

PROVENTION CONSORTIUM

Community Risk Assessment and Action Planning project

BANGLADESH – Gaibandha municipality



Copyright 2002-2005, Maps-Of-The-World.com

The maps used do not imply the expression of any opinion on the part of the International Federation of Red Cross and Red Crescent Societies or National Societies or the ProVention Consortium concerning the legal status of a territory or of its authorities

Hazard Mapping and Vulnerability Assessment for Flood Mitigation

CRA Toolkit
CASE STUDY

This case study is part of a broader ProVention Consortium initiative aimed at collecting and analyzing community risk assessment cases. For more information on this project, see www.proventionconsortium.org.

Bibliographical reference:

Bangladesh Urban Disaster Mitigation Project (BUDMP), "Hazard Mapping and Vulnerability Assessment for Flood Mitigation". Bangkok: Asian Disaster Preparedness Center/ AUDMP, no date.

Click-on reference to the **ReliefWeb country file for Bangladesh:**

<http://www.reliefweb.int/rw/dbc.nsf/doc104?OpenForm&rc=3&cc=bgd>

Note:

A Guidance Note has been developed for this case study. It contains an abstract, analyzes the main findings of the study, provides contextual and strategic notes and highlights the main lessons learned from the case. The guidance note has been developed by Dr. Ben Wisner in close collaboration with the author(s) of the case study and the organization(s) involved.

HAZARD MAPPING AND VULNERABILITY ASSESSMENT FOR FLOOD MITIGATION BANGLADESH URBAN DISASTER MITIGATION PROJECT (BUDMP)

1. Background

The hazard mapping and vulnerability assessment process carried out under BUDMP focused on urban flooding in two flood prone municipalities of Bangladesh namely Tongi and Gaibandha. The project was implemented by CARE Bangladesh under their Disaster Management Project (DMP), with technical and financial support from ADPC's Asian Urban Disaster Mitigation Program (AUDMP) funded by USAID. BUDMP is being implemented from March 2000 and will continue till March 2005.

This case study focuses on the flood risk-vulnerability assessment activities of BUDMP in Gaibandha municipality, where annual flooding was a recurring event.

2. Overview of the Tools/ Techniques used in Assessment

Together with the Municipality Disaster Management Committee (MDMC) of Gaibandha, the BUDMP staff selected volunteers from the 9 wards and basic disaster management and vulnerability assessment trainings were organized for them. Plans were formulated with the local committee consisting of respective commissioners and volunteers to carry out vulnerability assessment in every wards.

For the assessment, the following three areas are considered:

1. Physical damage: Buildings, infrastructures, lifelines, other emergency facilities, agricultural, etc.
2. Social disruptions: Vulnerable groups, livelihoods and local institutions
3. Economic loss: Direct and indirect loss.

In order to carryout vulnerability assessment, the following 5 major Participatory Learning Approach (PLA) tools were applied through two methods: a) Focus Group Discussion and b) Semi Structured Interview. The PLA tools applied were-

1. *Transect Walk*: to get complete topographical information of the targeted area.
2. *Social Mapping*: to identify risk and resources in the targeted area.
3. *Problem Identification and Prioritisation*: to understand the degree of problems faced by the communities.
4. *Mobility Chart*: to know about people's shelters in times of disasters.
5. *Wealth Ranking*: to identify BUDMP beneficiaries.

Apart from the above mentioned tools, the following supplementary tools were used for collecting hazard information from the community.

- Timeline: to remind the community about extent of damaged by different disasters during last decades (1991-2000).
- Seasonal Calendar: to remind community how they cope with different disasters in the year round.

3. Methodology and Outputs

3.1. Loss Parameters

The loss parameters applied under this assessment are the range of undesirable consequences of natural hazards, listed below.

Consequences	Measures
Deaths	Number of people
Injuries	Number and injury severity
Physical Damage	Inventory of damaged elements by number and damaged level
Emergency Operations	Volume of manpower, man day employed, equipment and resources
Disruption to Economy	Number of working day lost, volume of production lost
Social Disruptions	Number of displaced persons, homeless
Environmental Impact	Scale and severity (clean up cost, repair cost as consequences of poor environment, health risk, risk of future disaster)

3.2. Data Collection

The first step in vulnerability assessment was the collection of data through surveys in the two working municipalities. The priority information needed in defining the risk within the project areas were determined as follows:

- Nature of the Hazard
 - Hydrological information with sufficient inundation records due to flood hazard
 - Flood history of two working municipalities
 - Topographical information with land use pattern
 - River morphology (flood in terms of return periods, duration and inundation level relative to rivers, level of danger, etc.)
- Exposure inventory (Population, Buildings, Highway, Bridges, other existing infrastructure, etc.)
- Vulnerability of exposures to flooding hazards
 - Meteorological information relating to flood seasons (dissemination process, lead time)
 - Geological information (soil structure, soil type, etc.)
 - Existing preparedness system of two working municipalities and Annual Development Plan of Municipality

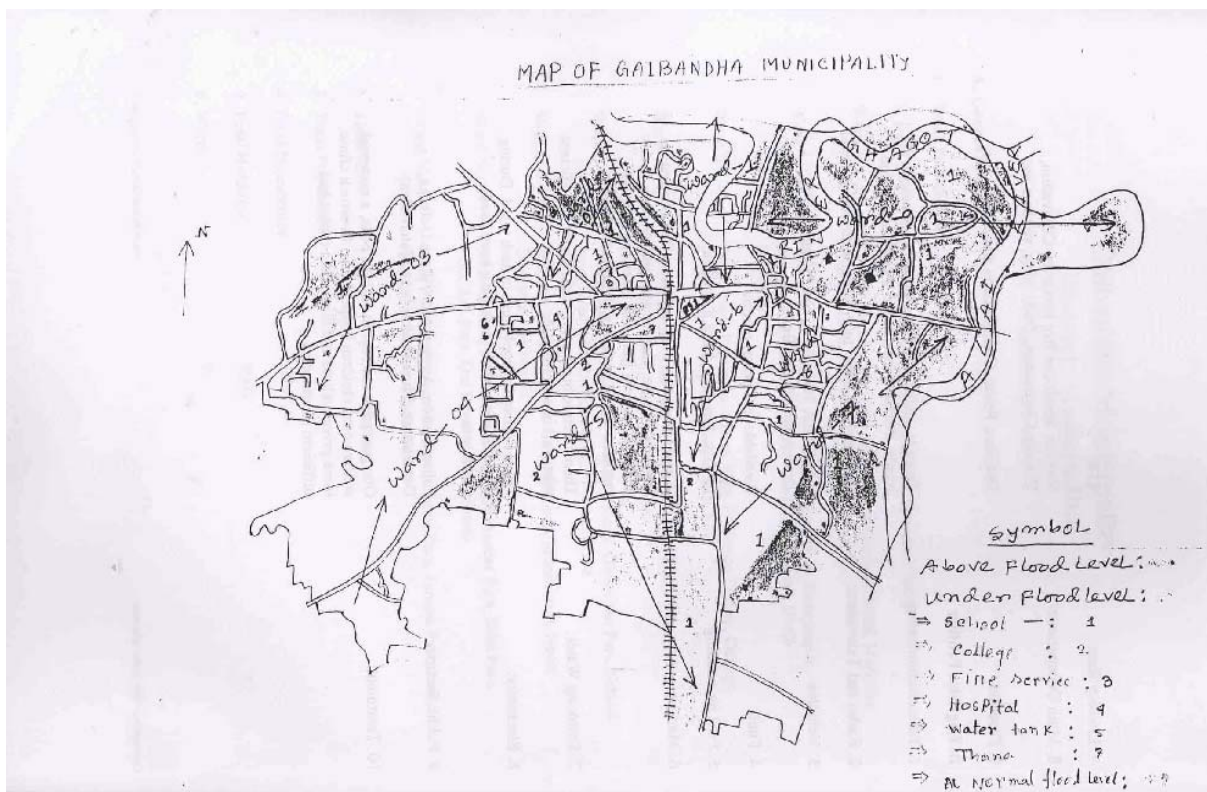
→ Necessary demographic information (population, urban growth rate, poverty situation, migration rate, etc.).

The combined information on hazard, exposure and vulnerability helped define the nature of risk.

3.3. Mapping

The BUDMP project staff and volunteers, together with the community, prepared risk and resource maps of more than 3 spots in every ward. Then individual map for each ward were compiled and analyzed at the municipality level. This particular map which was produced by the municipality officials was a manual map without the use of any GIS or computer aided tools.

3.3.1 Map of Gaibanda Municipality



3.4. Findings of PLA Tools

3.4.1. Transact Walk

The exercise on transact walk was conducted in order to learn the history, topographic condition, agro ecological situation, culture and macro economic situation of each ward in the targeted communities and had all the information sorted by the volunteers and MDMC members.

The data collected were entered into a cross checking table to formulate the solutions. The following table summaries the findings.

Characters tics	Homesteads	Pond	Field	Factory	Market	Bank	Cinema	School	Mosque	Madrasha	Road
Soil	Clay & Sandy Clay	Clay & Sandy Clay	Clay, Sandy Clay	Clay, Sandy clay	Clay, Sandy clay	Clay, Sandy Clay	Clay, Sandy clay	Clay, Sandy Clay	Clay, Sandy Clay	Clay, Sandy clay	-
Type	Pucca, Semi Pacca & Thatched	Pucca, Hearing bone bond & Kantcha	Single & Double Cropped	Small & big	Not deep & small	Small & big	Pucca & Semi Pucca	Pucca & Semi Pucca	Pucca & Semi Pucca	Thatched & C.I sheet roof	Deep & Shallow
Uses	Resident	Commu--nication	Cultivation	Fish culture	Abandon	Fruits & Timber	Pray	Business	Learning	residence	Drinking Water
Crops/ Fruits	Mango, Black berry, Gourd, Bean	Timber	Paddy, Jute, Wheat	Fish	Local fishes	Coconut & Jack Fruits	Coconut & Jack Fruits	-	Mango & Black Berry	Gourd & bean	
Irrigation	Tube well	-	Shallow and Deep Tube well	-	-	-	-	-	-	-	-
Pesticide, Insecticide & Manure	-	-	Urea, Phosphate, Potash and insecticides.	-	-	-	-	-	-	-	-
Problem	Water logging in low land area	Inundates in monsoon	Crop damage due to flood.	Inundates during flood	Not deep	-	Road inundates & partially damage	-	Inundate s	Inundates also	Inundates also in low land area during flood.
Solutions	To construct dam in river side, drain and culverts	To raise up to flood level	To construct dam in necessary places.	To raise banks & digging	To dig	-	To raise roads & re-construct roads	-	To raise ground up to flood level	To raise ground up to flood level	To raise up to flood level.

3.4.2. Social Mapping

The following table indicates ward based social resources, disaster prone area and probable solutions for each ward within the Gaibandha municipality.

Ward No.	Name of Resources	Vulnerable Area Identified	Probable Measures
01.	<ul style="list-style-type: none"> Kabilapara Primary School Debit Company Para Primary School Abandon Compartments of Train Railway Line Volunteers Ward CBO 	<ul style="list-style-type: none"> Debit Company Para Kalibaripara 	<ul style="list-style-type: none"> Raising roads up to flood level Reconstruct Road Homestead Raising Reinstall tube well and latrines up to flood mark Construction of flood Shelter
02.	<ul style="list-style-type: none"> Paschim Para Primary School Abandon Compartments of Train Railway Store Labor Office Volunteers Ward CBO 	<ul style="list-style-type: none"> Sarker Para Paschim Para Muhury Para Bihari Para Railway Colony 	do
05	<ul style="list-style-type: none"> Railway Line Primary Training Institute A. Hye High School 	<ul style="list-style-type: none"> West Gobindhapur Mazipara College Para Bangla Bazar East Gobindhapur 	<ul style="list-style-type: none"> Homestead Raising Reinstall Tube well and Latrine up to the flood mark Construction of sufficient drainage
07	<ul style="list-style-type: none"> Agriculture Training Institute (ATI) High land of ATI Volunteers Ward CBO 	<ul style="list-style-type: none"> Baniarjan Para Kalibari Para Malibari Para 	<ul style="list-style-type: none"> Homestead Raising Reinstall Tube Well and Latrine up to flood mark Road Repairing Rebuild embankment up to flood mark
08	<ul style="list-style-type: none"> Purba Para Primary School Munshi Para Primary School Volunteers Ward CBO 	<ul style="list-style-type: none"> Sardar Para Rickshaw Patti Purba Para Mali Para 	do
09	<ul style="list-style-type: none"> East Kamarni Primary School Volunteers Ward CBO 	<ul style="list-style-type: none"> Akua State Para Kutipara Jumma Para East Kamarnai 	Do

Note : * Ward No.-3, 4, 6 are not vulnerable.

* Ward No.-5 is partially vulnerable

3.4.3. Problem Identification and Prioritisation

Based on the data collected from the 9 wards of Gaibandha Municipality, problems are listed according to their importance as follows:

1. Flood
2. Epidemic Disease
3. Cold Wave
4. Education Facilities
5. Water Logging
6. Drainage System
7. Fuel Problem during Flood Period
8. Dowry
9. Calamity of Insects on crops
10. Construction of Dam
11. Economic Marginalization
12. Communication
13. Environmental Pollution
14. Housing Problems
15. Calamity of Mosquito
16. Electricity
17. Drought

Note: Methodology for grading: The community was requested to use jute sticks in identifying the priority problems. The more number of sticks were put against more pressing problems. Accordingly the problems were ranked.

3.4.4. Mobility Chart

The volunteers conducted focus group discussions to identify mobility area and the following table was constructed accordingly. It shows the existing safe areas and the activities that can be undertaken for further improvements.

Ward No.	Name of Disaster	Name of Mobility Area	Probable Solutions
01	Flood	<ul style="list-style-type: none"> • Kalibari Primary School • Debit Company Para Primary School • Abandon Railway Compartment 	<ul style="list-style-type: none"> • Raising Ground of Primary School
02	Flood	<ul style="list-style-type: none"> • Paschim Para Primary School • Railway Store • Labor Office • Abandon Railway Compartment 	<ul style="list-style-type: none"> • Raising School Ground up to flood level
05	Flood	<ul style="list-style-type: none"> • A.Hye High School • Railway line • Primary Training Institute • Adarsha College 	<ul style="list-style-type: none"> • do
07	Flood	<ul style="list-style-type: none"> • Agriculture Training Institute (ATI) • Highland of ATI 	<ul style="list-style-type: none"> • No measure needed
08	Flood	<ul style="list-style-type: none"> • Purba Para Primary School • Munshi Para Primary School 	<ul style="list-style-type: none"> • Raising School Ground up to flood level
09	Flood	<ul style="list-style-type: none"> • East Kamarnai Primary School 	<ul style="list-style-type: none"> • do

3.4.5. Wealth Ranking

This tool was developed to define criteria for identifying priority targets for undertaking mitigation measures at the individual homestead level and focused mainly on the urban poor living in the vulnerable wards. The following criteria were considered to determine the target group.

- **Household Income:** < or = Taka 3000/- per month.
- **Ownership of Homestead:** Ownership or no ownership.
- **Plinth of Homestead:** Made of earth or non engineered houses

The following table shows the number of households in each ward, that need help.

Ward No.	Monthly Income < or = Taka 3000 + Own Homestead	Monthly Income < or = Taka 3000 + Without Own Homestead	Probable Measures
01	152	91	<ul style="list-style-type: none"> • Homestead Raising • Distribution of Tube well and Latrine • Homestead Plantation • Distribution of extra pipe and ring slab • Repairing houses
02	206	155	
07	500	200	
08	100	108	
09	644	155	
Total	1602	709	

4. Using Assessment Findings in Planning, Preparedness and Mitigation Processes

Relevant findings, maps and diagrams were compiled and analysed at the municipality level and BUDMP officials prepared the report containing relevant recommendations for preparedness measures that need to be undertaken. The report was presented at the meeting of the Municipal Disaster Management Committee (MDMC). Based on the findings and recommendations derived from the assessment, BUDMP organized a review workshop to share and discuss the lessons learned and to plan for the next phase of the project. The Fig. 1 illustrates the community participation process under BUDMP.

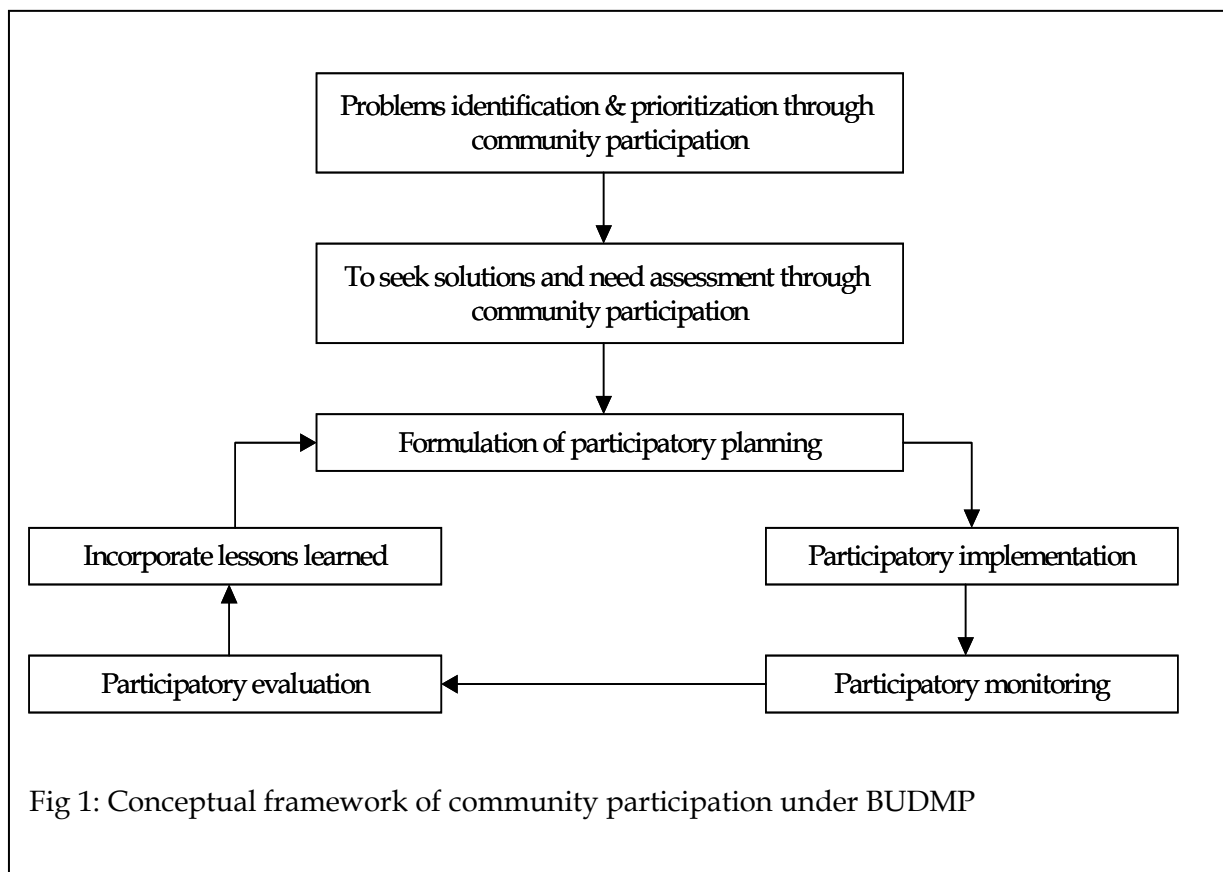
The results and findings were disseminated to the community in all wards. Through this, the community became more aware of their hazardous situations and gained knowledge on preparedness and mitigation measures that individuals could do to minimize the negative impacts of the disasters.

The findings of the assessment also provides the Municipality Disaster Management Committee (MDMC) with basic data to propose recommendations of structural mitigation initiatives, some of which were taken up under BUDMP. Furthermore, assistance was provided for MDMC in preparing Contingency Plan for the year 2002.

Several probable measures and solutions were implemented by BUDMP, CARE Bangladesh and MDMC and the local community in the years that followed.

Main activities in all four municipalities included foundation training for new NGOs and other officers of those municipalities on:

- Basic Disaster Management;
- Municipality Disaster Management Committee
- Participatory Monitoring and Evaluation
- Training of Trainers
- Community Volunteers
- Role of Civil Society in Urban Disaster Mitigation
- Scheme Maintenance
- Awareness raising among school children on urban Disaster



5. Extension to other areas

To promote mitigation, CARE Bangladesh and partner NGOs under the BUDMP mobilized funds and in-kind contributions from the municipalities and community groups in developing small, cost-effective mitigation schemes against flood risks. In a subsequent Phase, BUDMP replicated the project activities in two other flood-prone

municipalities of Bangladesh namely: Goalanda (in Rajbari District) and Dohar (in Dhaka District), following its successful implementation in two demonstration project municipalities—Tongi and Gaibandha. The vulnerability assessment mapping for the above municipalities is underway.

6. References

- i. Monzul Morshed and Nurul Huda (September 2002) *Hazard Mapping and Vulnerability Assessment Process Under BUDMP. Proceedings on Regional Workshop on Best Practices in Disaster Mitigation: Lessons Learned from the Asian Urban Disaster Mitigation Program (AUDMP) and other initiatives* ADPC,; Bali Indonesia.
Available online: <http://www.adpc.net/audmp/rllw/default.html>
- ii. CARE Bangladesh. (December 2003). *Project Completion Report of the Bangladesh Urban Disaster Mitigation Project (BUDMP)*.
- iii. AUDMP, ADPC (2004). *'Can small be beautiful? Community based flood mitigation in Bangladesh' Safer Cities 7: Case studies on mitigating disasters in Asia and the Pacific*
Available online: http://www.adpc.net/AUDMP/library/safer_cities/7.pdf

7. Additional Web Resources

ADPC: www.adpc.net

AUDMP: <http://www.adpc.net/udrm/udrm.html>
www.adpc.net/audmp/bangla.htm.

Care Bangladesh: www.carebd.org
http://www.carebd.org/project_dtls.php?pid=7

8. For more information contact

Urban Disaster Risk Management (UDRM) Team: ADPC

Mr. Arambepola
Team Leader (UDRM)
Program Manager,
Asian Urban Disaster Mitigation
Program (AUDMP)
arambepola@adpc.net

Mr. Rajesh Sharma
Programm Manager
Project Manager,
Asian Urban Disaster Mitigation
Program (AUDMP)
rajesh@adpc.net

CARE Bangladesh

Monzu Morshed
Disaster Management Program
Coordinator
Morshed@carebangladesh.org

Nurul Huda
Project Manager
BUDMP
dmputt@mail.bangla.net