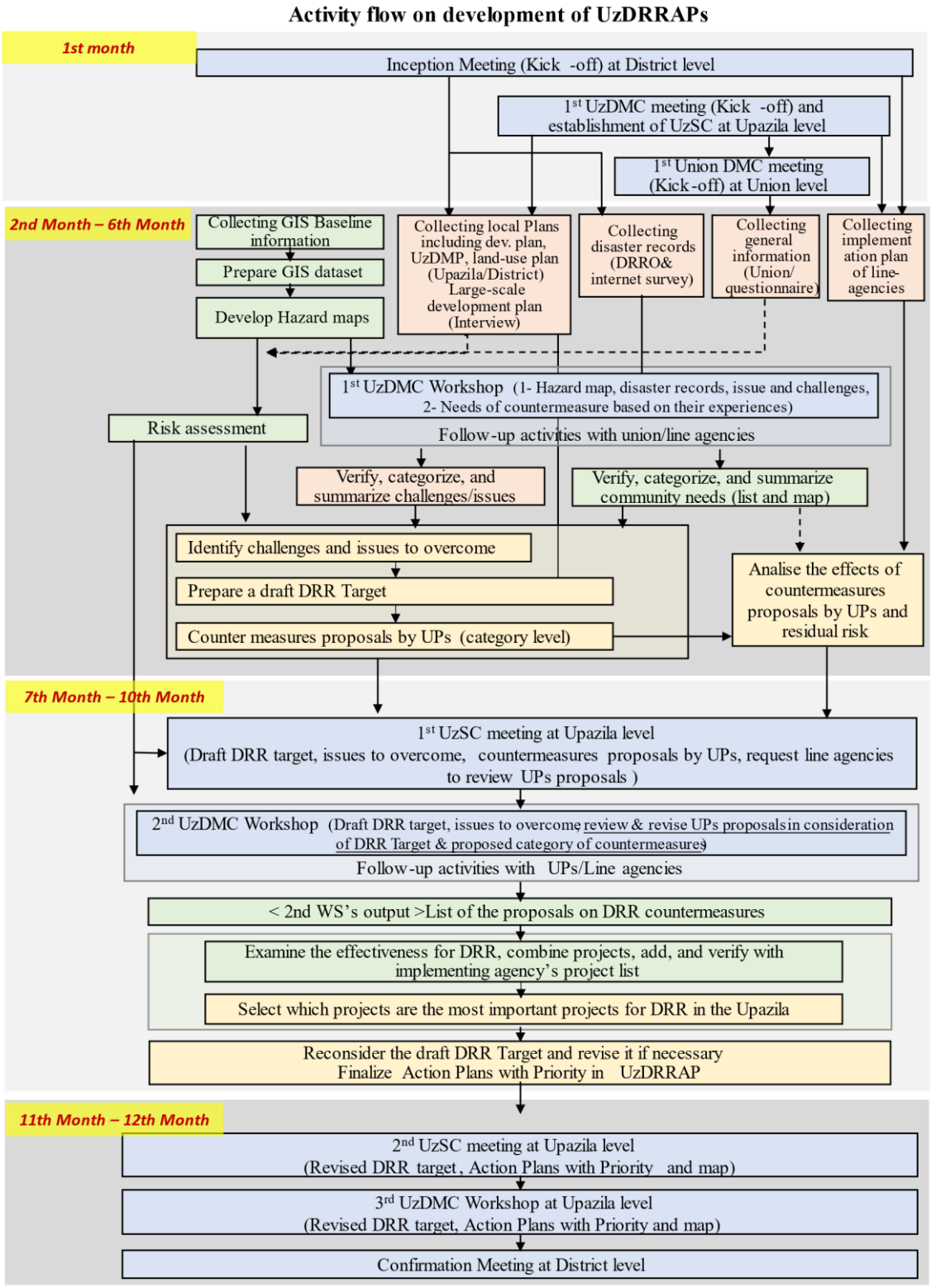
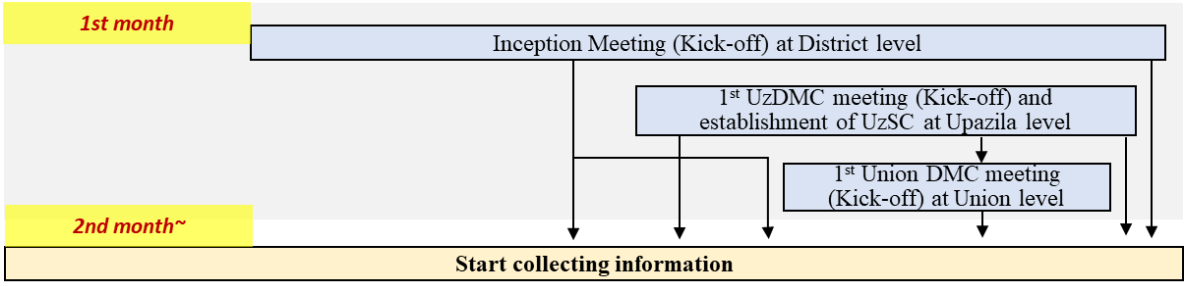


Figure 3-7. Implementation Schedule of UzDRRAP

The planning schedule can be divided into the following three phases

- **Preparation phase of DRR planning**
- **Planning Phase -Information Gathering and Analysis -**
- **Approval and Monitoring Phase**

Preparation phase of DRR planning (1st Month)



Before the Inception Meeting (Kick-off)

(1) Selection of District and Upazila to support DRRP formulation by LDRRAP Unit in DDM

Work 1-1: DDM assigns personnels for the LDRRAP Unit to make decisions on Upazila priority and the number of target Upazilas.

(2) Contracting with Local Consultant in the selected District

Work 2-1: Select a consultant to be contracted for the practical work of organizing workshops and UzSC meetings, collecting and organizing various types of information, and writing the draft UZDRRAP, specifying the period of the plan formulation, the method of formulation, and the other outputs.

Inception Meeting at District level (Kick-off) and 1st Upazila Sub Committee Meeting

(3) Holding Inception meeting (Kick off) at District level

Work 3-1: Hold a Inception meeting to discuss the roles and responsibilities of the stakeholders (Representatives of Union Parishads, Line agencies at central and local level, and DDM) to formulate UzDRRAPs in selected Upazilas. Overall schedule until the UzDRRAP aproval is agreed in this meeting.

(4) Establishment of UzSC in selected Upazila (as a decision-making body on coodination with stakeholders, formulation schedule and setting the DRR

targets)

Work 4-1: holding a pre-meeting to establish the UzSC, inviting DRRO and key person of the DDMC

The meeting agenda includes topics below;

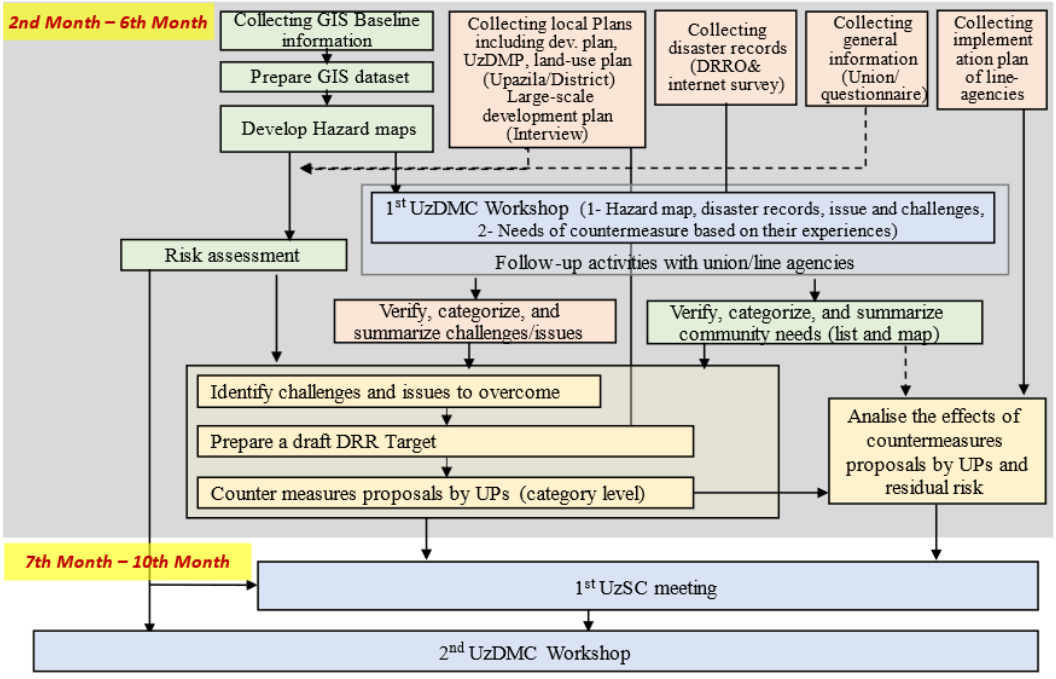
- Review of DRR plan objectives,
- Benefits of the DRR Plan,
- Planning process,
- Stakeholder responsibilities, and
- Identification of Workshop participating institutions/Union Parishads)
- Request to support for provindng information

Work 4-2: holding a pre-meeting with Union DMCs individually.

The meeting agenda includes topics below;

- Review of DRR plan objectives,
- Benefits of the DRR Plan,
- Planning process,
- Stakeholder responsibilities, and
-Identification of Workshop participating institutions/Union Parishads)
- Request to support for provindng information

Planning Phase-1 -Information Gathering and Analysis for 1st UzSC and 2nd WS (2nd month to 6th month)



(5) Collection of hazard and risk information

Work 5-1: Develop and distribute hazard maps → Preparing for 1st workshop
- Sub consultant collects GIS baseline information, and prepare GIS dataset.

Work 5-2: Collect relevant information for risk assessment.
- Local plans including Upazila Development Plan, Land Use Plan, Master Plan (Implementing line agencies and Pourshava)
- Disaster records
- Socio economic information in Union and Upazila

After the first workshop (preferably before the WS), the local consultant shall review the general structure of the UzDRRP, or refer to past case studies such as three districts six Upazilas (Cox's Bazar,Sunamganj, and Kurigram), to gather the necessary information to describe Chapters 1 to 3.

Questionnaires shall be distributed to Union Parishads and related implementing agencies to collect and organize the information necessary for the description of Chapters 1 through Chapter 3.

Box-6 Gender consideration

Information should be collected with attention to:
- Gender-specific disaster impacts (e.g., access to shelters, responsibilities)
- Mobility challenges of elderly and disabled individuals
- Gender-responsive evacuation and recovery planning

See Training Manual Appendix for the contents of the questionnaire items. In addition to the questionnaire, the Local Consultant shall start collecting information on the required items from the websites of the relevant government agencies, etc.

(6) Hold 1st UzDMC Workshop

Work 6-1: The 1st Workshop is to be held to share hazard map and disaster records, and discuss issues and challeges. The workshop starts collection of the needs of countermeasures based on the people's recognition of the represetatives of the participants from Union Parishads.

Agenda items to be identified with stakeholders at the first workshop

- Hazard types in the region (hearing opinions including those not reflected in the hazard maps),
- Results of analysis of hazard maps (based on simplified analysis) for each disaster type (and collection of hazard information not reflected in the maps)
- The population, rice paddies, and other public facilities in the potentially affected union,
- Economic damage to paddy fields, etc.
- Expected countermeasures proposed by Union Parishads

(7) Gathering and organizing information on Countermeasures and local needs after the workshop (Following Up Task)

Work 7-1: After the 1st Workshop, challenges and issues and expected countemeasuresthat representative of each Union Parishad stated shall be summarized as a following-up activity of the workshop. The time allocation for this in the workshop is limited. The local consultants visit each UP to obtain those information. .

Work 7-2: The countermeasures are organized as a list and summurized in the countermeasure map based on the following-up work above.

(8) Risk assessment and drafting Disaster Risk reduction Target(DRR target)

Work 8-1:Hazard exposure for each hazard type on agricultural fields, population, transportation infrastructure ,and important econmic values such as public facility is to be summarized on the risk assessment map. The result to show scale of the risk in each Union shall be analyzed by quantitative method such as scattered charts to set priority area.

Work 8-2: Identified challenges and issues to be ovecome must be reflected and integrated in the DRR Target when it describe necessary mission and countermeasures.

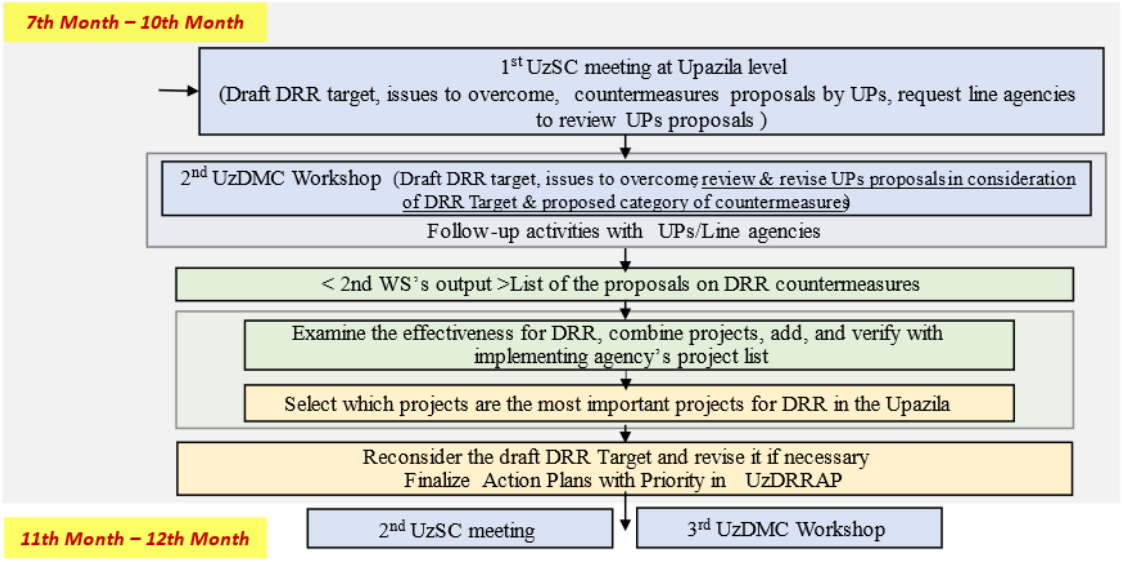
Work 8-3: Prepare a draft DRR Target, referring to hazard exposures for the values above mentioned and challenges on the hazard prone areas.

Work 8-4: Establish category of the possible countermeasures.
-Structural measures (measures to reduce hazard impact, and infrastructure necessary for emergency response)

-Non-strucutural measures (Regulations and Policies, Early warning and Communication, Disaster Management Training and materials, DRR education & Public awareness raising)

Based on the category above, summarize the countermeasure proposed.

Planning Phase-2 – Review of Countermeasures and DRR Target setting (7th month to 10th month)



(9) Holding 1st Upazila Sub Committee meeting

Work 9-1:1st UzSC discusses on Draft DRR Target and proposed countermeasures by UPs.

Meeting Agenda
- Sharing Risk assessment result and challenges & issues - DRR target drafting intergrated with challenges and issues - Request on necessary cooperation with the UPs proposals review Continuing from the 1st workshop, UzSC meeting shall be held to collect information on implementing agencies' projects, including status of project plans, budgets, estimated priorities in implementing agencies, specifications of each project, status of plans, and benefits.

Work 9-2:1st UzSC requests necessary support to provide projects information to line agencies in order to check and review the proposed countermeasure with existing or pipeline project in the line departments.

(10) Holding 2nd UzDMC Workshop

Work 10-1:Based on the feedback of 1st UzSC, hold 2nd UzDMC Workshop to discuss on Draft DRR Target and proposed countermeasures.

Issues to be understood by stakeholders at the second workshop

Countermeasures proposals by UPs are to be reviewed and revised based on DRR Target.

UzSC starts making the lists of needed countermeasures from both communities (Union parishads) and local offices of implementing agencies.

To initiate this task, the UzSC shall request all interested parties, including implementing agencies, to cooperate in the necessary work.

UzSC shall provide an overall picture of countermeasures to create UzDRRP Chapter 5-1 and review information on existing/non-existing countermeasures

(11) Examine the effectiveness for DRR, combine projects, add, and verify with implementing agency's project list

Work 11-1:

UzSC members re-examine the UP proposals, and formulate an action plan to address the issues raised at the WS, based on the DRR target. The GIS map is used to check how the action plan implemented by the Line Ministry corresponds to the issues raised by the UP and the proposed projects for addressing them.

What is important here is the technical judgment of the implementing agencies (agencies) regarding the countermeasures proposed by the UPs (proposing parties).

1) Limitations of Resident Proposals

Even if residents share hazard maps and understand the results of risk analysis, they do not have specialized disaster prevention knowledge, so their proposals are not always effective in controlling hazards or reducing damage.

2) Differences in how phenomena are perceived

Residents often see flooding and urban water logging as local issues. However, from the perspective of the implementing agency, these are phenomena that have a wide-ranging impact, and a comprehensive understanding is required.

3) Project priorities

Even if the residents' proposals and the actions envisaged by the implementing agency are in agreement, project priorities are based on technical judgments. Therefore, the priorities considered by the residents and the judgments made by the implementing agency may differ.

For example, when installing irrigation facilities along a large river or in a Char area,

riverbank erosion countermeasures are a prerequisite. Even if irrigation facilities are strongly desired as a drought countermeasure, it is impossible to install permanent facilities in a situation where the riverbanks are unstable.

Therefore, in the overall action plan, riverbank erosion countermeasures are prioritized, and the installation of irrigation facilities is positioned second.

Through this task, perspective of the priority by line agencies, the Objectives and the program in the DRR target are to be integrated.

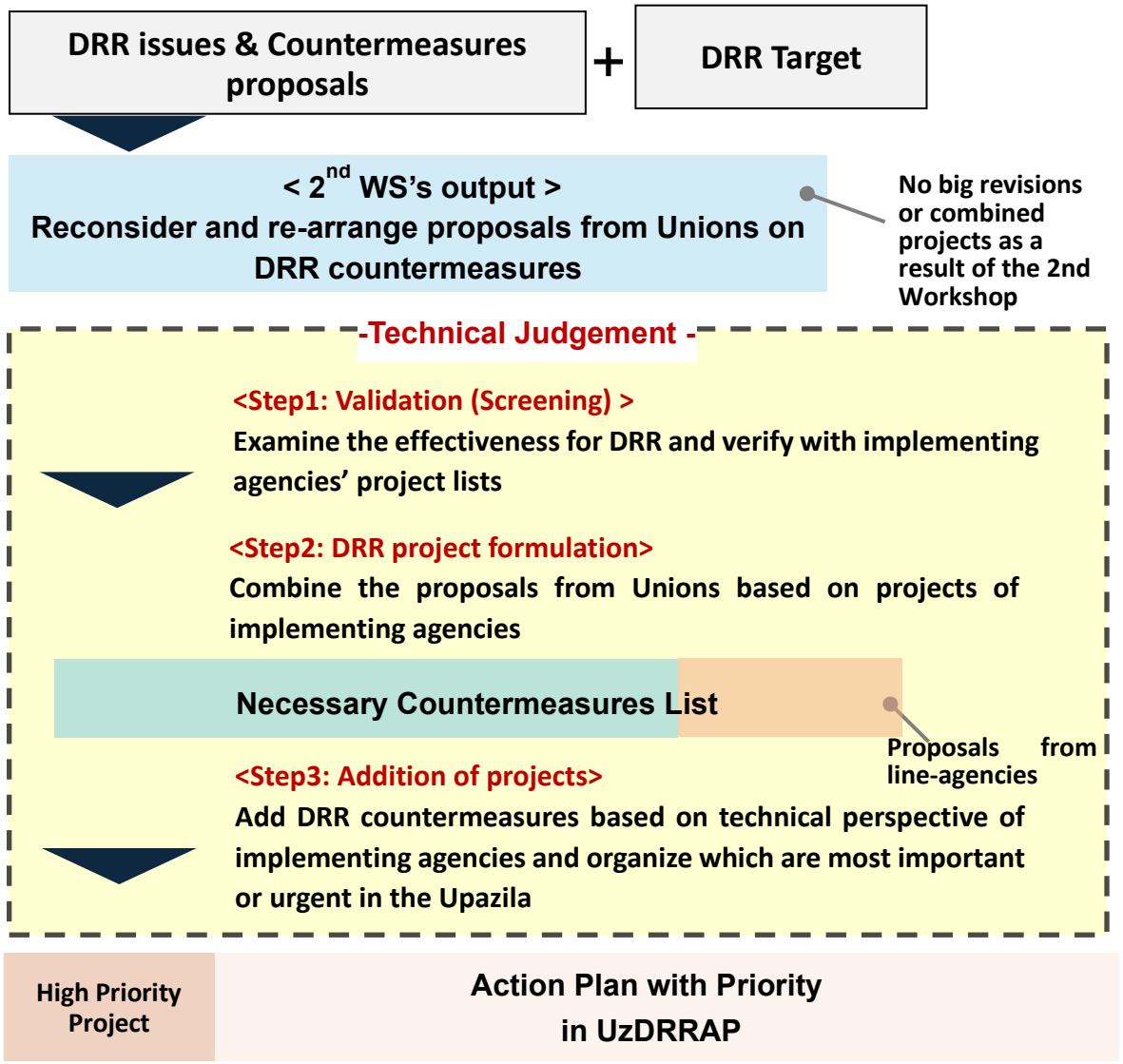


Figure 3-8 Priority setting in Action Plan

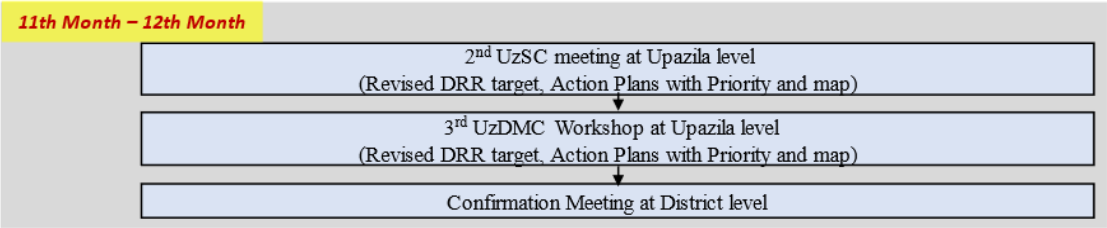
(12) Review the DRR target and finalize the countermeasures list and map

Work 12-1:Based on the task above, draft DRR target must be reviewed and

revised if necessary.

Summarize which proposed countermeasures are expected to highly contribute to achievement of the DRR targets and review the information on existing/unaddressed countermeasures in UzDRRP Chapter 5-1 and discuss whether the unaddressed countermeasures should be applied to future plans. Through this task, countermeasures map and list are to be finalized.

Planning Phase-3 - Validation of Countermeasures and DRR Target setting (7th month to 11th month)



(13) Holding 2nd UzSC meeting to agree on priority areas and Disaster Risk Reduction Targets and countermeasures

Work 13-1: Holding a second UzSC meeting.

UzSC meeting will be held when the above work at Planning phase 1 and 2 is completed.

MEETING Agenda-.
Agenda 1: Confirmation of DRR Targets, objectives and program,
Agenda 2: Sharing action plans
→summarize the priority of actions to achieving DRR targets

If there are objections or additional modifications to the action plans compiled by the local consultant, these should be commented on at this second UzSC meeting

(14) Drafting of UzDRRP

Work 14-1: Information collected and organized through questionnaires and web research is to be included in draft chapters 1-4 of the DRR plan.

It is preferable to start work on Chapters 1 and 2 before the workshop, since most of the topics in these chapters are general information that does not require interviews with participants at the workshop.

For hazard maps and risk analysis in Chapters 3 and 4, the results of the workshop and the presentation materials should be used.

Work 14-2: Write Chapter 5 based on the discussions at the UzSC;.

(15) Exchange of opinions with central line ministries

Work 15-1: Hold a FGOCG on DDM's initiative to share an overview of the UzDRRP, exchange ideas and get feedbacks.

(16) Consensus of all stakeholders in the Upazila DMC at the 3rd workshop.

Work 16-1: Hold the third workshop.

Workshop Agenda.
- Presentation of the overall plan,
- Review of priority projects (Chapter 5) by all DMC members,
- UzDRRP approval process (see 3-3).

(17) Holding District DMC meeting.

Work 17-1: Toward the approval process, district DMC meeting initiated by Deputy Commissioner is to be held to confirm the final outcome of the plan.

Approval and Monitoring phase

(18) Monitoring for plan update and promotion of project implementation

Work 18-1: Holding MoDMR Meeting

Agenda: Confirmation on approval process of the UzDRRAPs.

Work 18-2: Holding FGOCG Meeting

Agenda: Confirmation of project monitoring schedule and instructions to UzDMC, and progress report.