



## BEST PRACTICES FOR ADAPTATION AND DISASTER RISK REDUCTION

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**CASE STUDY-11: < RAISED EARTHEN FLOOD SHELTER:  
STRUCTURES TO ENSURE SAFE SHELTER PROVISIONS  
FOR FLOOD AFFECTED PEOPLE >**



RURAL VOLUNTEERS CENTRE  
VILLAGE+P.O=AKAJAN, VIA-SILAPATHAR  
DISTRICT-DHEMAJI (ASSAM), INDIA  
PIN-787 059



**TITLE:** < Raised Earthen Flood Shelter: Structures to ensure safe shelter Provisions for flood affected people>

**ORGANISATION:** <Rural Volunteers Centre (RVC)>

**1. THEME:** CBDRR for safe shelter during flood.

**2. STATE/REGION/COMMUNITY:** Assam/Upper Brahmaputra River Basin/Flood vulnerable population of Brahmaputra River Basin

**3. BACKGROUND:**

**Context: The economic, social and geographical situation:**

**Geographical context:**

The geographic area of operation of RVC covers the flood plains of Dhemaji and Lakhimpur District and Majuli Sub-Division of Assam in particular and whole of the 8 North Eastern states of India in general.

The District emerges from the foot hills of Arunachal Pradesh and stretches to the Brahmaputra River with Subansiri one side and the river Siang on the other. Geographically situated between the 94° 12' 18" E and 95° 41' 32" E longitudes and 27° 05' 27" N and 27° 57' 16" N latitudes, the district covers an area of 3237 Sq. Km and is a basically plain area lying at an altitude of 104 m above the Mean Sea Level.

The District Lakhimpur lies on north bank of the mighty river Brahmaputra. It is bounded on the north by Siang and Papumpare District of the state of Arunachal Pradesh and on east by Dhemaji District. Majuli, the largest River-island belonging to Jorhat District is on the south and Gahpur sub division of Sonitpur District is on the West. The exact location of the district is 26048' and 27053' northern latitude and 93042' and 94020' east longitude (approx.).

Being situated in a strategic location where the steep slope of eastern Himalaya abruptly drops, forming a narrow valley which makes the region, as well as the whole Upper Brahmaputra River-basin, immensely vulnerable to flooding, affecting 50% - 70% population every year for the last 3 decades. The mighty Brahmaputra River, the Subansiri River and numbers of their tributaries originating from the hilly terrain of Arunachal Pradesh account for the perennial flood problem of the region which has already caused irreparable damage to the region. In addition, extensive human interventions (deforestation, river stripping, construction of mega dams etc.) on the Brahmaputra River Basin compounded with probable impact of climate change are gradually making the whole of the Brahmaputra Basin immensely vulnerable to multiple hazards.

**Socio Economical context:**

- The District Dhemaji and Lakhimpur i.e. the immediate area of working of RVC is of rural character (98.5% populations are rural) and the economy is largely agro based.



- Livestock rearing is the main secondary livelihood practice of the community but the sector is yet to be commercially organized.
- Sericulture, fishing and driftwood business are practiced in smaller scale.
- Sand deposition, bank line erosion, shifting of river course and other adverse effects of chronic floods on fertile agricultural land have made even the affluent farmers land-less.
- The depletion of agro based traditional livelihood practices has resulted in inter-District and inter state seasonal and permanent migration in large.
- Access to basic needs (water, sanitation provisions etc) of the flood affected population is largely denied.

### **Rationale/ Justification for being a good practice and potential for scaling up /replication:**

The “**Raised earthen flood shelter**” is a good practice and potential for scaling up because it is community owned and community manageable structure within the periphery of traditional practice which provides immediate shelter provisions for flood affected people along with their livestock and other household belongings; provides provision for continuing the emergency services viz. public health, schools, ICDS etc locally. The other potential factor for scaling up the “**raised earthen flood shelter**” because it provides opportunity for income generation to the flood affected through extending unskilled manual labor(earth works) on constructing the flood shelter.

### **Brief on the local condition prior to Project initiation:**



Local conditions in general: RVC's experiences of working on the flood plains of Brahmaputra River Basin reflected that damage to shelter, inundation of homestead and water logging for a prolong period due to flood combined with lack of safe shelter structures locally creates untold miseries in the lives of the people. The miseries include lost of livestock, damage of HH properties, shifting of flood victims to distant relief camps, exposure to unhygienic conditions lead to

outbreak of water borne diseases, skin diseases etc.

The other aspect is that damage to the infrastructures or due to inundation/water logging for a prolong period practically disrupts functioning of the health sub-centres, schools, ICDS centres etc. Lack of safe highlands acted as a major hindrance to continue the service delivery temporarily.

One other observation was that lack of highlands disabled the flood vulnerable community to plan in advance the rescue routes. The general practice was people along with their livestock and other belonging took shelter on embankments or dykes and thereby further deteriorate the physical



health of the embankments and dykes. The whole practices made the people more vulnerable to flood.

### **Project / Intervention Formulation:**

In the year 2000 devastating flood ripped through the Arunachal Pradesh and Assam part of the Brahmaputra River basin. The impact of the flood was mainly felt in Upper Brahmaputra Basin in Assam part. The untold miseries of the people led RVC to undertake relief and rehabilitation works in Dhemaji District as well as in Dhakuakhana Sub-Division of Lakhimpur District. During period of survey followed by relief operation the volunteers of RVC realized the crucial gaps of non-availability of safe temporary shelter provisions for the flood affected population locally. It was well understood that safe-shelter provisions locally would have reduced the risks of the flood affected population manifold. It was also felt that availability of safe highlands would have attributed towards uninterrupted functioning of the public service delivery systems.



The understanding led RVC to come up with the concept of “ Raised Earthen Flood Shelter” for the first time in Dhemaji District and Dhakuakhana Block of Lakhimpur District during the rehabilitation phase of the flood response program 2000.



During the rehabilitation program 10 numbers of “Raised Earthen Flood Shelter” was constructed in Sissiborgaon Development Block and Jonai Development Block of Dhemaji District and Dhakuakhana Block of Lakhimpur District.

The flood shelter are constructed in flood plain where flood water raise to a height far above the homestead or raised stilts (chang ghar) with the objective to ensure income generation opportunity (FFW/CFW) to the flood affected

people for a defined period by providing unskilled manual labor and in turn generate community resource to reduce risks of disaster.

### **Goal and Objectives:**

#### **Goal:**



The appropriate Government and National and International agencies have adopted the “Raised Earthen Flood Shelter” model in their Policy and have been implementing through out the Brahmaputra River basin.

**Objectives:**

**Flood affected people in distress have access to safe shelter provisions locally.**

**4. KEY ELEMENTS:**

**Target Beneficiaries:** The initial targeted beneficiaries are the flood vulnerable/affected people inhabiting the Upper Brahmaputra River Basin.

**Geographical Coverage:** Dhemaji District and Lakhimpur District (presently).

**Key Project Activities/ Key Innovative Features - (capacity building, institution building, awareness, empowerment, etc) and methodologies/practices:**

**The project activities involve the following steps:**

- (i) Selection of ideal location (low lying flood affected villages).
- (ii) Working out the appropriate size of the “Raised Earthen Flood Shelter” in consultation with the community, PRI members, and Village headmen.
- (iii) Selection of appropriate site for construction of the flood shelter in consultation with the communities.
- (iv) Estimating the nos of wage day the construction works will generate and sharing of the same with the community.
- (v) Formation of a “Village monitoring committee” to monitor the works.
- (vi) Actual construction works on Food for work (FFW)/Cash for work (CFW) basis engaging local community.
- (vii) Maintaining attendant register for the FFW/CFW works.
- (viii) Providing FFW/CFW in periodic intervals as worked out in the village meeting.
- (ix) Plantation works/turfing on the slopes of the flood shelter to prevent erosion after completion of the earthen works.
- (x) Constitution of a “Flood shelter maintenance committee” and handing over the structure to the community.

**Key Technical Inputs:**

Compaction of soil: Inputs are provided on compaction of the soil which is directly proportional to the life span of an earthen structure. Whenever and wherever laid, is of utmost importance to ensure good health of the structure built over it throughout the designed life of the structure. Good compaction of soil results in minimizing of its settlement on application of load increases its density thus increasing its shear strength and decreases its permeability leading to a fall in its water absorption and reduction in its swelling or shrinkage.



## Impact – Social / Environmental/ Economical/ Policy Changes.

### Social impact:

- The “*raised earthen flood shelter*” enables the flood affected people to remain in their native villages or adjacent to their native villages which in turn accelerate the process of rebuilding their lives.
- Staying in their native villages or adjacent to their native villages provides a high sense of security to the women community who otherwise have had to take shelter in distant Government relief camps.
- Staying in their native villages or adjacent to their native villages in a known environment helps children come out of the initial shocks fast and conveniently.
- The sense of community ownership (people are involved in planning process, peoples give labor, people maintain the structure) over the flood shelter attributes towards strengthening the “*intra village*” as well as “*inter village*” social integrity which leads to “*integrated social action for reducing risks of disaster*”.
- Highly valued social needs viz access to education, access to health services etc remains undisrupted in temporary basis over the flood shelter, other which would have to cease functioning for a prolong period.
- The employment assurance that the affected people accrue through providing labor in constructing the platform for a planned period encourages the community to concentrate on other family level as well as community level concerns.

### Economical impact:

- The primary objective of flood shelter construction is to ensure income generation opportunities to the flood affected person enabling the people in distress to rebuild their lives fast and according to their needs, priorities and choices.
- The flood shelter minimizes damage to the household belongings and thereby largely influences the household economy.

### Policy Changes:

- The Panchayati Raj system was revitalized in whole of Assam in 2002 after a gap of 10 years. After the election the District Administration organized a 4-days orientation workshop involving all the elected representatives (President/ Councilor/ZPMs). In the workshop, which was held in RVC premises, RVC presented concept note of the “*Raised Earthen Flood Shelter*” in details, along with the estimate and the probable appropriate size for the District Dhemaji. The detailed presentation had influenced the PRIs as well as the District administration which resulted in adopting the model for the flood plains of Dhemaji District under Government of India’s Employment Assurance Schemes(EAS) viz. National Food for Work Program, National Rural Employment Guarantee Act 2005. Notable shifting from the conventional practice of constructing/repairing of rural roads under EAS to construction of “*Raised Earthen Flood Shelter*” has been taking place since.

## 5. COST INCURRED:



The cost incurred largely depends upon size of the flood shelter. Diagram and detail of the cost has been separately attached with this doc.

#### Case I:

Size: Top - 135' x 135'  
Bottom - 165' x 165'  
Height - 15'  
Volume -  $[(165+135)/2] \times [(165+135)/2] \times 15$   
=3, 37,500 cft.

Estimated cost: Total: Rs.2, 07,500.00

#### Case-II

Size Top - 205' x 205'  
Bottom - 265' x 265'  
Height - 15'  
Volume -  $[(205+265)/2] \times [(205+265)/2] \times 15$   
=8, 28,375 cft.

Estimated cost: Total: Rs.5, 04,040.00

#### Case III

Size Top - 300' x 300'  
Bottom - 360' x 360'  
Height - 15'  
Volume -  $[(300+360)/2] \times [(300+360)/2] \times 15$   
=1633500 cft.

Estimated cost: Total: Rs. 9, 89,600.00

### **6. MONITORING MECHANISM:**

- During the construction phase, a village monitoring committee is formed which involves community's representatives as well as volunteers of RVC. The monitoring committees apart from maintaining a register of labor twice a day also maintain a measurement book on progress of works. Comparing the attendance register along with the measurement book enables the monitoring committee to understand the progress of the work i.e. balances between the wage day and land works performed.
- During the post-construction phase, the monitoring if required is done by the "Flood Shelter Maintenance Committee".



## **7. CHALLENGES:**

1. Mobilizing land for the construction works.
2. Mobilizing labor.
3. Maintaining balance between Wage day and actual work done.
4. Completion of works within the stipulated time frame due adverse weather, ground water rising etc.
5. Generating ancillary community resources.

## **8. LESSONS LEARNT** (both Positive & Negative)

### **Positive:**

- The “ Raised Earthen Flood Shelter have the potentiality to reduce risks of disaster in multiple sectors- (1) Safety to human and animal lives (2) Safe shelter during flood emergency (3) Safety to household belongings (4) Hygienic environment during flood.
- The income generation opportunity through providing labor on “Raised Earthen Flood Shelter” enables people in distress to rebuild their lives conveniently.
- The “Raised Earthen Flood Shelter” ensures undisrupted functioning of health services, education, ICDS etc.

### **Negative:**

- The primary objective of flood shelter construction is to ensure employment opportunities to the affected person which is a welcome approach but often it has been found that the approach resulted in non-achievement of the set standard of the infrastructure.

Comments: Appropriate mechanization approach should be framed out to supplement the human effort and achieve the set target to combat adverse impact of flood for a prolong flood-cycle.

- The flood- shelter (the earthen structure) is not totally equipped structure in it's own to address the shelter aspects of the flood victims. In most of the cases the victims have to depend largely on external aid to construct living space above the flood shelter, which sometime results in mixed-response from the victims to take shelter on the flood shelter.

## **9. CONCLUSION**

Till date RVC has constructed 11 numbers of “Raised Earthen Flood Shelter” in Dhemaji and Lakhimpur District. Out of the 11 numbers 10 had been constructed in the year 2000-01 and 1 in the year 2002. These 11 flood shelters which were located in remote location since construction had been providing immense relieves to the flood affected people in distress. The success of the intervention has influenced the PRIs and other Government departments to under take similar activities in flood plains of Dhemaji and Lakhimpur in following years.



**10. Submission may include photographs, graphs, charts, and other illustrations.**

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