FINAL REPORT VOLUME - 2

BIHAR KOSI FLOOD RECOVERY PROJECT (BKFRP)

Report on Developing Approach, Protocols And Mechanisms for Community Participation in Embankment Surveillance and Piloting in Select Communities in Kosi River Basin

Submitted to:

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JPS Associates (P) Ltd. New Delhi

Volume- 2 (Part –I)

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1.0 COMMUNITY PARTICIPATION MODES IN EMBANKMENT SURVEILLANCE IN NORMAL TIMES AND DURING FLOOD TO SUPPLEMENT THE INSTITUTIONAL EFFORTS

1.1 Community Participation – The concept and existing modes of community participation:

Globally, it has been realized and also been practiced for long that decentralization in decision making can lead to inclusive development. It prepares the local communities for making informed decisions and hasa say in policies that directly affects them. It lessens the burden on state system and exchequer by refraining to intervene in every small and medium size points of trouble. The community becomes capacitated and informed enough to take care of such issues.

Within India we can draw parallels to reforms that have taken place in political system with the enactment of PRI Act. In many places this promises to reform the system of governance. Whereas, the flood control measures equipped with backup support from technical measures have a tendency to cope with the emergency situation, community participation has the potential to make such measures part of daily discourse. Being at the forefronts, communities need to have capacity to respond to threats themselves. It is for this reason that communities should be involved in managing the risks that may threaten their well-being.

A live example of how community participation can aid the public delivery system is that of participatory irrigation management within the Irrigation Department in Bihar. While details still need to be validated, however, PIM improved the revenue collected as irrigation charges. It also, substantially cut down the cost on machinery for revenue collection. We have already presented a summary of lessons emerging from the international and national practices in disaster and flood management and also few instances where community is engaged in surveillance and maintenance of structures like embankment in particular and resource management in general. We sum up here some of the key lessons emerging from these practices that hopefully at later stages will enable us in formulating approach, protocol and mechanism for community participation.

- Based on the existing models of community participation world-wide it has been argued that it has to be seen not merely as means to enable the people to get, through

mutual – help initiatives and possibly with outside help, the basic needs which, otherwise, would elude them, but also a mean to influence decisions about issues affecting them.

- In some of the standard definition community participation process is identified as an instrument of empowerment.
- It is argued that development should lead to an equitable sharing of power and to a higher level of people's, in particular the weaker groups', political awareness and strengths.
- While these and related details may not be of relevance here, this brief conceptual understanding has been brought in here to drive two related points:
  a) Firstly, while visualizing community participation or drafting its modality we cannot think about the component where members of community are envisioned as mere messengers.
  b) Secondly, any mode of community participation has to strategize ways where community becomes an active stakeholder and such strategies are designed in manner that can sustain their participation for longer duration.

1.1.1 Community Based Disaster Management-New Approach in Disaster Management

- During the last decade, parallel efforts in various regions of the world called for a shift in paradigm from the prevailing emergency management framework to disaster risk management to reverse the increasing trend in disaster occurrence and loss, especially from small- and medium-scale disasters.
- These highlighted the need for proactive disaster management activities and the significant role of local communities.

The community based approach also corrected the defects of the top-down approach in development planning and disaster management which failed to address local needs, ignored the potential of local resources and capacities, and may have even increased people's vulnerabilities. The key word here is shift from **Emergency Alert System to Disaster Risk Reduction.**

1.1.2 Lessons for ideal model for community participation from Japan

This brief example from Japan is cited here not necessarily that Bihar needs to emulate for coping disasters like flood. Admittedly, such a replication would require a detailed look at the varying socio-economic conditions and the long history of coping with the disasters in a collective manner that has enabled Japan to reach to the present level of sophistication in community based disaster management. The present example has been brought in here merely to demonstrate the effectiveness and process of community participation not only in disaster management but policy making in general. Japan's tradition of community participation in preparedness was a key factor in minimizing the number of lives lost to the GEJE. Community-based DRM activities are well integrated into the daily lives of most Japanese, ensuring that awareness of natural hazards is never far from their minds. The national and local governments formally recognize and support the involvement of the community in DRM through laws and regulations that define roles and commitments, through linkages with local institutions (such as ichikai, or neighborhood associations), and through participation in meetings at which decisions are made. During the GEJE, local governments and communities in affected areas served as first responders, managed evacuation centers, and promptly began post disaster reconstruction.

1.1.3 Outcome of Community based Disaster Management

Experiences gathered from across the globe suggest that in natural disasters, the communities that experience the least damage and recover the fastest are those that can rely on mutual support systems and on their own resources.

1.2 Community participation modes in embankment surveillance in normal times and during flood to supplement the institutional efforts and recommend how the Panchayati Raj Institutions would be involved:

In Para 6.1 we have tried to explain the meaning of community participation in context development programmes as it is practiced in various policies and programmes within India and also globally. We emphasize on the fact that it needs to be seen as a tool of enablement and dissemination of information and consciousness. Successful integration of community

participation in policy framing and programme implementation across the globe has considerably improved the governance & management of a programme. We need to recapitulate this brief discussion here to justify a series of measures required for better governance of embankments and integration of community participation for its surveillance. We, however, emphasize that all the suggested measures are based on our intensive interaction both with the communities all along the embankment systems of Kosi and Kamla and also with different stakeholders within the Water Resources Department.

1.2.1 The Approach to Community Participation

Cases of top down and bottom's up approach exist all over the world in different initiatives involving community participation. In general, it has been observed that initiatives thrown by communities themselves on self-help are more successful and sustained one's. However, the innovativeness of EAMS and given the technicalities involved in embankment management in general and its surveillance in particular, one cannot help but initiate the process from above. Hoping that once the process of community participation takes some direction and roots, modifications in it can be made through engagement by communities at stake.

1.2.2 Formation of Committees/Groups among select communities:

As pointed out earlier in isolated instances of department personals taking help from identified individual's for getting communications about embankments health that there has been cases of either miscommunication or receiving wrong information. This, we feel is primarily the result of absence of any sense of responsibility in such identified individual's towards the larger interest of community and embankment. In the absence of any formal arrangement of reporting sender's of wrong information cannot be faulted. However, creation of formal arrangement for communication will not only instill a sense of responsibility among community members but will be of great help for the department as well who can be assured about the veracity of such communication.

Towards this objective different stakeholders have had different opinions. **Based on the inputs**

received from the community and the feedback we received from the WRD officials, officials from BAPEPS, FMISC, BSDMA, we strongly recommend formation of committees/groups in selected locations. The strategy has full ratification of the people surveyed along the Kosi and Kamla embankments. Most of the respondents felt that if the responsibility of embankment surveillance and other aspects of its management are entrusted to groups/committees they will act in a more responsible manner and it will also help in representation of all voices and concerns of the area. The local committees will serve the purpose of information sharing, information flow during both the normal times and also during flood.

JPS proposes the following modes towards community participation:

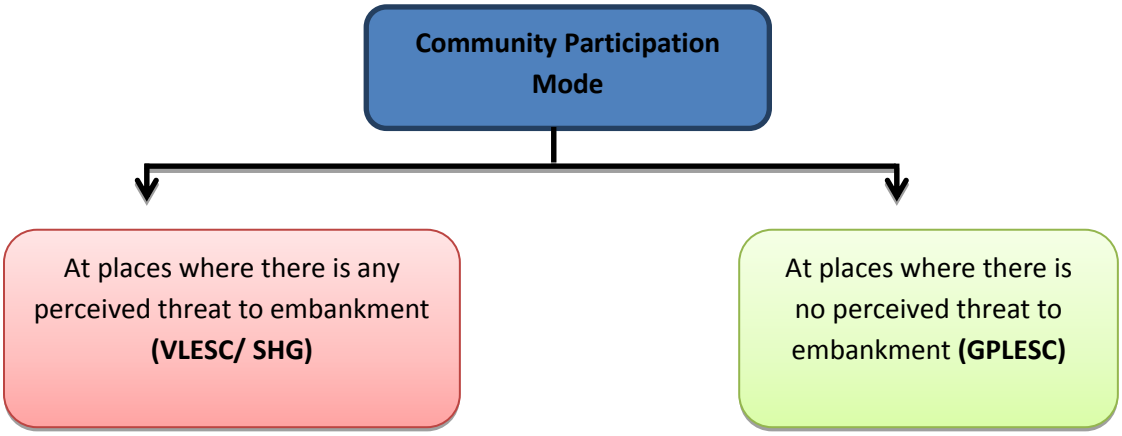

Figure 1: Community participation mode

1. Community participation mode in identified areas where embankment is presumed to be under any sort of threat:

i) To form exclusive groups/committeesat village termed as Village Level Embankment Surveillance Committees **(VLESC)** in every vulnerable pointwhere the embankments health seems to be under any sort of threat or even in areas which were threatened in the past.

ii) Department can think to tap select **SHGs** (formed under the ambit of Aajeevika -Bihar Livelihood Mission) at vulnerable points stretches to be assigned the task of Embankment Surveillance after due training by WRD / BSDMA.

2. Community participation mode in areas where there is no perceived threat to embankment:

PRIs at the GP level can commission a committee selecting members from different existing committees such as Health and Sanitation Committee / Farmers committee/ Education Committee, etc. named as G.P. Level Embankment Surveillance Committees **(GPLESC)** to exclusively work towards embankment surveillance and management at the Panchayat level across the stretch of the embankment under the jurisdiction of the Panchayat. This approach can be done universally across the G.P's villages adjoining to the embankment which are not so vulnerable. In vulnerable points however the VLESC should be the norm.

In either of the modalities mentioned above WRD Division will need to initiate the elements of group formation by involving NGOs to ensure that such groups are formed at the required levels and trained adequately for sustainability.

1.3 Protocols for community participation in identified areas where embankment is perceived to be under any sort of stress:

Frame work:

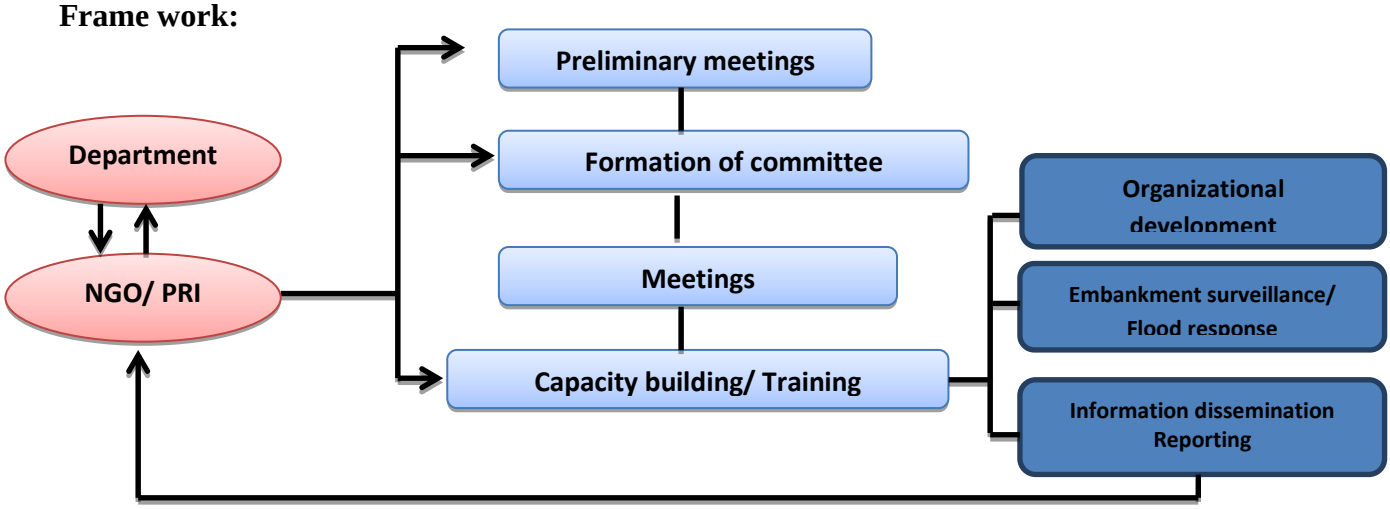

Figure 2: Frame work of community participation in areas where embankment is perceived to be under some sort of stress

Note: *The area where VLESC is to be formed has to be identified and certified as area under any perceived threat by the Junior /Assistant Engineer after due visits to the site.*

1.3.1 Process of formation of committee VLESC:

The Junior Engineer will have to identify areas where there are threat and areas where there are no threat to embankment during his normal field visit or from the feedback from home guards in position. With the help of local NGO / PRI members/ Home guards in the identified areas which are under threat the Junior Engineer will:

- Organize village /RD level preliminary meetings with the village community/ SHGs or any other existing peoples' organization in the village. This will be done before the onset of monsoons (preferably during February – March) of the year.
- Two preliminary meetings will have to be held before the committee is actually formed.

1.3.2 Structure/ constitution of the Embankment Surveillance Committee (VLESC) in areas where there is any perceived stress / threat to the embankment

Protocols for group formation

i. Group formation will require careful representation of all sections of population in the area.
ii. Extra care needs to be taken to ensure representation of vulnerable and marginal sections of the population. This will make them feel part of the entire process.
iii. Regular meetings of the committee/group will be required to sustain their interest in the entire process.
iv. It is proposed by the consulting firm that the field level functionary of the WRD from time to time should initiate and be present in group deliberations to bridge the current gap in communication between the department and the community.
v. Such interactions will also be useful for the department to discuss the on-going and up-coming works for maintenance of the embankment to assuage the curiosities and apprehensions of the community with regard to such works.
vi. The forum can also be utilized for imparting training on various aspects of embankment surveillance and maintenance.
vii. The process, it is hoped will help in ensuring an informed participation of community in embankment surveillance.

The members in the committee may include:

i) The committee may contain 7or 9 members
ii) 2 members from the PRI (ward member and mukhiya etc.)
iii) 2 local but influential and responsible members from any existing committee(VHSC, VEC, YuvakSangha/ NariSangha)
iv) 2 members from SHGs

"The constitution of the committee was suggested by the PRI members during FGDs and also by the respondents individually interacted with. The officials of WRD/ BAPEPS etc. also had similar suggestions…"

v) One WRD staff (Junior Engineer/ Assistant Engineer)
vi) Contractor involved in execution of any work being undertaken in the embankment
vii) Home guard

ii) Mobilizing SHGs for Embankment Surveillance:

The Officials of the concerned WR Division will have to identify potential SHGs in the areas where any threat to embankment is perceived. They can meet the Jeevika coordinator and discuss the matter of involving the SHG in embankment surveillance.

The SHG can be a potential body for embankment surveillance. The SHGs are formed for a particular objective of promoting economic independence by group activity (lending and recovery). They function under inbuilt rules and the dynamics of group formation and capacity building is already there in the Jeevika program. Adding the dimension of embankment surveillance through some sort if incentivisation will not be a difficult option.During discussions with SHGs in Baptiyahi and other places the SHGs seemed to be very interested in the concept of embankment surveillance as they came out unanimously that embankment added safety and security to their economic activity. They were of the opinion that with proper training it would become relatively easier for the members to look after the embankment properly.

During formative stages SHGs in many places across the country are governed by 10 commandments such as:

a. All members registered in the SHG will have to send their children to school
b. SHG members will have to take care of the health and hygiene of the children
c. SHG members shall conduct 4 meetings a month
d. SHG members shall document all transactions and meeting proceedings in a register
e. SHG members will open a bank account and deposit all the group savings in the bank
f. SHG members will be involved in some sort of community development activity such as village sanitation
g. SHG members will try to mediate in issues like wife beating, alcoholism affected member
h. SHG members will initiate kitchen garden in their backyards for proper dietary supplementation of the family members, particularly children
i. SHG members will coordinate with lead banks for availing credit
j. SHG members will take an active part in monitoring school and education committee and the Village health and sanitation committee to ensure that all

children are sent to school and no children/ mother in the village remains non-vaccinated.

The element of embankment surveillance can be integrated into the existing system of SHG code if there is any or the Jeevika coordinator may be contacted to introduce this component in the group dynamics of SHGs. Making embankment surveillance mandatory to the SHGs criteria for qualifying for credit linkages can evolve as a great initiative in embankment surveillance.

1.3.3 Meetings

Timing of the meeting:

The VLESC will have to hold regular meetings and the proceedings of the meetings have to be recorded.

i. Initially the VLESC will have to meet on a weekly basis (during formative stage only)
ii. Once the capacity building is over they can meet on a monthly basis or quarterly depending on the situation.
iii. A month before onset of monsoon the VLESC will have to meet weekly.

1.3.4 Purpose of the meetings:

In the preliminary meetings issues such the importance of embankment in context to the lives of the community, embankment management and protection for safety etc. will be explained. The junior engineer may like to take the villagers/ some PRI members/ members of SHGs to the vulnerable points in the embankment and show them the threat factors.

- Discuss on general condition of embankment
- Discuss on human, traffic, animal activity causing any sort of threat to the embankment
- Discussion on settlements coming up on the embankment
- Discussion on roles and responsibilities of the committee/ committee members during normal times and during flood times.
- Discussion on issues related to flood preparedness
- Discussion on networking with different line departments for other related works such as

for income generation, road works

- Discussion on modes of information flow (actors involved, process and modality)
- Discussion on organizing labour / skilled labour for the department during emergency situation

1.3.5 Capacity building/Trainings for empowerment of the committee (VLESC) formed

Once the committee is in place and regularity of meetings is maintained the department can think of strengthening the committees by imparting trainings. Trainings can be of different nature and will have different modules:

Table 1: Capacity building/Trainings for empowerment of the committee (VLESC) formed

Module no:	Content	No. of members	Duration	Location	Resource person/ agency
Module 1	Leadership or organizational training – purpose of formation of committee, accountability, transparency, meetings and its importance, roles and responsibilities, book keeping , networking etc.	50-60 (at least 3 members of each of the VLESCs)	One day	WRD Division level	NGO
Module 2	Domain training – Embankment and its relevance to the community, embankment safety, threats to embankment, methods and practices to be adopted for embankment safety and other associated issues.	50-60 (at least 3 members of each of the VLESCs)	One day (Half day class room , half day at field	G.P. Level	WRD experts
Module 3	• Flood preparedness; Early warning system, role of VLESC during pre, during and post flood situation Managing resources, • Networking with department of Water Resources, other line departments	50-60 (at least 3 members of each of the VLESCs)	One day	G.P. Level	WRD experts

Module no:	Content	No. of members	Duration	Location	Resource person/ agency
Module 4	Information flow: types of information , relevance of information sharing, types of information sharing, modes of information transmission	28-30 (at least members of 3 VLESCs)	One day	G.P. Level	WRD, K-EAMS experts, Experts from BAPEPS

1.3.6. Roles and responsibilities of Embankment Surveillance Committee (VLESC//SHG) during normal times and during flood situation:

Table 2:Roles and responsibilities of Embankment Surveillance Committee (VLESC//SHG) during normal times and during flood situation

Role	During Normal times	During Flood season
Preparatory stage: Planning for embankment surveillance	Meetings to be held during Feb/March	Meetings to be held with community on receiving any emergency update from the department
Awareness building in the community:		
• Create awareness on early warning system, flood preparedness, disaster mitigation	Quarterly activity	Daily - Intensified through loudspeaker – camp mode
• Create awareness on flood warning, classification of floods based on intensity and threat, safety measures (indigenous measures), creation of common resources such as tarpaulins, lantern, floating bags, grain banks, places of safety etc.Creating awareness on officials to be contacted during vulnerable periods	Quarterly activity	-do-
• Involving community in activities related to reducing community irritation during execution of works during and after floods or any emergency or even at	Quarterly activity	Daily

Role	During Normal times	During Flood season
normal times		
Patrolling	Weekly patrolling	Daily patrolling
Updation of perceived threat situation to embankment (condition of embankment) (Identify threats to ment health (Rat holes, cuts, breaches) with location specific information - relative distance (RD) wise	Monthly activity	Updating required daily, even hourly messages will be of importance
Communication of relevant messages: Communicate reliable information (coded/digital/ photos) needed by the Department in proper , organized manner periodically on a monthly basis during rainy season / vulnerable periods)	Fortnightly/ Monthly activity	Daily activity
Arranging for local labour during execution of embankment maintenance works	As and when required	Daily activity – in emergency - immediate

2.0. PROTOCOLS FOR COMMUNITY- DEPARTMENT INTERFACE: TOWARDS ARRIVING AT A CONSENSUS APPROACH

In the discussions above we pointed to the existence of a yawning gap between people's expectations and the department's procedures of embankment management in the present. Though people do realize that embankment is for their safety and has enabled them to earn their livelihood in a more secure environment, however, in the present system of embankment management by the department they feel distanced from its affairs. As such the primary function of embankment of providing protection to people has taken a back seat in the minds of general people sparing few months of monsoon. It is important to regenerate the interest of the community for their round the year interest in embankment protection. People need to be brought in the center stage of embankment management not only for the proposed participation of community in embankment surveillance but also for its more efficient management. Some of the measures suggested by the present Consulting Firm for consolidating the interaction between the WRD and community members are provided below:

i. Regular interaction in the form of meetings with community members on aspects of embankment safety, eliciting community's suggestions for improvement of embankment management is of vital importance. It is important for the department to ensure that in such meetings field officials at different levels are present on different occasions.

ii. These frequent meetings will help in bringing the department closer to community's aspirations with regard to embankment management and will also help in allaying several of the existing apprehensions on both sides.

iii. The WRD should explore the possibility of bringing greater transparency in the maintenance works undertaken in the embankment and try to adopt procedures of construction and maintenance adopted in other road and bridges project. This measure has the potential to allay misplaced grudges of the people with regard to functioning of the department for the various works undertaken for embankment maintenance. In the long run this will enable the department to command greater respect of the people near the embankment.

iv. For many habitations embankments are the only link for commuting. It also came out during consultations with the community that one of the factors encouraging people to encroach upon embankment is its bad maintenance. The department should look into the aspects of consolidating the structures of embankments and wherever possible black top roads should be constructed. Consolidation and creation of black top roads will considerably place a curb on encroachments. This will also ease the movement of department vehicles on the embankment during regular and emergency inspections. In the present condition it becomes extremely difficult for vehicular movement, especially during the rainy season as the consultant team itself experienced.

Protocols for Community Participation – Community: Department Interface (Consensus Approach)

i. Some of the measures arising as a consensus for Community Participation Approach arising from Discussions with Community and Department (consensus approach) are listed below:

ii. Community participation leads the key to protection of embankments which are fundamental to the existence of community living in close proximity

iii. Currently there is scope of increase in interaction between the department and community.

iv. There is a need for the department to organize Community organizations (VLESC/GPLESC culled out of existing PRI/ SHG/ any other group existing at the community level) for embankment surveillance.

v. Once community organisation's are formed, regular interaction in the form of meetings with community members on aspects of embankment safety, eliciting community's suggestions for improvement of embankment management is of vital importance. These meetings will help in bringing the department closer to community's aspirations with regard to embankment management and will also help in allaying several of the existing apprehensions on both sides.

vi. The WRD should explore the possibility of bringing greater transparency in the maintenance works undertaken in the embankment and try to adopt procedures of construction and maintenance adopted in other road and bridges project.

vii. This measure has the potential to allay misplaced grudges of the people with regard to functioning of the department for the various works undertaken for embankment maintenance. In the long run this will enable the department to command greater respect of the people near the embankment.

viii. For many habitations embankments are the only link for commuting.

ix. It also came out during consultations with the community that one of the factors encouraging people to encroach upon embankment is its bad maintenance.

x. The department should look into the aspects of consolidating the structures of embankments and wherever possible black top roads should be constructed. Consolidation and creation of black top roads will considerably place a curb on encroachments.

xi. This will also ease the movement of department vehicles on the embankment during regular and emergency inspections. In the present condition it becomes extremely difficult

2.1 Mechanism for Information Flow – An outline

As mentioned above in our report that flow of information about embankment condition from community members already exists in the area. People have taken recourse to mobiles and such other existing communication tools to inform the relevant people in their cognizance about impending dangers to the embankment. The departments personals feel that most such information coming from people are based on unfounded apprehensions and seldom does any useful information comes from the community that is useful. In the existing scenario it is important to approach the community with a list of possible technical faults or other type of problems that can emerge on the embankment and train the identified partners among the community to alert the department about such emerging faults in the embankment on priority basis. A suggestion to the present consulting firm in this regard has come from the stakeholder meeting organized at FMISC to look into the procedures adopted in Bagmati – Adhwara embankment. The consulting firm is analyzing the procedures adopted in Bagmati – Adhwara and intends to take it to community members in Kamla and Kosi and also with the department's field personals there to incorporate their suggestions in the mechanism. During this exercise the consulting firm will also interact with the EAMS consultant in Kosi and try to explore the features which the software can support,for instance, the possibility of sending and receiving of picture messages, etc.

An important aspect that will also be explored during the piloting of the programme in a select WRD division will be to also finalize the seasonality of type of information flow that is important for the community and useful for the department. A strategy thus finalized in consultation with all the relevant stakeholders will have easy acceptance and will also ease the training process of select community members.

3.0 THE NATURE, CONTENTS AND FORMAT FOR COMMUNITY REPORTS, BASED ON VISUAL OBSERVATIONS OF EMBANKMENT CONDITION AND RIVER FLOW:

Community reported embankment and river status data will be integrated with EAMS for developing the maintenance and planning module. The consultant would refer Bihar check list finalized for inspection of embankments. Some basic formats for receiving embankment report (community to WRD) are proposed below:

Model Format 1

Community feedback on condition of Embankment condition

(To be reported to Office of Executive Engineer, WR Division)

1. General information

Date: _____/_____/_____
Period of reporting: Monthly/ Quarterly/Emergency (Please tick)
Name of the G.P:
Name of VLESC/ GPLESC:
Concerned person name: mobile no:
Location (stretch – RD km's.) from _____km's to _____

2. Embankment related information: Based on Visual observation

Embankment condition Main embankment (Please tick)	**Normal**	**Alarming**	**Any other**
If Alarming, what are chief concerns(please tick)	1. Degradation to black top 2. Slope of embankment affected 3. Toe of the slope affected 4. Rat holes/burrows/ other animal activity causing seepage 5. Settlement activity starting up besides the embankment 6. Lot of vehicular movement degrading the embankment 7. Cracks/ cuts on the embankment 8. Contractors / other people extracting soil/sand/silt on the inside of the embankment 9. Heavy Seepage observed		
Embankment condition (Spurs/ dykes) (Please tick)	Normal	Alarming	Severe

If alarming what are the chief concerns	1. Structural damage 2. Nose of the spur damaged 3. Erosion 4. Sand bags/ boulders sinking /washed away 5. _____ 6. _____ 7. _____		
Has the VLESC informed the concerned Junior /Assistant Engineer			
Whether Concerned official visited the site			
River flow information (please tick)	Flow is normal (no Threat)	Flow is approaching towards embankment	Rise of water level

Note: This is an abridged format (just illustrative). It can be modeled according to the need of the Department)

Model Format 2

Format for WRD Communication to community members in response to alerts received from them

Date: _____/_____/_____

From: Name of the Division:

Name of VLESC/ GPLESC:

Mobile Number:

Location (stretch – RD km's.) from _____km's to _____

Reported Problem:

Date of Inspection of reported site:

Action being taken -

Inspection of the reported site is done.	**Problem will be resolved shortly.**	**Problem will be immediately**	**Problem has been resolved.**

		resolved	

We thank you for your participation in embankment surveillance and timely reporting of the problem.

Note: *This is an abridged format (just illustrative). It can be modeled according to the need of the Department/Community)*

4.0. MODES OF INFORMATION FLOW TO DIFFERENT IDENTIFIED RECIPIENTS INCLUDING BAPEPS, EAMS, FMISC, FMC AND FIELD WRD OFFICES DURING NON-FLOOD AND EMERGENCY SITUATIONS.

Figure 3: Information flow mechanism

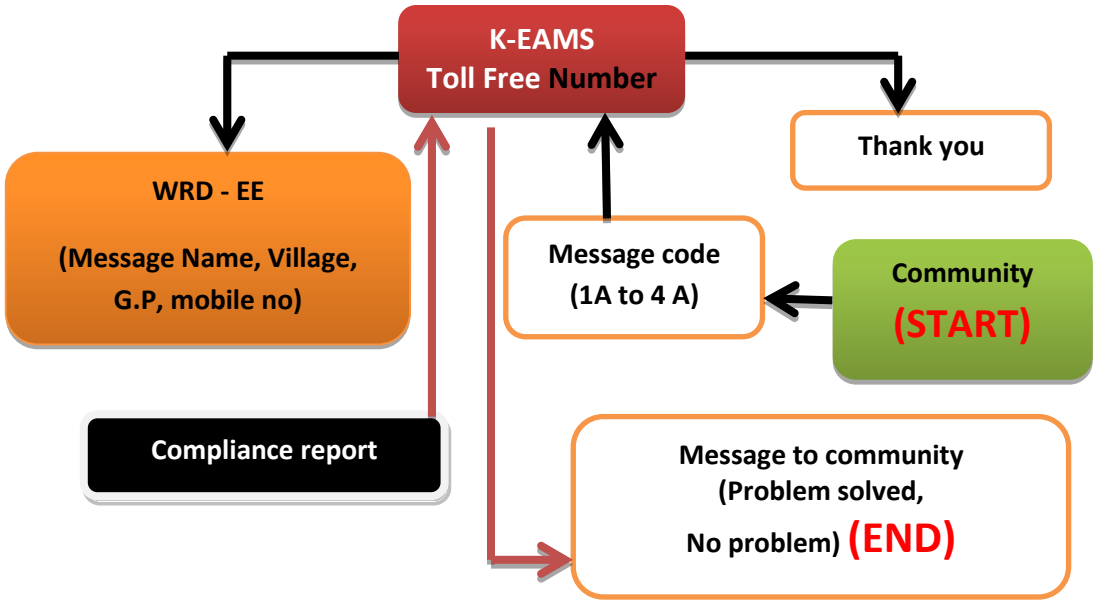

Figure 3 describes the mode of information flow in normal times and in times of emergency. The information channel during normal times would be from Grass root (individual/SHG member/PRI member to VLESC /GPLESC to the Junior engineer of concerned Water Resource department and from there to the K-EAMS installed / operational in either the BSDMA/FMC. From the main operation center the information could be routed to FMISC, BAPEPS, Ministry or even processed and sent back to the WRD division / community based on the necessity. During emergency times the information from VLESC / GPLESC can be directly transmitted to the

Main operation center.

4.1 Modes of information flow:

The consultants propose two different modes

a) Written mode
b) Mobile communication through an app

While Written mode is the traditional method and model format 1 (Community feedback on condition of Embankment condition) proposed can be used to collect information and send to the respective divisions as a normal practice, communication through mobile app could be a faster mode of communication.

The modern day has seen the mobile technology evolve majorly and as an important tool in information dissemination in different sectors. The Government of India recognizes the value of CHWs owning mobile phones to support the value of CHWs, and some states are purchasing mobile phones for these workers. The Government of Madhya Pradesh distributed SIM cards to Nearly 80,000 ASHAs and ANMs. Similarly the Government of Uttar Pradesh distributed a basic mobile phone with SIM card to all ASHAs and ANMs in its state[1] to help them register antenatal cases.

Different mobile apps such as OLA (for travel) mobile banking apps for money transfers and the like have proved to be very useful in providing real time feedback and services.

4.2 Excerpts from Mobile penetration in Bangladesh:

Bangladesh is one of the first countries in the world to have exemplified a model for rural access to mobile phones through widely acclaimed initiatives of Grameen Phone followed by other mobile service providers. The growth rate for mobile phone market has been 200 percent over the last few years. Almost every single village in Bangladesh has been brought under the coverage of mobile network system. And due to the wide prevalence of low cost jwipre-paid cards, there are now many who can afford to keep a mobile phone since the minimum bill payable per month is about US$ 5.
Based on the basic assumption that 2nd Generation level technology for mobile communication is available in Bangladesh and that mobile phones have reached a critical mass. Moreover, the

[1] Integrated Child Development Services Scheme. Ministry of Women and Child Development, Government of India. Retrieved on September

Network coverage of cellular phones has reached a fairly distributed geographical region covering most of the disaster prone areas Chowdhury Ghulam Hussain, Mridul Chowdhury and Ibrahim Kushchu have worked out the prospect of using m-Technology for disaster information management in Bangladesh with clear implications for other LDCs (Less Developed Countries).

In their proposed model, the Disaster Management Bureau (DMB) will play the central role of coordination for implementing mobile technology for disaster management. This DMB has a line of communication with other weather forecasting agencies. The weather forecasting agencies will forecast the disaster, cyclone for example, and pitch this information to the DMB. Dissemination of disaster warning, rescue and recovery information will be disseminated through two separate but complementary approaches. One is through the formal channel of communication like local authority and local disaster shelters. To implement this channel, the prerequisite is that all local centers will have at least one mobile phone. It is also possible to select a local representative who owns a mobile phone to keep communication with the centers that don't have mobile phone. The central coordinator (DMB) will send updated information to the local centers which in turn will be distributed using both online and offline media. This weather information will be highly specific depending upon the cell of the mobile phone.

The prevailing system of communication is through radio which is not much targeted. Another approach, which is the focus of proposed model, is disseminating disaster warning, rescue and recovery information directly to the affected people using mobile phones. The central coordinator (DMB) collects weather information from the weather information department. There will be line of communication between the DMB and the mobile phone operators. After receiving location based weather report, the central coordinator will write a Short Message Service (SMS) describing the weather report and necessary steps to be taken and then send it to the mobile phone operators. Mobile operators then disseminate this short message to all mobile phones in a specific geographic cell. This service will be push service which will not require users' active participation.

4.3 Pull and Push Service – Receiving Messages from Community and its dissemination to different stakeholders:

4.3.1 Format & content for community reporting

The format & content for community reporting has been designed to keep the entire process in a structured manner and present the participants with well-defined parameters. This will hopefully keep the process simpler and encourage participation by the community.

- The Format and its content for Community Participation have been designed following the LIS of USACE.

- The idea here is to put together all possible problems that an embankment generally has to face during flood and normal period.
- The messages contained in the format for community reporting are mostly non-technical in nature.
- They have been phrased in a manner so as they are easily comprehensible to common masses who are living in the countryside of the embankments.
- The numbers before every message are intended as code numbers that will enable EAMS to recognize the content of the message.
- These alerts have been prioritized based on the gravity of threat they pose to embankments.

4.3.2 Alerts & Its Prioritization

Table 3: Alerts and prioritization

S. No.	Alerts	Priority	SMS Code
1	Erosion, caving on the river side slope of embankment is occurring.	1	WRD 1A
2	Cracks have been observed on the embankment.	1	WRD 1B
3	Damage or caving of protection work done on the river side of embankments has been observed.	1	WRD 1C
4	The river is flowing at the edge of embankment and erosion/caving of embankment is taking place.	1	WRD 1D
5	Seepage or sand boils have been observed on the embankment slope and in nearby areas.	1	WRD 1E
6	Surface of the embankment is in bad shape and needs immediate attention.	2	WRD 2A
7	Country side toe-cutting has been observed in the embankment.	2	WRD 2B
8	The river is flowing at a distance of 100 mts. From the embankment and displays a tendency of coming nearer.	2	WRD 2C
9	Depressions greater than 6 inches have been observed on the embankment.	2	WRD 2D
10	Rain cut has been observed on the embankment that requires soil filling.	3	WRD 3A

S. No.	Alerts	Priority	SMS Code
11	Several animal burrows present on the embankment that require immediate attention.	3	WRD 3B
12	Construction of hutment & animal shed is taking place on the embankment.	4	WRD 4A

The Hindi translation of these alerts will be displayed on big hoardings at key locations in the embankment selected with due consultation of the filed level functionaries and community members of the concerned area. Further, they will also be pasted in the Panchayat Bhawan of the selected Panchayats on the embankment for integration with EAMS.

4.3.4 Modality of message transmission

- EAMS will receive message from the community on **Toll Free Number** following the below mentioned procedure:
- Code of Type of Problem
- Since the cell number & other database of selected persons will already be stored in the system it will immediately know the location of the sender
- On receiving the message the EAMS will generate a gratitude note which the sender will immediately receive.
- The EAMS may get back to the message sender once Action has been taken on the problem identified.
- A database of contact numbers of selected persons can be registered in the CP section in EAMS that will help identify the location instantly on receiving messages from any of these.
- This Database of contact numbers will in any case be important for sending alerts to the community by EAMS.
- The major feature of CP Page on EAMS will be:-
  a) Archive of Community Messages on embankment safety for every quarter.
  b) Messages received from community will appear on the page as marquee/flash.
  c) Action Taken Report on messages received from Community will be uploaded on the page
  d) Community reports and remedial actions by the dept should form part of maintenance and inspection database.

Some of the other components for implementing this process are:

1) **A toll free number for K-EAMS**. This toll free number will be well advertised during the training at different locations and attempt will be made and suggested for its widest dissemination in the area. Availability of toll free number will be crucial during field training.
2) **Format for Contact Person/Persons/Groups** The coordinates of the selected people/groups will be stored in the EAMS in the following format.

Sl. No.	District	Block	Village	Name of the embankment	Location on the embankment (RD)	Contact person(s)/VLSC	Contact No.

4.3.4.1 Pull Service – Receiving Messages from Community and its dissemination to different stakeholders

- In this process the coordinates of the identified community groups/members will be fed into the K-EAMS.
- On receiving messages from such identified locations the EAMS will immediately know the location of the sender and type of problem
- Community will be sending identified messages with regard to various types of technical problems that embankments can face.
- These messages will be provided codes based on gravity of threat they pose to the embankment and also on SMS gateway provider for the toll number in K-EAMS.
- Once the EAMS receive message from the community it will immediately travel to the various stakeholders in state government.
- It will be the task of EAMS developer to link the flow of messages received from community to different stakeholders whose coordinates have been fed into the EAMS database.

4.3.4.2 Push Service – Sending Messages to Community

1. Push service can similarly be used to inform the identified community groups about action taken on the alerts provided by them, rainfall forecast, rising river level, putting them on alert, maintenance work to be undertaken on the embankment, etc. It is during the piloting that forms of these messages can be concretized.

Action Taken report, in fact can be uploaded on the community page in K-EAMS and anybody from community with access to internet can look at this

5. FINANCIAL IMPLICATION OF COMMUNITY PARTICIPATION AND RECOMMEND WHETHER THE PARTICIPATION WOULD BE VOLUNTARY OR FUNDED.

Based on the recommendations in workshop a financial model can be developed which will cater to:

a) Formation and training(capacity building) of community organizations (VLESC/GPLESC)
b) Developing of Mobile app and information dissemination system and integration of the same into the K-EAMS

During interaction with the community members and also from findings of our survey it is quite apparent that community members are willing to participate in surveillance exercise on a voluntary basis. They recognize the importance of embankment in the safety of their lives and property and will be a willing partner in maintaining its safety. However, based on the requirements of the tools and mediums for information dissemination and for smooth operation of two way communication with the community we are providing a tentative estimate of expenditure needs to be incurred for making community participation in embankment surveillance functional. Some of these costs are one time expenditure while, some other components could be recurring in nature.

5.1 Cost involved in formation of GPLESCs – as proposed in the 3rd Deliverable

Table 4: Cost involved in formation of GPLESCs –as proposed in the 3rd Deliverable

Sl.	Particulars	Amount (INR)
Cost of arranging one GPLESC		
1	Travel to villages for awareness building meetings at Village level (at least 3 visits) @ 500/- per visit	1,500
2	Cost of arranging GP level meeting (Cost of tea and snacks)	500
3	Cost of signage with messages (at Panchayat office), Road side and School and flex boards at various places of the Panchayat	1,500

4	Management costs to NGO/agency conducting meetings @ 500 per meeting for 4 meetings annually including cost of stationary materials	2,000
Total Cost for arranging one GPLESC		**5,500**
Cost of arranging 50 GP level committees proposed in table no 6		**2,75,000**

5.2 Cost involved in conducting workshop cum orientation of GPLESCs at Division level:

Table 5: Cost involved in conducting of workshops - as proposed in the 3rd Deliverable

Sl	Particulars	Amount (INR)
1	Working lunch, tea for 70 participants @ Rs.125/-	8,750
2	Cost of miking for creation of awareness and inviting participants in the embankment stretch from where participants will come (includes vehicle and mike costs for one day prior to the workshop)	2,500
2	Logistics (Hiring of Audio visual equipment like Microphone, Projector, chair tables)	2,500
3	Honorarium to Resource persons @ 500 per person X 2 persons	1,000
4	Miscellaneous expenses (Training materials, banners etc.)	1,500
	Total	**16,250**
	Cost for 20 Workshops	**3,25,000/-**

Other costs: Design of Communication Material and costs of boards and hoardings on embankment for alerts and Officials phone numbers across the 10 Divisions

Table 6: Other Costs involved in formation of GPLESCs

SL	Item	UNIT	Rate Rs/unit	Cost
1	Design of Communication Materials** and costs of boards and hoardings on embankment	LS	LS	1000000
2	Communication costs (Toll Free Number)***	LS		500000
	Grand Total			**1500000/-**

** Items like boards, wall painting, poster etc.

***As per Government Rates

Volume – 2 (Part – II)

तटबंध निगरानी पर प्रशिक्षण सामग्री

तटबंध निगरानी पर प्रशिक्षकों हेतु
प्रशिक्षण की नियमावली और दिशा – निर्देश

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नई दिल्ली – 110016

तटबंध निगरानी समिति के गठन और कोसी तटबंध के सुरक्षा हेतु प्रशिक्षण सामग्री

प्रशिक्षण की सामान्य प्रशिक्षण

यह प्रशिक्षण सामग्री तटबंध निगरानी समिति के गठन और कोसी तटबंध के सुरक्षा हेतु प्रशिक्षकों को प्रशिक्षण देने के लिये तैयार किया गया है। इस नियमावली के निर्माण में इस बात का विशेष ध्यान रखा गया है कि प्रशिक्षकों द्वारा जमीनी स्तर पर किस तरह प्रशिक्षण दिया जाए। नियमावली में उन समस्त तकनीकी बातों की जानकारी दी गई है, जो तटबंध के रख–रखाव और उसे सुरक्षित रखने के लिए जरुरी है। इस नियमावली के निर्माण में इस बात पर भी खास ध्यान रखा गया है कि ग्रामीण स्तर पर बनाए गए तटबंध सुरक्षा समिति को तटबंध के रख रखाव के प्रति अपनी जिम्मेदारी और भागीदारी की स्पष्ट जानकारी दी जा सके।

एक दिवसीय प्रशिक्षण कार्यशाला

इस एक दिवसीय प्रशिक्षण कार्यशाला को चार सत्र में विभाजित किया गया है। विभिन्न सत्रों की रुपरेखा निम्नलिखित सारणी में दी गई है।

सारणी सं. – 1 प्रशिक्षण कार्यक्रम की रुपरेखा

मॉड्यूल संख्या और मुख्य रुपरेखा	विषयसूची	समय	प्रशिक्षण माध्यम	प्रशिक्षक
दिन – 1 सत्र 9:30 से 11:00 बजे				
सत्र – 1 मॉड्यूल संख्या –1 तटबंध का परिचय	• प्रशिक्षण का परिचय और कार्यशाला मे शामिल भागीदारियो की अपेक्षा का आदान – प्रदान	10 मिनट	संवादात्मक	प्रशिक्षित प्रशिक्षक
	• तटबंध पर वृत्त चित्र	10 मिनट	ऑडियो वीडियो	प्रशिक्षित प्रशिक्षक
	• वृत्त चित्र का विश्लेषण	10 मिनट	संवादात्मक	प्रशिक्षित प्रशिक्षक
	• तटबंध और उनके प्रकारों का परिचय	30 मिनट	व्याख्यान और प्रदर्श	जल संसाधन विभाग के पदाधिकारी
	• तटबंध से जुड़े ढाँचो की रुपरेख (स्पर, स्टड, लेवी, पॉरक्युपाईन, सैन्डवैगिंग, रिभेटमेंट, इत्यादि)			
चाय काल (11:00 – 11:15 बजे)				
दिन – 1 – 2 11:15 से 12:30 बजे				
सत्र –2	• तटबंध निगरानी और उसकी आवश्यकता, वर्तमान में निगरानी की व्यवस्था	45 मिनट	प्रदर्शन , वीडियो और पास लगे तटबंध का अध्ययन यात्रा	तटबंध विशेषज्ञ प्रशिक्षित प्रशिक्षक
मॉड्यूल संख्या – 2	• तटबंध को नुकसान पहुचाने वाली गतिविधि • तटबंध को सुरक्षित कैसे रखा जाए • तटबंध निगरानी की वर्तमान अवस्था (विभागीय निगरानी की वर्तमान रुपरेखा)			
तटबंध सुरक्षा और समुदाय	• समुदायिक भागीदारी द्वारा तटबंध को होने वाले	30 मिनट	व्याख्यान	प्रशिक्षित प्रशिक्षक

मॉड्यूल संख्या और मुख्य रुपरेखा	विषयसूची	समय	प्रशिक्षण माध्यम	प्रशिक्षक
की भूमिका	नुकसान की पहचान • सामुदायिक भागीदारी द्वारा तटबंध का रख रखाव			
भोजनावकाश 12:30 से 1:30 बजे				
सत्र – 3 मॉड्यूल संख्या – 3 तटबंध सुरक्षा समिति (उसके कर्त्तव्य और उसकी भूमिका)	• तटबंध निगरानी समिति क्या है और उनकी आवश्यकता क्यों है। उनके गठन के तरीके। • तटबंध निगरानी समिति के सदस्यों के गठन, दायित्व और कार्यकलाप। • तटबंध निगरानी समिति की सभाऐं, विभिन्न सभाओं के बीच का अंतराल और सभाओं के कार्यवाही का अभिलेख (proceedings) • तटबंध निगरानी समिति की बाढ़ के पूर्व, बाढ़ के दौरान ओर बाढ़ के उपरान्त के जिम्मेदारियों की रुपरेखा।	1.5 घंटे	व्याख्यान, संवादात्मक	तटबंध विशेषज्ञ और प्रशिक्षित प्रशिक्षक
सत्र – 4 मॉड्यूल संख्या –4 तटबंध निगरानी और सूचना का प्रसार	• तटबंध सुरक्षा के लिए मुख्य संवाद एवं सूचना जिसकी विभाग को जरुरत हैं। • इन संवाद सूचनाओं के प्रसारण के प्रकार। • विभाग द्वारा प्रेषित वो कौन सी सूचनाऍ हैं, जिसकी समुदाय को जरुरत है। • ये जानकारी कब, कहॉ और कैसे उपलब्ध है। • विभिन्न जानकारियों का (K- EAMS) में समन्वय। • डिवीजन के कार्यतर विभिन्न पदाधिकारियों का सम्पर्क नम्बर • तटबंध निगरानी समिति के मुख्य सदस्यों का सम्पर्क नम्बर	1 घंटा	व्याख्यान और प्रदर्शन	तटबंध विशेषज्ञ, प्रशिक्षित प्रशिक्षक और K- EAMS के अधिकारी

मुख्य संसाधन व्यक्ति – जल संसाधन विभाग के अधिकारी

पहले सत्र की योजना के लिए मुख्य स्त्रोत व्यक्ति के लिए जरुरी दिशा – निर्देश (कुल समय 60 मिनट)

दिशा निर्देशः

1. प्रशिक्षक सत्र की शुरुआत सभी प्रतिभागियों के सक्षिप्त परिचय के साथ शुरु करेंगे। अधिकतम – 10 मिनट
2. प्रशिक्षक परिक्षण के उद्देश्य को संक्षेप में रखेंगे। – 5 मिनट
3. प्रशिक्षक तटबंध पर बने वीडियो को दिखायेगें – 10 मिनट
4. इसके उपरांत प्रशिक्षक 1 से 10 तक दिये गय प्रदर्श (फोटो को दिखा कर) तटबंध की जानकारी साझा करेंगे। – 5 मिनट
5. तटबंध का संक्षिप्त इतिहास बताएंगे। – 5 मिनट
6. तटबंध से जुड़े अन्य ढॉचे जैसे कि लेवी, स्पर, स्टड, पॉरक्यूपाईन, सैडवैगिंग, रिवेटमेंट और तटबंध को होने वाले विभिन्न खतरो की जानकारी देंगे।

नोटः– यह मुख्य बात ये है कि प्रशिक्षक को तटबंध और उससे जुड़े सभी ढॉचों की जानकारी प्रदान की जाए।

तटबंध की संकल्पना:

तटबंध पर वीडियो शो के उपरांत तटबंध की संकल्पना पर एक परिचर्चा आवश्यक है, जिसमें तटबंध का इतिहास, उसके आसपास के लोगों के जिंदगी पर उसका प्रभाव, उसका भौगोलिक विस्तार इत्यादि बातों पर चर्चा करना आवश्यक है। ये आवश्यक है कि इस चर्चा में अधिक से अधिक प्रदर्श (फोटो) का सहारा लिया जाए। कुछ चुनिंदा प्रदर्श इस नियमावली के साथ संलग्न किए गए हैं।

तटबंध क्या है ?

- तटबंध मुलरुप से मानवीय संरचना है जिसे नदी के किनारे बनाया जाता है। इसका निर्माण सड़क, रेल और नहर को समर्थ प्रदान करने के लिए भी किया जाता है।
- यह कि टिलारुपी संरचना है, जो नदी में पानी की सतह को बढ़ने पर उसे नदी से बाहर जाने में रोकता है।
- तटबंध का निर्माण नदी के किनारे किया जाता है। और इसका मुख्य कार्य नदी से सटे गॉवों को सुरक्षा प्रदान करना है।
- तटबंधों का निर्माण नदी के अन्दर से निकाले गए मिट्टी, गाद (silt), और बालू से किया जाता है।
- छोटे पहाड़ों की तरह तटबंधों में भी ढ़लान होते हैं।

प्रशिक्षक कार्यशाला में आये सहभागियो से उनके क्षेत्र में तटबंध के विस्तार के बारे में पूछें, और नीचे दिये गये प्रदर्श और 1 से लेकर 3 नं प्रदर्श के बारे में विस्तार मे चर्चा करें।

प्रदर्श सं. – 1 तटबंध

प्रदर्श सं. – 2 कोसी पूर्वी तटबंध (भीमनगर)

प्रदर्श सं. – 3 कमला तटबंध

तटबंध कैसे होना चाहिए :

प्रशिक्षक कार्यशाला में आये सहभागियो से प्रदर्श सं. 4 से 7 दिखाये और उनकी प्रतिकिया लें।

प्रदर्श सं. – 4 ऐसा तटबंध जिस पर मकान और दुकान बने हो ☒

प्रदर्श सं. – 5 ऐसा तटबंध जिस पर जिसका कोई रखवाला नही ☒

प्रदर्श सं. – 6 नीदरलैड का एक तटबंध ☑

प्रदर्श सं. – 7 बंग्लादेश का एक तटबंध ☑

कोसी तटबंध का संक्षिप्त इतिहास :

- कोसी तटबंध का निर्माण नदी से होने वाले बाढ़ को रोकने के लिए किया गया है। कोसी नदी भारत और नेपाल दोनों की सीमाओं को लांघता है। कोसी नदी गंगा नदी की सबसे लम्बी सहायक नदी है।
- कोसी तटबंध का निर्माण 1955 में प्रारंभ हुआ।
- कोसी तटबंध की लंबाई पूर्वी तट पर 125 कि.मी. की है जो वीरपुर से कोपडीया तक है। पश्चिम कोसी पर इसका विस्तार 126 कि.मी. की है जो भरदाह (नेपाल) से लेकर घोघेपुर (सहरसा) तक विस्तृत है।
- नेपाल से हुए समझौते के हिसाब से इन तटबंधो के रख–रखाव की जिम्मेदारी बिहार सरकार पर है।
- इसके अतिरिक्त नेपाल में 34 कि.मी. तटबंध (Afflux – bund) का निर्माण नदी के पूर्वी भाग में हुआ। साथ ही साथ 12 कि.मी. Afflux – bund लम्बे का निर्माण पश्चिमी भाग में हुआ।
- 1963 में वीरपुर के समीप एक बराज का निर्माण किया गया, जिसका उद्देश्य नदी के पानी को नियंत्रित करना और पूर्वी एवं पश्चिमी कोसी नहर के माध्यम से सिंचाई के लिए पानी उपलब्ध कराना है।
- कोसी डैम की क्षमता अधिकतम 9.5 लाख क्यूसेक जल स्त्राव तक का है। और ये 2 लाख 14 हजार हेक्टेयर भूमि को सुरक्षा प्रदान करता है।
- पश्चिमी कोसी नहर 3 लाख 25 हजार हेक्टेयर खेती की जमीन को सिंचाई प्रदान करती है।
- नदी के पानी के द्वारा सटे ईलाकों को डुबने से बचाती है।
- नदी की धारा को तेज और ऊंची सतह पर बिना आसपास के ईलाकों को नुकसान पहुँचाये बहने में मदद करती है।
- सामान्य समय में यह आवागमन का भी माध्यम है।
- बाढ़ के समय बाढ़ पीड़ितों के लिए यह आश्रय स्थल भी बन जाती है।

प्रशिक्षक कुछ प्रश्न पुछें–

1. कोसी तटबंध का विस्तार कहा से कहा तक है?
2. कोसी बराज कहॉ पर स्थित है और उसकी क्या भूमिका है?
3. तटबंध से हमे क्या लाभ है?
4. कोसी से हमें क्या खतरा है? कोसी नदी में सबसे ज्यादा नुकसान किस साल और क्यों हुआ था?

प्रदर्श सं. – 8 कोसी बराज का एक दृश्य

कोसी नदी से आए कटाव से बाढ़ का आंतकः कोसी तटबंध में कटाव एवं टूट का इतिहास

1953 – नेपाल में पश्चिमी तटबंध में कटाव।

1968 – उत्तर बिहार में पॉच स्थलों पर कटाव।

1971 – 1969 में निर्मित भटनिया उपरौच बंद का धंसाव।

1980 – पूर्वी तटबंध में कटाव।

1984 – पूर्वी तटबंध में कटाव।

1991 – नेपाल के नोगिनिया (हनुमान नगर) के समीप पश्चिमी तटबंध में कटाव।

2008 – पूर्वी Afflux – bund (Nepal) में कटाव।

प्रशिक्षक कार्यशाला में आये प्रतिभागियों से कुसहा मे आये कटाव और उसके नुकसान के बारे मे चर्चा करें ।

तटबंध से जुड़े हुए ढांचे

ढांचे का नाम और उसका विवरण	प्रदर्श	कोसी तटबंध में इसका महत्व
• **लेवी** डैम की तरह एक तटबंध है।		• पत्थर या मिट्टी का एक लम्बा टीला जिसका निर्माण पानी को रोकने एवं सुरक्षा प्रदान करने के लिए किया जाता है।
• **स्पर** स्पर का निर्माण नदी की धारा को तटबंध से दूर रखने के लिए किया जाता है ।		• स्पर का निर्माण तटबंध को नदी की सीधी धारा के बहाव से बचाव के लिए किया गया है। खास कर ऐसी अवस्था में जहॉ नदी तटबंध से सटकर बहती है। • पूर्वी और पश्चिमी तटबंध में कुल मिलाकर 378 स्पर बने हुए हैं।
• **स्टड**		• नदी की धारा जिस बिन्दु पर सबसे तेज आक्रमण करती है वहां स्टड के जरिये धारा के वेग को कम किया जाता है। • धारा को दूर रखकर नदी के किनारे को सुरक्षित रखती हैं। • नदी के बहाव को निर्धारित करती हैं।

ढांचे का नाम और उसका विवरण	प्रदर्श	कोसी तटबंध में इसका महत्व
• **बालु के बोरे (सैंडबैगिंग)** इसका उपयोग बाढ़ नियंत्रण के लिए किया जाता है। इसको रखते समय यह ध्यान रखा जाता है कि इसका मुंह ऊपर की तरफ रहे ताकि पानी आने पर ये खुले नहीं ।		• इसकी उपयोगिता है कि बोरे महंगे नहीं होते । खाली रहने पर इनका भंडारण और लाना ले जाना आसान रहता हैं। खाली बोरों को किसी स्थल पर लाया जा सकती हैं, और स्थानीय बालु और मिट्टी भरे जा सकते हैं। • सैंड बैग का उपयोग आपात काल में किया जाता है। जब नदी अपने किनारे को तोड़ देता है अथवा लेवी या डाइक में कुछ खतरा हो जाता है। सामान्य परिस्थिति में भी इसका उपयोग नये लेवी या बाढ़ नियंत्रण के अन्य उपायों के निर्माण में किया जाता है।
• **पॉरक्युपाईन**		(क) नदी की धारा को निर्धारित धार में रखना। (ख) नदी की धारा जिस बिन्दु पर अत्यधिक आक्रमण करती है, वहॉ पर धार के वेग को कम करना। (ग)पॉरक्यूपाईन का सबसे महत्वपूर्ण कार्य धार के वेग को कम करके किनारे में हो रहे कटाव को रोकना है।
• **बोल्डर**		बोल्डर प्राकृतिक रुप से उपलब्ध सामग्री है, जिनका उपयोग कई कार्यो में किया जाता है। जैसे कि तटबंध की ढ़लान का मजबूती प्रदान करने में नदी किनारे को मजबूती प्रदान करने में, स्पर को मजबूती प्रदान करने में , इत्यादि।

ढांचे का नाम और उसका विवरण	प्रदर्श	कोसी तटबंध में इसका महत्व
		बोल्डर का आकार–प्रकार, वजन और श्रेणी गुणवत्ता का परिचायक होते हैं।
• **स्लुइस गेट** इस संरचना में गेट लगे होते हैं जिसे ऊपर – नीचे जरुरत के अनुसार किया जाता है ।		स्लुइस गेट से नदी से गॉव में कितना पानी छोड़ना है इसका निर्धारण करने में मदद मिलती है। साथ ही साथ गॉव से निकासी में भी उपयोगी होती है। स्लुइस गेट गॉव से जल निकासी में भी उपयोगी होती है।
• **वेटीवर –** वेटीवर एक प्रकार का घास है जिसकी जड़ें काफी लम्बे होते हैं 3 मी. तक इनकी लंबाई बढ़ जाती है । इस तरह के घास मिट्टी को बॉधने में सक्षम होते हैं।		ये घास 5 महीनों तक पानी में डुब कर भी रह सकते हैं। लम्बे जड़ होने के कारण पानी की धारा का इन पर असर नहीं होती और मिट्टी की कटाव को रोकने में सक्षम होते हैं।

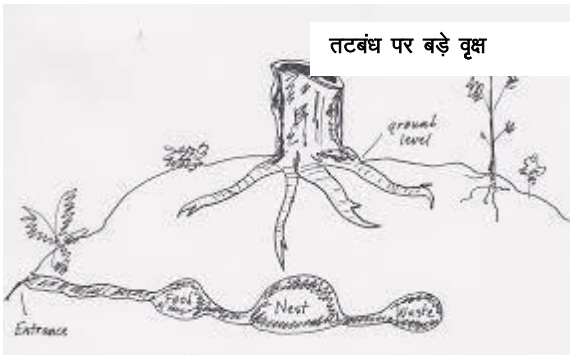
सत्र – 2
तटबंध निगरानी – इसकी जरुरत, तटबंध को खतरा और तटबंध को सुरक्षित रखने के उपाय (विभागीय तरीके और समुदाय के कर्त्तव्य)

सत्र	विवरण	समय	माध्यम	स्त्रोत व्यक्ति
सत्र – 2 मॉड्यूल सं. 2 तटबंध – तटबंध सुरक्षा के लिए विभिन्न ढॉचों के बनावट और उनके प्रकार	• तटबंध को खतरा – ऐसे कौन से मानवीय, प्राकृतिक और पशु के गतिविधि है जिससे तटबंध को खतरा होता है। • तटबंध की सुरक्षा कैसे करें। • वर्तमान विभागीय निगरानी के तरीके।	45 मिनट	प्रस्तुति, वीडियो और समीप के तटबंध पर जा कर।	तटबंध विशेषज्ञ और प्रशिक्षित प्रशिक्षक।
	• खतरों के पहचानने में समुदाय की भूमिका	30 मिनट		

दूसरे सत्र की योजना के लिए प्रशिक्षक के लिए जरुरी दिशा निर्देश – कुल समय 75 मिनट

प्रशिक्षक को निम्नलिखित बातों को ध्यान रखना चाहिए।

1. तटबंध निगरानी की संकल्पना – 10 मिनट
2. तटबंध निगरानी की जरुरत और उसे सुरक्षित रखने की उपाय – 10 मिनट
3. तटबंध को खतरों के प्रकार – 10 मिनट
4. तटबंध को होने वाले खतरों की पहचान में समुदाय की भूमिका – 10 मिनट
5. तटबंध को सुरक्षित रखने की उपाय – 10 मिनट
6. तटबंध की वर्तमान निगरानी व्यवस्था – 10 मिनट
7. तटबंध निगरानी समिति पर एक संक्षिप्त परिचर्चा – 10 मिनट
8. सवाल – जवाब – 5 मिनट



तटबंध पर बड़े वृक्ष

तटबंध पर चूहों का आवास

तटबंधों को होने वाले संभावित नुकसान

अधिकतर तटबंध में खतरे की मुख्य वजह पानी का उसके ऊपर से गुजर जाना या आन्तरिक कटाव या पानी का आन्तरिक स्त्राव (seepage) की वजह से होता है।

1. अधिकांशतः तटबंध के अंदर की तरफ रहने वाले लोग बढ़ते जल स्तर से अपने बचाव के लिए तटबंध को काटने का प्रयास करता है। जबकि तटबंध से सुरक्षित लोग ऐसी परिस्थितियों में कटाव न हो इसके लिए निरंतर निगरानी में रहते हैं।
2. तटबंध को तभी खतरा होता है जब नदी का सतह तटबंध से सुरक्षित जमीन की सतह से ऊँची हो जाती है।
3. कई जगहों पर कोसी नदी में गाद के जमाव के कारण नदी का स्तर काफी ऊंचा हो गया है। इसकी वजह से कुछ स्थानों पर स्पर भी बहुत प्रभावी नहीं हो पाते। स्पर तभी प्रभावी रहते हैं, जब नदी की धारा में एकरुपता हो, लेकिन गाद के जमाव के कारण स्पर धारा को दूर रखने के बजाय अपने तरफ आकर्षित करने लगते हैं, जिसे तटबंध को नुकसान पहुंचता है।
4. स्थानीय अभियंता को इन तरह की परिस्थितियों का सामना करने के लिए तैयार रहना पड़ता है। इस सावधानी के बावजूद भी कई बार धारो को तटबंध से दूर रखना संभव नहीं हो पाता इस वजह से तटबंध को नुकसान भी पहुंचता रहता है।
5. तटबंध को बड़े वृक्षों, मकान और दुकान, जानवरो का आवागमन, कुछ जानवर जेसे गीदड़, चूहे (जो तटबंध के ढलान (slope) पर अपना वास बना लेते हैं) से भी खतरा होता है।
6. इन परिस्थितियों में समय रहते ही जल संसाधन विभाग के अधिकारियों को सूचित करना अत्यावश्यक है।
7. सूचना का प्रसारण उचित तरीके और प्रणाली से करना आवश्यक है, जिसका जिक्र इसी प्रशिक्षण सामग्री विस्तार के साथ दिया गया है।

प्रदर्श सं. – 10 जानवरो के द्वारा किया गया तटबंध पर नुकसान

यहॉ निम्नलिखित बातों पर परिचर्चा आवश्यक है।

1. तटबंध के स्वास्थ्य के लिए क्या – क्या घातक है?
2. तटबंध को नुकसान पहुंचाने वाले तत्वों के पहचान के तरीके क्या क्या है?
3. इन खतरों को चिन्हित कौन करेगा?
4. खतरे चिन्हित होने के बाद इसकी सूचना किसे करना है?
5. सूचना का प्रसारण किस प्रकार होगा?

प्रदर्श सं. – 9 तटबंध पर पानी के टकराने से और बारिश से कटाव (चीन में हुए लियांग फैग तटबंध का कटाव)

प्रदर्श सं. – 11 आस्ट्रेलिया में हुए उकेश्विर डैम का कटाव

तटबंध निगरानी

तटबंध को सुरक्षित और स्वस्थ्य रखने के लिए उसकी निरन्तर निगरानी आवश्यक है।

- तटबंध को सुरक्षित रखने की आवश्यकता इसलिए है क्योंकि वह हमें बाढ़ से सुरक्षा प्रदान करता है।
- वह हमें, हमारे घर, खेत और जानवरों का बाढ़ से सुरक्षित रखता है।
- बाढ़ के समय बढ़े हुए जलस्तर को तटबंध के अन्दर रखता है।
- मिट्टी से बने कोसी तटबंध को कई तरह के समस्याओं को सामना करना पड़ता है।
- तटबंध का स्थायित्व अथवा उसको होने वाले खतरे इस बात पर निर्भर करती है कि निर्माण के समय प्रयोग किये गए तरीके स्थानीय निवासियों का तटबंध के प्रति व्यवहार और कोसी नदी में होने वाले परिवर्तन का उस पर कितना असर रहा है।
- मिट्टी से बने हुए अधिकतर तटबंध पर बारिश के वजह से मानवीय और पशुओं की गतिविधि से नुकसान पहुचता है।
- जहां तक मानवीय और पशुओं की गतिविधि का सवाल है उसे एक जागरुक समुदाय नियंत्रित कर सकता है । लेकिन प्राकृतिक आपदाओं से होने वाले खतरों से तटबंध को तभी बचाया जा सकता है जब समय रहते तटबंध में इनकी वजह से पहुंचे नुकसान को ठीक कर लिया जाए। ऐसे ही समय में निरंतर निगरानी की व्यवस्था तटबंध के लिए उपयोगी हो सकती है।
- वर्तमान मे तटबंध कर सुरक्षा की जिम्मेदारी जल संसाधन विभाग के पास है और विभाग इसकी निगरानी के लिये 4 से 5 महीने तक (वर्षा के महीनों में) चौकीदार (होमगार्ड) को नियुक्त करके करवाती है।
- इस निगरानी के व्यवस्था में समुदाय को शामिल करने की मुहिम शुरु की गयी है जो प्रशंसा योग्य है, और अब समुदाय को इस व्यवस्था मे बड़े पैमाने पर भागीदारी के लिये सामने आना चाहिये और तटबंध की सुरक्षा और निगरानी मे नियोजित तौर तरीके से काम करना चाहिये।

कुछ प्रश्न करें

1. तटबंध को सुरक्षित रखने की जरुरत क्यों है?
2. तटबंध को सुरक्षित रखने की वर्तमान में जिम्मेदारी किसके पास है?
3. क्या समुदाय इसकी सुरक्षा व्यवस्था मे शामिल है और नही तो क्या समुदाय को इस व्यवस्था मे शामिल होने की जरुरत है?

तटबंध को सुरक्षित रखने के तरीके?

1. निगरानी सही समय पर हो।
2. निगरानी मे समुदाय स्वेच्छा से शामिल हो।
3. विभाग को तटबंध पर कुछ नुकसान या क्षति का समय रहते ही सूचना मिलें।

तटबंध की सुरक्षा के उपाय

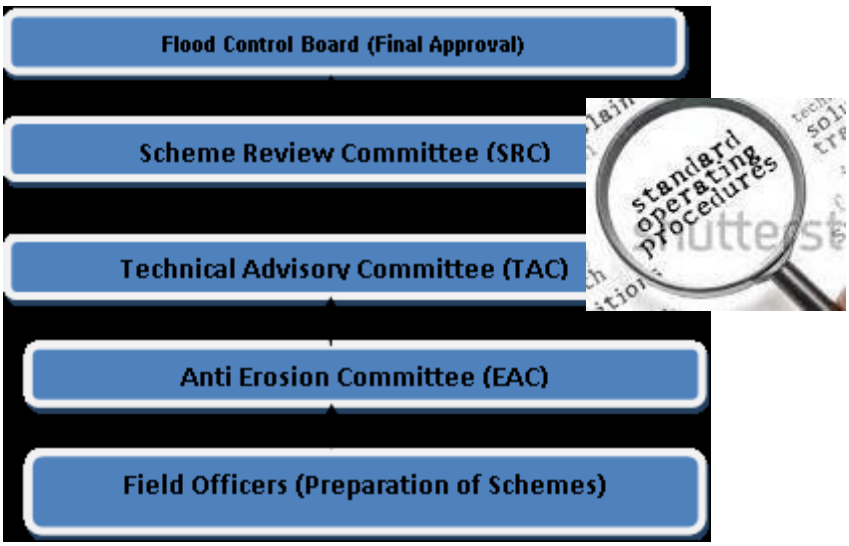
- तटबंध को निरंतर निगरानी उसकी सुरक्षा का एक अचूक तरीका है।
- समय पर किए गए प्रयास, कटाव एवं दरार के खतरों को कम करता है।
- विभागीय हस्तक्षेप और समुदाय का सम्मिलित प्रयास समस्या को काफी हद तक कम करने में सक्षम हैं।
- सामुदायिक हस्तक्षेप तटबंध के सतत् स्थायित्व के लिए जरुरी है।

तटबंध निगरानी और सुरक्षा का वर्तमान व्यवस्था

कुछ प्रश्न करें

1. क्या आपको (S.O.P., TAC, AEC और SRC) के बारे मे पता है?
2. क्या आपको तटबंध निगरानी की वर्तमान व्यवस्था के बारे मे कुछ पता है?

- वर्तमान में जल संससाधन विभाग बिहार सरकार द्वारा किया जाता है।
- बिहार सरकार ने अब तक संरचनात्मक हस्तक्षेप जैसे कि, तटबंधों का निर्माण, उनका सुदृढ़िकरण नदियों के प्रवाह हो अनुकुल रखना इत्यादि कार्यों पर ज्यादा बल दिया है।
- तटबंधों का मरम्मती और सुदृढ़िकरण का कार्य स्थानीय अभियंताओं द्वारा किया जाता है। बाढ़ के उपरान्त अभियंता द्वारा विभिन्न विषयों पर मरम्मती व सुदृढीकरण की योजना बनाते है। ये योजना विभाग द्वारा गठित कटाव निरोध कमिटि को सौपा जाता है।



- एक ऊच्चस्तरीय तकनीकी सलाहाकार समिति (Technical Advisory Committee – TAC) इन योजनाओं का निरक्षण करती है। और जरुरी बदलाव के सुझाव देती है।
- स्थानीय अभियंता तकनीकी सलाहाकार समिति के सुझाव के अनुसार खर्च के आकलन का एक प्रारुप तैयार करते है।
- चुने गए प्रस्ताव की स्वीकृति के लिए विभाग द्वारा योजना निरीक्षण समिति (Scheme Review Committee - SRC) के समक्ष रखा जाता है।
- उपलब्ध संसाधनो और योजनाओं की सार्थकता को देखते हुए योजना निरीक्षण समिति (SRC) इनके कियान्वयन पर सहमति प्रदान करती है। इसके उपरान्त बाढ़ नियंत्रण समिति इन योजनाओं पर अपनी सहमति प्रदान करता है। और अगले बाढ़ के पूर्व इन योजनाओं को पूरा करने का लक्ष्य रहता है।

- विभाग द्वारा विभिन्न स्थानीय अधिकारियों के लिए तटबंध निगरानी के जरुरी दिशा – निर्देश (Scheme Standard Operation Procedure (S.O.P.) में दिये गए है।
- S.O.P. के अनुसार साल के सितंबर माह में सिविल और मैकेनिकल इंजिनियर और कटाव नियंत्रण समिति (Anti Erosion Committee) तटबंध पर भ्रमण करेंगे।
- इस दस्तावेज के अनुसार सभी डिविजन के कार्यपालक अभियंता अपने अधीन तटबंध के क्षेत्र का निरीक्षण करेंगे ओर किसी भी प्रकार की असुरक्षा से तटबंध को सुरक्षित रखने का उपाय करेंगे। यह काम हर साल 31 मई के पूर्व ही जाना चाहिए।
- दस्तावेज के अनुसार मुख्य अभियंता द्वारा सभी कमजोर स्थलों की पहचान कि सूची बनाई जाएगी ओर उन्हें संबंधित डिवीजन को सौप दिये जाएंगे ताकि उनकी निगरानी निरंतर हो सके ।

समुदायिक सहभागिता – एक संक्षिप्त परिचय

बिहार में तटबंध निगरानी और सुरक्षा में सामुदायिक सहभागिता।

- वर्तमान में तटबंध निगरानी के लिए सामुदायिक सहभागिता की कोई भी संगठित व्यवस्था नहीं है।

समुदायिक सहभागिता

तटबंध निगरानी में सामुदायिक सहभागिता की आवश्यकता

- तटबंध की निरंतर निगरानी की कुंजी समुदायिक सहभागिता से संभव है।
- समुदाय तटबंध के पास रहते है और तटबंध उनके जीवन का हिस्सा होता है।
- तटबंध पर उनका आना – जाना बराबर लगा रहता है।

कुछ प्रश्न करें

1. समुदायिक सहभागिता किसे कहते है?
2. क्यों और किसलिए सामुदायिक सहभागिता?

- जरुरी प्रशिक्षण प्राप्त कर तटबंध में होने वाले खतरों की पहचान एवं खतरों से निपटने की उपाय भी कर सकते हैं।
- तटबंध से सीधा लाभ होने के वजह से समुदाय इसके बचाव करने में सक्षम हो सकते हैं।

तटबंध सुरक्षा में समुदाय क्यों भागीदार बन सकता है?

- तटबंध के किनारे रहने वाले बखुवी समझते है, कि तटबंध उनकी सुरक्षा के लिए है और तटबंध के द्वारा प्रदान किया गया सुरक्षा से ही उनके घर और जीविका साधन सुरक्षित रहता है। ऐसी परिस्थिति में तटबंध को कोई नुकसान पहुचता है तो इसकी भरपाई सर्वप्रथम उन्हे ही करनी पड़ेगी।
- यह समझदारी पर्याप्त कारण है, जिसकी बजह से यदि विभाग तटबंध निगरानी में उनकी सहभागिता पर पहल करती है तो वो उत्साह के साथ आग आयेंगे ।

सत्र – 3:– तटबंध निगरानी में सामुदाय सहभागिता के तरीके?

सत्र	विवरण	समय	समय चर्चा का माध्यम	स्त्रोत व्यक्ति
सत्र मॉड्यूल 3 समुदाय सहभागिता का तरीका तटबंध निगरानी समिति और उसके कार्य	तटबंध निगरानी में समुदाय सहभागिता का औचित्य तटबंध निगरानी समिति की संकल्पना • तटबंध निगरानी समिति क्या है, इनकी जरुरत क्यों है? • इनका गठन कैसे हो। • तटबंध निगरानी की सदस्यों का गठन कार्य और भूमिका । • निगरानी समिति की बैठक, बैठकों के बीच की अन्तराल और कार्यवाही की लेखा – जोखा । • बाढ़ के पूर्व, बाढ़ के समय और बाढ़ के उपरान्त निगरानी समिति की भूमिका।	1.5 घंटा	व्याख्यान	तटबंध विशेषज्ञ और प्रशिक्षित प्रशिक्षक

समुदाय सहभागिता का औचित्य

- तटबंध के समीप रहने वाले लोग ये बखुबी समझते है कि यदि तटबंध का सीधा लाभ पहले उन्हें मिलता है, तो तटबंध में नुकसान पहुचने से पहले नुकसान उन्हें ही झेलना पड़ेगा।

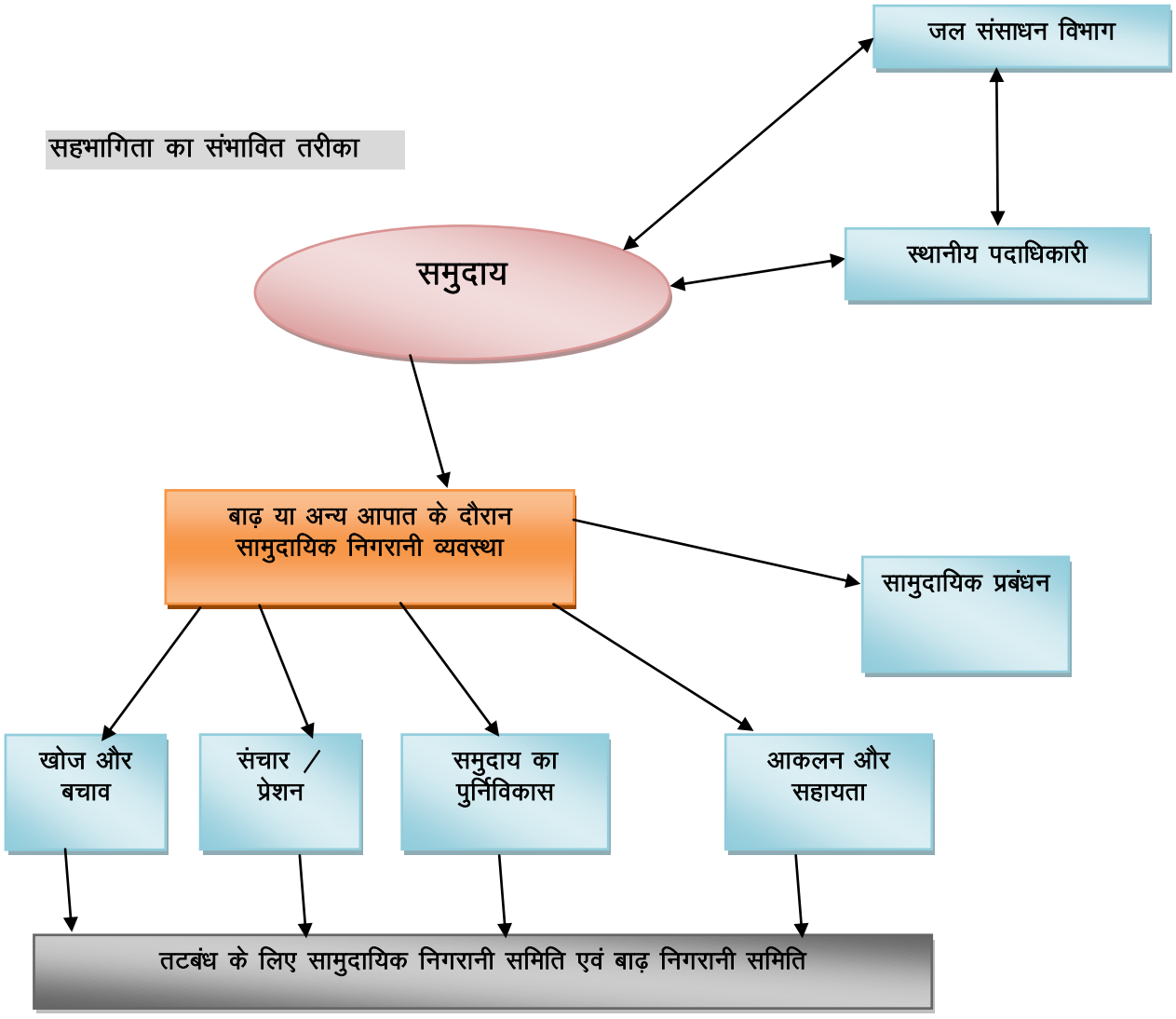
बंग्लादेश में तटबंध के निगरानी और सुरक्षा के लिये जुड़े ग्रामवासीयो ने तटबंध सुरक्षा समिति का गठन किया

- यह समझदारी पर्याप्त कारण है, जिसके कारण तटबंध निगरानी में अग्रणी भूमिका निभा सकते हैं।
- विकेन्द्रिकरण में सबका साथ लेकर पारदर्शिता लाने की अपूर्व क्षमता है।
- विभाग से मिलकर निरंतर तकनीकी समझ परिपक्व कर सकती है। इसका दूरगामी परिणाम विभाग को समुदाय से निरंतर सहयोग के रुप में प्राप्त हो सकता है।
- सबसे अहम बात यह है कि सामुहिक सहभागिता से आम लोगों को उन नीतियों से जुड़ने में अवसर मिलता है, जिसका उनके जीवन पर सीधा असर पड़ता है।
- उपरोक्त बातों का चर्चा इसलिए जरुरी है कि तटबंध निगरानी में सामुहिक सहभागिता को केवल इस प्रकार ना लें । जहां समुदाय के सदस्य केवल संदेश वाहक की तरह नजर आयें, अपितु यह पूरी

व्यवस्था ऐसी होनी चाहिए, जिससे आमलोग नीतियों के निर्माण में एक अहम भूमिका निभा सके और उनके सहभागिता में निरन्तर बनी रहें।

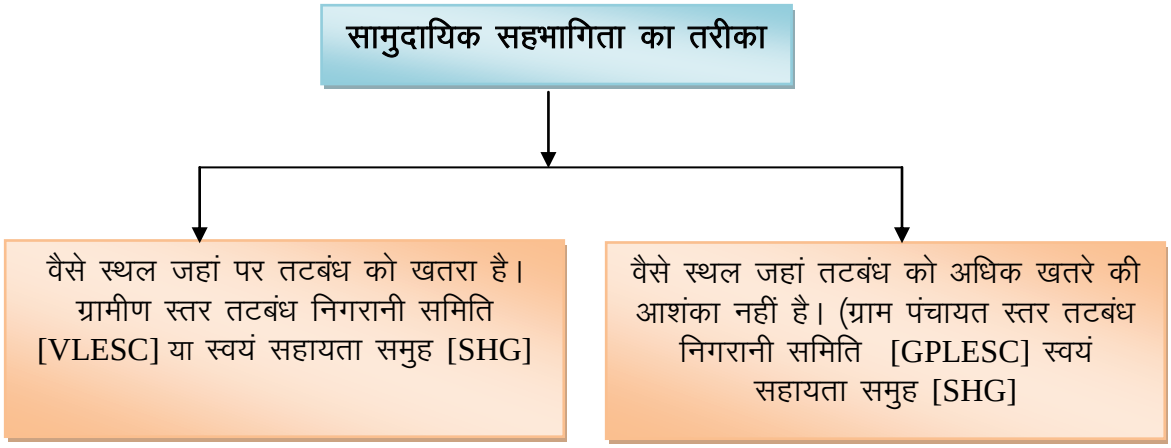
समुदायिक सहभागिता का उदाहरण

- सिंचाई विभाग की समुदायिक सिंचाई व्यवस्था सामुदायिक सहभागिता की एक जलन्त उदाहरण है।
- हालांकि इसके सारे बिन्दूओं का सत्यापन होना अभी बाकी है। लेकिन अभी यह बात स्थापित हो चूका है। सामुदायिक सहभागिता से राजस्व प्राप्ति में वृध्दि हुई है साथ ही साथ राजस्व प्राप्ति की व्यवस्था के लिए किए गए खर्च में भी कटौति हुई है।



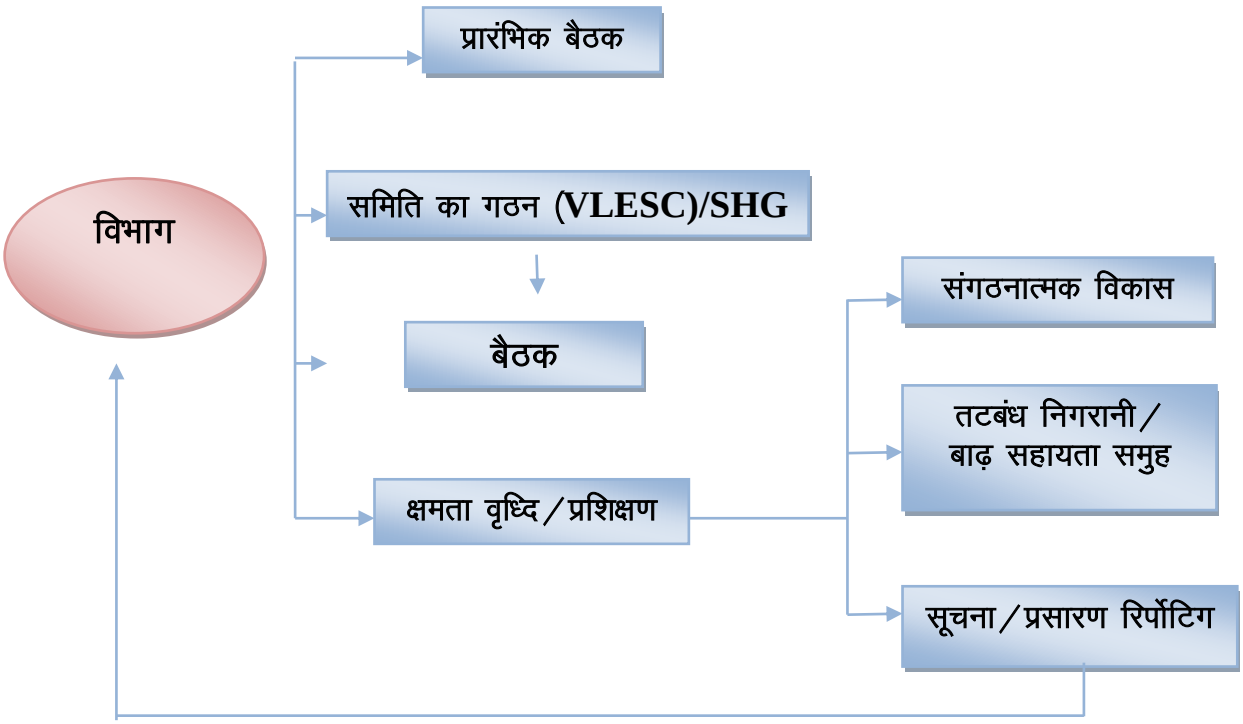
तटबंध निगरानी समिति की संकल्पनाः

चुने हुए समुदाय के बीच समिति या समूह का गठन। सामुदायिक सहभागिता की निम्नलिखित योजना पर विमर्श करना है।



वैसे स्थल जहां तटबंध को खतरे की आशंका हैं वहां सामुदायिक सहभागिता का प्रोटोकॉलः–

रूपरेखाः



नोटः वैसे स्थल जहां ग्रामीण तटबंध समिति बननी है उसकी पहचान कनीय या सहायक अभियंता उस जगह पर भ्रमण करने के पश्चात तय करेंगे।

VLESC गठन की प्रक्रियाः

कनीय अभियंता अपने भ्रमण के दौरान संवेदनशील और ऐसे स्थल जो संवेदनशील नहीं है उसकी पहचान करेंगें तत्पश्चात स्थानीय NGO पंचायत सदस्यों और होम गार्ड की मदद से निम्नलिखित प्रयास करेंगे।

- ग्रामीणों के साथ बैठक करेंगे जिसमें स्वयं सहायता समूहों के सदस्यों को भी शामिल करने का प्रयास किया जाएगा।
- यह जरूरी है कि तटबंध निगरानी समिति बनने के पूर्व इस पर कम से कम दो बैठकों में व्यापक चर्चा होगी।

वैसे स्थल जहां तटबंध को खतरे की संभावना हैं वहां बने VLESC/GPLESC का संगठन/सविधानः–

समुह निर्माण का प्रोटोकॉल

1. समुह में समुदाय के सभी वर्गों का प्रतिनिधित्व जरूरी है।
2. पिछड़े और कमजोर तबके के लोगों का प्रतिनिधित्व पर विशेष ध्यान देना आवश्यक हैं।
3. समिति समुह के स्थायित्व के लिए नियमित बैठक जरूरी है।
4. इस तरह की बैठकों में जहां तक संभव हो विभाग के अधिकारियों की उपस्थिति ग्रामीण को विभाग से जोड़ने का काम करेगी।
5. विभाग यदि चाहे तो इन बैठकों में ग्रामीण को तटबंध संबंधि मरम्मती कार्य की जानकारी दे सकते हैं।
6. तटबंध निगरानी और मरम्मती कार्य में प्रशिक्षण प्रदान करने के लिए भी इन बैठकों का उपयोग किया जा सकता है।
7. यह उम्मीद की जाती है कि इस प्रक्रिया से तटबंध निगरानी में एक जागरूक समुदाय का सहयोग प्राप्त होगा।

समिति में निम्नलिखित सदस्य शामिल होंगे :–

1. समिति में 7–13 सदस्य होंगे।
2. 2–3 सदस्य पंचायती राज संस्था से होंगे (वार्ड सदस्य, मुखिया आदि)
3. 2–3 स्थानीय लोग जो प्रभावशाली एवं उत्तरदायी सदस्य हो वर्त्तमान में गठित समितियों के (VHSC, VEC] युवक संघ, नारी संघ, इत्यादि)
4. 2–3 सदस्य स्वयं सहायता समुह से होंगे ।
5. 1–2 जल संसाधन विभाग कर्मी; कनीय अभियंता/सहायक अभियंता)
6. होम गार्ड

तटबंध निगरानी के लिए स्वयं सहायता समुह के सदस्यों को संगठित करना।

- वैसे स्थल जहां पर तटबंध को खतरा है वहां तटबंध निगरानी समिति के गठन के लिए जिन ऐजेन्सीयों पर इस कार्य की जिम्मेदारी दी गई है वे उस स्थल पर कार्यरत स्वयं सहायता समुह की पहचान कर उन्हें इस संगठन से जोड़ने का प्रयास करेंगे। इस कार्य के लिए वे जीविका के स्थानीय कार्यकर्त्ताओं से मिलकर सहयोग प्राप्त कर सकते हैं।
- तटबंध निगरानी में ऐसे समुह के सदस्य संभावित सहभागी हो सकते हैं। ये समुह संगठनात्मक पहलुओं पर प्रशिक्षण प्राप्त किए रहते हैं और तटबंध निगरानी के कार्य में इनके शामिल होने से कार्य में आसानी होगी।
- तटबंध निगरानी को किसी लाभाकारी कार्य के विकल्प के तौर पर प्रस्तुत करना भी कोई अधिक मुश्किल काम नहीं है।

तटबंध समिति का एक बैठक

प्रारंभिक समय में इन समुहों / संगठनों को निम्नलिखित दस नियमों का पालन करने का प्रशिक्षण दिया जाना चाहिए।

- समुह के सभी सदस्यों को अपने बच्चों को स्कूल भेजना होगा।
- बच्चो के स्वस्थ एवं स्वच्छता पर उन्हें ध्यान देना होगा।
- आरंभ में सदस्यगण महीने में कम से कम चार बार बैठक करेंगे।
- इन सभी बैठकों के कार्यवाही की रिर्कार्डिंग एक रजिस्टर में आवश्यक हैं।
- समुह बैंक में खाता खोलेगा और अपने सभी बचत को जमा करेंगे।
- समुह के सदस्य गांव में सामुदायिक विकास की गति में शामिल होंगे जैसे कि ग्रामीण स्वच्छता की गतिविधि ।
- समुह के सदस्य नशाखोरी और घरेलू हिंसा जैसे मामलों में हस्तक्षेप का प्रयास करेंगे।
- पोषक भोजन को प्राप्ति के लिए समुह के सदस्य अपने आंगन में साग–सब्जी बोयेंगे।
- ऋण के लिए वह क्षेत्र के प्रमुख अग्रणी बैंको से संपर्क करेंगें।
- समुह के सदस्य ग्रामीण शिक्षा समिति और ग्रामीण स्वच्छता समिति से सम्पर्क रखेंगे ताकि गांव के सभी बच्चो का नियमित टीकाकरण होते रहे।
- तटबंध निगरानी का मुद्दा वर्त्तमान स्वयं सहायता समुह के नियमों में आसानी से जोड़ा जा सकता है। इस दिशा में जीविका के स्थानीय कार्यकर्त्ता की मदद ली जा सकती है।

बैठकों का उद्देश्य

प्रारंभिक बैठकों में ऐसे मुद्दे जैसे कि ग्रामीण जीवन में तटबंध का महत्व और उसके सुरक्षा की जरूरत पर चर्चा की जानी चाहिए। कनीय अभियंता कुछ सदस्यों को तटबंध के संवेदनशील स्थलों पर ले जाकर संभावित खतरों की जानकारी दे सकते हैं।

- तटबंध की सामान्य अवस्था की जानकारी।
- तटबंध को मानवीय, यातायात और जानवरों से होने वाले संभावित खतरों की जानकारी ।
- तटबंध पर हो रहे अतिक्रमण पर चर्चा।
- साधरण और बाढ़ के समय निगरानी समिति के सदस्यों की भूमिका।
- बाढ़ से निपटने के लिए की गई तैयारी पर चर्चा।
- बाढ़ के समय अन्य विभागों से तालमेल बनाने पर चर्चा।
- सूचना प्रसारण के तरीको पर चर्चा ।
- साधारण श्रमिक और हुनरमंद श्रमिकों को आपदा स्थिति में कैसे लाया जाए इस पर चर्चा।

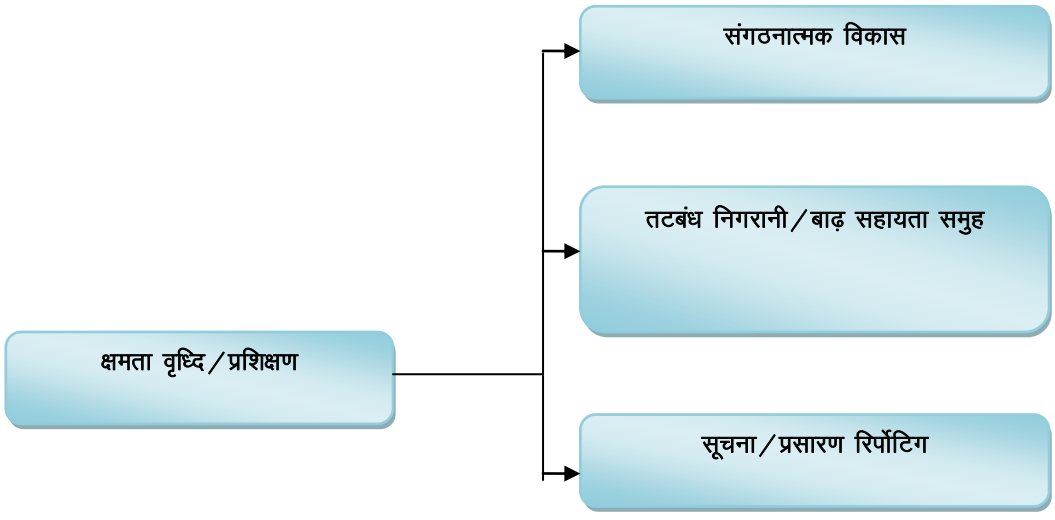
बैठक का समय :

ग्रामीण स्तर तटबंध समिति की नियमित निगरानी बैठक आवश्यक है, इन सभी बैठकों की कार्यवाही को लेखा–जोखा जरूरी हैं।

1. शुरूआती समय में VLESC को सप्ताह में एक बार बैठक करनी पड़ेगी।
2. जब क्षमता वृध्दि का कार्य सम्पन्न हो जाएगा तब ये बैठक जरूरत के हिसाब से महीने में एक बार या तीन महीने में एक बार की जा सकती है।
3. मानसून के एक माह पूर्व VLESC को सप्ताह में एक बार बैठक करनी चाहिए।

VLESC के सशक्तिकरण के लिए क्षमता वृध्दि (Capacity Building) और प्रशिक्षण

एक बार जब तटबंध निगरानी समिति का गठन हो जाता है तब विभाग इन समिति के सशक्तिकरण के लिए क्षमता वृध्दि और प्रशिक्षण का कार्य आयोजित कर सकता है।



तटबंध निगरानी समिति (VLESC/SHG) के कार्य और दायित्व – बाढ़ के समय और साधरण समय

भूमिका	साधरण समय में	बाढ़ के समय में
प्रारंभिक स्तरः तटबंध निगरानी की योजना	ये बैठक फरवरी से अप्रैल माह के बीच होनी चाहिए	विभाग से कोई आपदा सूचना मिलने पर समुदाय के साथ बैठक होगी
समुदाय में जागरूकता का निर्माणः		
• बाढ़ पूर्व चेतावनी प्रणाली, बाढ़ से निपटने की तैयारी और आपात के प्रभाव को कम करने जैसे मुद्दे पर जागरूकता फैलाना।	• यह गतिविधि हर तीन महीनों पर होंगी।	• रोजाना लाउडस्पीकर के माध्यम से कैम्प लगाकर।
• बाढ़ के विभिन्न आयामों पर चर्चा, बाढ़ के समय जरूरी समानों का संकलन, मुख्य पदाधिकारियों का संपर्क न. का संकलन जैसे विषयों पर चर्चा।	• यह गतिविधि हर तीन महीनों पर होगी।	• रोजाना लाउडस्पीकर के माध्यम से कैम्प लगाकर।
• निगरानी समिति के सदस्यों को और अन्य ग्रामीणों को बाढ़ के समय किये गये कार्य पर जानकारी प्रदान करना।	• यह गतिविधि हर तीन महीनों पर होगी।	• रोजाना लाउडस्पीकर के माध्यम से कैम्प लगाकर।
निगरानी	**सप्ताहिक निगरानी**	**रोजाना निगरानी**
तटबंध में होने वाले संभावित खतरों की अद्यतन जानकारी ।	मासिक–गतिविधि	सूचना का रोजाना संकलन आवश्यक है, संभव हो तो हर घंटे की जानकारी का संकलन होना चाहिए।
जरूरी उद्देश्यों का प्रेषण	**15 दिनों पर अथवा मासिक गतिविधि**	**रोजाना की गतिविधि**
तटबंध में होने वाले संभावित खतरों की अद्यतन जानकारी ।	जब भी आवश्यकता हो ।	रोजाना की गतिविधि, आपदा परिस्थिति में ।

विभाग समुदाय के बीच संवाद का प्रोटोकॉल – आम सहमती के तरीके

वर्तमान में ताल–मेल की वजह से, हालांकि तटबंध के किनारे रहने वाले सभी ग्रामीण तटबंध की अहमीयत समझते है पर तटबंध के रख–रखाव के प्रति उदासीन रहते है। यह मुख्य वजह है जिसके कारण मानसुन के समय को छोड़कर तटबंध की भूमिका अन्य समय में गौण हो जाती है। ऐसे वातावरण में यह जरूरी हो जाता है कि ऐसे कदम उठाये जाएं ताकि लोग तटबंध के रख–रखाव के प्रति पूरे साल संवेदनशील रहे। इस दिशा में कुछ कदमों का सुझाव निम्नलिखित बिन्दुओं में दिया गया है।

1. विभाग और समुदाय के बीच तटबंध सुरक्षा पर परस्पर चर्चा समय – समय पर होनी चाहिए । इस तरह की बैठकों में विभाग के विभिन्न स्तर के स्थानीय पदाधिकारी की मजुदगी का अच्छा प्रभाव पड़ेगा।
2. विभाग और समुदाय की आपसी चर्चा दोनों को करीब लायेंगे और भ्रम की स्थिति को दूर करने में मददगार रहेंगे।
3. तटबंध की मरम्मती कार्य के लिए उठाय गए कदमों के विषय में समुदाय में कई किस्म की भ्रामक स्थिति रहती है। विभाग को इस बात की संभावना तलाशनी चाहिए कि जहां तक संभव हो इन कार्यों के विभिन्न आयामों की चर्चा समुदाय के साथ कि जाएं। इससे एक–दूसरे के प्रति विश्वास का महौल बनेगा।
4. तटबंध के किनारे कई बस्तियों के आवागमन का एक मात्रा रास्ता तटबंध ही होता है। यदि तटबंध के उपरी सतह पर पक्की सड़क का निर्माण किया जाए तो इससे आवागमन में सुविधा होगी साथ ही साथ पक्के सड़क के निर्माण के कारण अतिक्रमण को भी रोकने में सहायता मिलेगी।

सत्र – 4

सत्र	विवरण	समय	चर्चा का माध्यम	स्त्रोत व्यक्ति
सत्र 4 मॉड्यूल 4 तटबंध निगरानी और सूचना का प्रसारण ।	• तटबंध सुरक्षा के लिए जरूरी सूचना का संकलन ; कोड–सहित)। • सूचना को जिस समय और किस प्रकार प्रेषित करना है। • समुदाय को विभाग से किस प्रकार की जानकारी कि आवश्यकता है। • यह जानकारी कब कहां और कैसे उपलब्ध है। • विभिन्न सूचनाओं का K-EAMS में समागम । • डिविजन में पदस्थापित विभिन्न पदाधिकारियों का संपर्क विवरण । • तटबंध निगरानी के मुख्य सदस्यों का संपर्क विवरण।	1.5 घंटा	व्याख्यान और प्रदर्श	तटबंध निगरानी विशेषज्ञ और प्रशिक्षित प्रशिक्षक, K-EAMS के पदाधिकारी

समुदायिक संदेशों का विवरणी और प्रस्तुति :

इस प्रारूप में तकनीकी बातों का सरलीकरण पर विशेष ध्यान दिया गया है। यह उम्मीद की जाती है कि इससे समुदायिक सहभागिता को गति मिलेगी।

- यहां तटबंध में होने वाले सभी प्रकार के संभावित खतरों का संकलन किया गया है।
- इस प्रारूप में दिये गये अधिकतर संदेश गैर–तकनीकी है और इनकी प्रस्तुति इस प्रकार की गयी है कि आम लोग इसे समझ पायें।
- सभी संदेशों के आगे एक कोड नम्बर प्रदान की गयी है, जो [K-EAMS] को इन्हें समझने में सहायता प्रदान करेगी।
- इन्हें खतरों की प्राथमिकता के हिसाब से रखा गया है।

सुरक्षा संदेशो की सूची

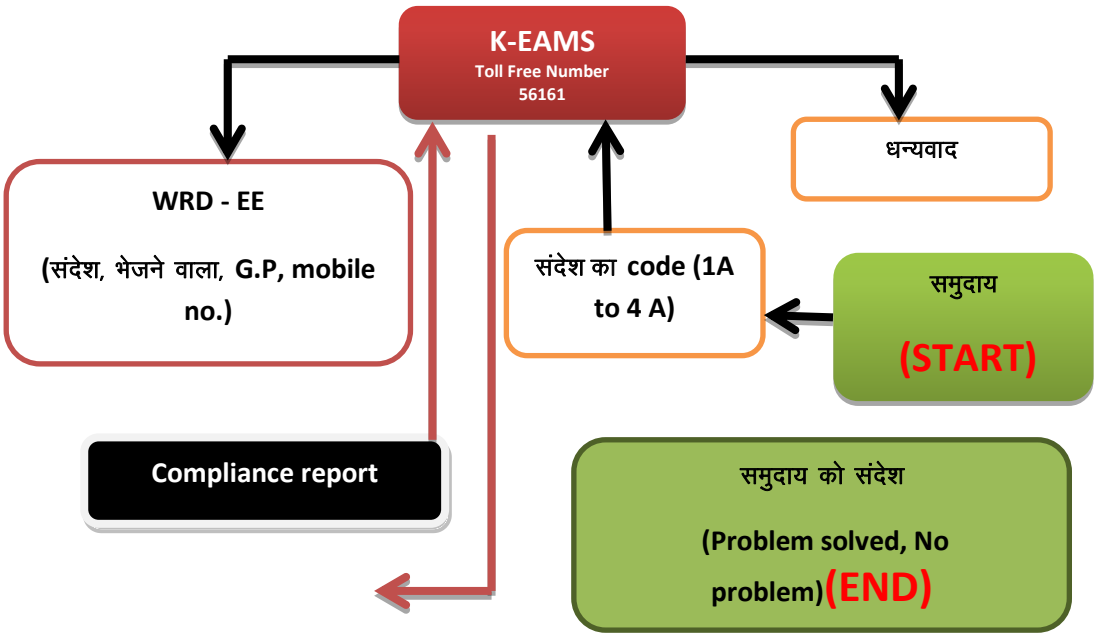
क्र. नं.	Alerts (सुरक्षा संदेश)	प्राथमिकता	SMS कोड
1	तटबंध के नदी भाग के ढलान में कटाव हो रहा है और ढलान की मिट्टी धंस रही है।	1	WRD 1 A
2	बॉध में दरार दिख रहा है।	1	WRD 1 B
3	तटबंध पर किये गये सुरक्षात्मक कार्यो में धंसान या क्षति देखी गई है ।	1	WRD 1 C
4	नदी तटबंध के किनारे पहुँच चूकी है और बॉध के ढलान का कटाव एंव धसान हो रहा है।	1	WRD 1 D
5	तटबंध से सुरक्षित क्षेत्र के तरफ का ढलान एवं आस–पास जमीन से जल का रिसाव हो रहा है या बुलबुले निकल रहे हैं।	1	WRD 1 E
6	तटबंध के ऊपर की सतह खराब स्थिति में है और इसके रख–रखाव की आवश्यकता है।	2	WRD 2 A
7	कुछ लोग तटबंध के ढलान (सुरक्षित क्षेत्र के तरफ का) से मिट्टी काट लिये हैं।	2	WRD 2 B
8	नदी तटबंध से लगभग 100 मी0 की दूरी पर है और इसकी प्रवृति और नजदीक आने की है।	2	WRD 2 C
9	तटबंध पर एक बित्ता (6 इंच से ज्यादा) के गढढे बन गये हैं।	2	WRD 2 D
10	बॉध पर वर्षा के कारण नालियॉ बन गई है जिसे मिट्टी से भरने की जरूरत है ।	3	WRD 3 A
11	बॉध में जानवरों द्वारा बिल बनाये गये हैं और इस पर तुरन्त ध्यान देने की आवश्यकता है।	3	WRD 3 B
12	बॉध पर लोगों ने मवेशी स्थल और झोपड़ी बना रखे हैं।	4	WRD 4 A

इस सूचि को स्थानीय पदाधिकारियों से विमर्श के उपरांत प्रमुख स्थलों पर प्रदर्शित कि जाएगी साथ ही साथ इस सूची को पंचायत भवन और विद्यालय इत्यादि पर भी प्रदर्शित कि जाएगी।

साधन

- संदेश और उसके कोड K-EAMS में प्रदरत होंगे।
- तटबंध निगरानी समिति और उनके सदस्यों की विवरणी निम्नलिखित प्रारूप में K-EAMS में प्रदरत होगी।

क्रमांक	जिला	पंचायत	तटबंध का नाम	तटबंध का कि.मी.	निगरानी समिति के प्रमुख नाम	संपर्क विवरण



- संदेश के कोड को K-EAMS में प्रदरत टॉल–फ्री नम्बर (56161) पर भेजा जाएगा।
- चूकि भेजने वाला का संपर्क विवरण K-EAMS में पहले से प्रदरत होगा, इसलिए K-EAMS के लिए यह पहचान करना आसान होगा कि किस स्थल से संदेश भेजा गया।
- संदेश प्राप्त होने के पश्चात संदेश भेजने वाले को एक धन्यवाद ज्ञापन प्रेषित किया जाएगा।
- K-EAMS द्वारा प्राप्त संदेशो को संबंधित डिवीजन के सभी स्तर के पदाधिकारियों को अग्रसरित कर दिया जाएगा।
- K-EAMS द्वारा प्राप्त संदेश मुख्यालय में BAPEPS और राज्य आपदा प्राधिकरण को भी प्रेषित किया जाएगा।
- समुदाय से प्राप्त संदेशों पर कि गयी कारवाई की रिपोर्ट K-EAMS की सामुहिक सहभागिता की पेज पर डाली जाएगी। जिससे समुदाय के सदस्य चाहे तो इन रिपोर्टों का अवलोकन कर सकता हैं।


बिहार सरकार
जल संसाधन विभाग
तटबंध सम्बन्धित खतरों की सूचि एवं कोड
निम्नलिखित में से किसी भी प्रकार के खतरे की सूचना कृपया 56161 पर SMS द्वारा सूची में दिए गए कोड को पंजीकृत मोबाइल नम्बर से प्रेषित करें।
उदाहरण के लिए 12 नम्बर पर वर्णित खतरों की सूचना को प्रेषित करने के लिए टाइप करे WRD(Space) 4A

Sl.	सूरक्षा संदेशो की सूची	Priority	Code
1.	तटबंध के नदी भाग के ढलान में कटाव हो रहा है तथा ढलान की मिट्टी धंस रही है।	1	WRD 1A
2.	तटबंध में दरार दिख रहा है।	1	WRD 1B
3.	तटबंध पर किए गये सूरक्षात्मक कार्यों में क्षति देखी गई है।	1	WRD1C
4.	नदी तटबंध के नजदीक पहुँच चूकी है और पास में कटाव एवं धसान हो रहा है।	1	WRD1D
5.	तटबंध से सुरक्षित क्षेत्र के तरफ का ढलान एवं आस-पास जमीन से जल का रिसाव हो रहा है या बुलबुले निकल रहे है।	1	WRD1E
6.	तटबंध के ऊपर की सतह खराब स्थिति में है और इसके रख-रखाव की आवश्यकता है।	2	WRD2A
7.	कुछ लोग तटबंध के ढलान (सुरक्षित क्षेत्र के तरफ का) से मिट्टी काट लिए है।	2	WRD2B
8.	नदी तटबंध से लगभग 100 मी. की दूरी पर है इसकी प्रवृत्ति और नजदीक आने की है।	2	WRD2C
9.	तटबंध पर एक बिता (6 इंच से ज्यादा) के गड्ढे बन गये है।	2	WRD2D
10.	तटबंध पर वर्षा के कारण नालियाँ बन गई है जिसे मिट्टी से भरने की जरूरत है।	3	WRD3A
11.	तटबंध में जानवरो द्वारा बिल बनाये गये है और इस पर तुरन्त ध्यान देने की आवश्यकता है।	3	WRD3B
12.	तटबंध पर लोगों ने मवेशी स्थल और झोपड़ी बना रखे है।	4	WRD4A

कार्यपालक अभियंता
वीरपुर डिवीजन-II
सम्पर्क नं-9473197059

- बाढ़ संबंधित जरूरी सूचनाएं विभाग द्वारा K-EAMS के माध्यम से अथवा मोबाईल के जरिए तटबंध निगरानी समिति के सदस्यों को प्रेषित किया जा सकता है।

'' चूकि K-EAMS संकल्पना एक नयी व्यवस्था है, इसलिए यह जरुरी है समुदाय की सहभागिता के लिए हम लोगों के पास कुछ पूर्व निर्धारित नीतियों के साथ जाएं और इन नीतियों के तहत लोगों को जोड़ने का प्रयास करें। इस व्यवस्था में स्थाईत्व आने के बाद में इसमें जरुरी परिवर्तन किए जा सकते है।''

TRAINING MANUAL ON EMBANKMENT SURVEILLANCE

A FACILITATION GUIDE WITH COMPLETE TRAINING MATERIALS

FOR CORE TRAINERS

ON

EMBANKMENT SURVEILLANCE

PREPRARED BY

JPS ASSOCIATES (P) LTD

R-5 HAUZ KHAS

NEW DELHI-110016

General Outline of the Training curricula:

This Training Manual has been designed for the purpose of Training visualized to facilitate the surveillance measures necessary for the safety of the embankment under the project "Developing Appropriate Protocols and Mechanisms for Community Participation in Embankment Surveillance and Piloting in Select Communities in Kosi River Basin"

The manual is developed for facilitating the trainers to conduct training at the grass root level. It covers the technical know-how on what, how, when and where with respect to "Embankment Surveillance".

The manual is perceived to be a "handy tool" for the Trainers , while conducting grass root level trainings , so that Embankment Surveillance Committees formed by the agencies involved are completely aware about the concept of Embankment surveillance, its necessity in preservation and maintenance of the embankment and a clear cut definition of the role communities can play in Embankment surveillance, so that the perceived threats to embankment could be reduced and therefore the risks and responsibilities of community to address and react to Flood Disaster is enhanced.

This is one day training and the training is divided into 4 sessions. Outline of sessions is provided in the table below:

Table 1: Training schedule

Module no and broad outline	Detailed content	Time	Medium	Resource person
Day 1: Session (9.30 am – 11.00 am)				
Session 1:	• Introduction to the training and sharing of expectation	10 minutes	Interactive	Core trainers
	• Movie on Embankment	15 minutes	AV	Core trainers
Module no 1:	• Reflection on the movie	5 minutes	Interactive	Core trainers
Introduction to Embankment	• Introduction to Embankment, Types	30 minutes	Lecture , Exhibits	Official from WRD
Embankments – Structure and composition of various structures for embankment protection.	• Outline of structures associated with embankment (Spur, Studs, levee, porcupines, sand bagging, boulders,vetivers etc.)	30 minutes		

Module no and broad outline	Detailed content	Time	Medium	Resource person
TEA BREAK (11.00- 11.15 AM)				
Day 1 Session 2: 11.15 – 12.30 pm				
Session 2: **Module no 2:**Embankment Surveillance and Role of Community	• Embankment surveillance and its need • Threats to embankment safety – What activities cause threat (natural, animal and human interference) • How to conserve the embankment • Current system of embankment surveillance (Departmental protocol)	45 minutes	Presentation, Video and site visit (closest to village)	Embankment expert and Expert from training team
	• Community role in identifying the threats • Community safety of the embankment	30 minutes		
LUNCH (12.30 - 1.30 pm)				
Session 3: **Module 3:** Embankment Surveillance committee/s and its functions	• What are embankment safety committees, Why they are required, How to form • Composition, role and responsibilities of members of the embankment surveillance committee • Meetings, periodicity of meetings and recording the proceedings of the meetings, action points required • Role of embankment surveillance committee before, during and after floods	1.5 hours	Lecture	Embankment expert and Expert from JPS
TEA (3.00 pm)				
Session 4: **Module 4:** Embankment Surveillance and Information dissemination	• What are the main data/ information (with codes) required by the department for embankment safety • When and how is the information required to be disseminated (When, how and whom)	1 hour	Lecture and demonstration	Expert Embankment Surveillance, JPS experts, K-EAMS official

Module no and broad outline	Detailed content	Time	Medium	Resource person
	• What information does the community require from the department • When, where and how the information available • Integration of information into K-EAMs • Contact details of the Department official posted at the division • Contact details of key members of the embankment surveillance committee			

PLAN FOR SESSION 1 AND RELEVANT TRAINING MATERIAL

Session details	Topics to be discussed
Session 1: **Module no 1:** Introduction to Embankment , Embankment Surveillance and the current system of Embankment surveillance **Time :** 1.5 Hours (9.30 am -11.00 am) **Resource person:** Embankment Expert from WRD	**Part I : General Idea of the Embankment** • What is an embankment • Types of Embankments **Part II:** • Overall idea on structures associated with the embankment • Outline of structures associated with embankment (Spur, Studs, levee, porcupines, sand bagging, embankment nose, etc.)

Instruction to the Resource person on Plan for Session 1 (One) – Total time 60 minutes:

1. The trainer will start the session with a brief introduction of all the participants – maximum 10 minutes
2. The trainer is expected to state the objective of the TOT briefly (5 minutes)
3. The trainer will show a video on Embankment **(video document - 1)** (10 minutes)
4. Following this video , the trainer needs to explain the concept of Embankment by showing exhibits 1-10 (photographs of the embankment) - 5 minutes
5. Brief History including time line of Embankment- 5 minutes
6. Brief of Concept and different terminologies associated with Embankment structures, e.g. Levees, Spur, Studs, Porcupines, sandbagging, various threats to embankment such as Cracks in embankment, breach etc.

Note: The idea is to give the trainer basic idea of the embankment and structures associated with embankment.

Concept of Embankment:

Post video show, an interactive session/ discussions should be held on concept of Embankment, its influence on the lives of people, brief history of embankment, the geographical coverage, types of embankment etc. Stress should be laid on demonstrating the whole concept through pictorial representation. Some of the suggestive exhibits are provided in this section.

What is an Embankment?

- An Embankment is an artificial barrier that typically is used to hold back water or to support a road way, railway or a canal
- It is a ridge to prevent water from passing beyond desirable limits
- Flood embankments are constructed along river banks to protect the countryside from flood damages due to spilling of river banks.
- Flood embankments are man-made structures constructed with earth made of clay, silt and sand locally available from river bed and banks.
- Most of the embankments have sloping sides, much like small hills.

The trainer can ask the trainees who will attend the training programme about the stretch of embankments in their areas and discuss in detail on the exhibits 1-3 given below

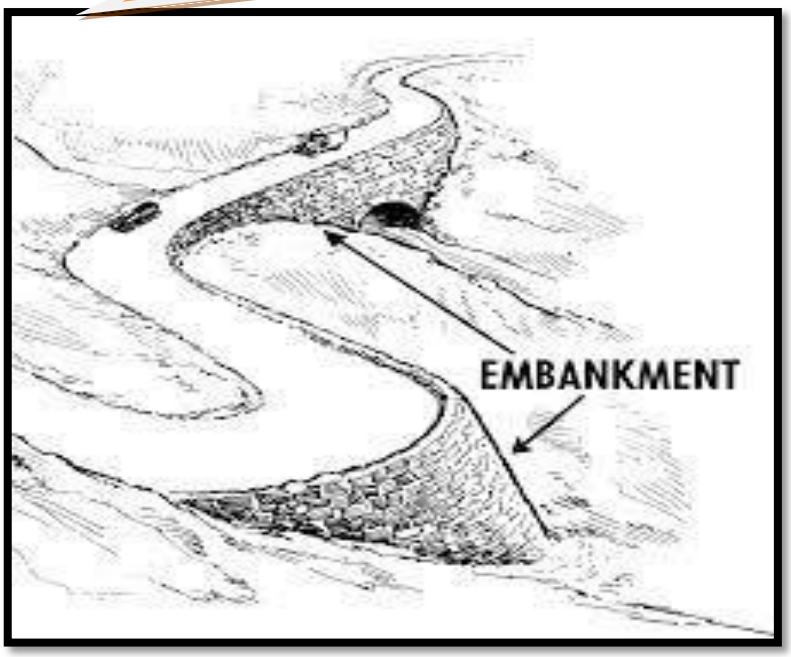


Exhibit 1 - Embankment

Exhibit 2 – Eastern Kosi Embankment

Exhibit 3 – Right Kamla Balan Embankment

Exhibit 4 –Embankment on which Houses and shops are there ⊗

Exhibit 5 –Embankment which has no one to look after it ⊗

Exhibit 6 – An Embankment in Netherlands

Exhibit 7 – An Embankment in Bangladesh

Trainer can ask questions

1. What is the stretch of kosi embankments
2. Where is Kosi barrage located and what is its importance
3. What are the benefits of embankments
4. What are the dangers from kosi river
5. When and where was the maximum damage done by Kosi river

Kosi Embankment – Brief History

- The Kosi embankments were built to retain the Kosi River which is a trans-boundary river between Nepal and India and is one of the largest tributaries of the Ganges.
- Kosi embankment started in 1955The Kosi Project resulted in the construction of a 125 km long embankments along the eastern bank of the Kosi from Birpur to Kopadia
- 126 km long embankment on the western bank from Bhardah in Nepal to Ghongerpur in Saharsa in Bihar
- Additionally a 34 km embankment was built on the eastern side in Nepal part together with a 12 km long afflux on the west bank
- Later a barrage was constructed in 1963 near Birpur on the river to regulate the river and provide irrigation to 712,000 ha of land through the eastern Kosi canal.
- The Kosi dam is designed to withstand a discharge of 950,000 cusecs to protect 214,000 ha of land from floods.
- The western Kosi canal was supposed to serve another 325,000 ha of cropped land on the western side of the river5.
- Embankments holds back water in order to prevent flooding from lakes, or rivers onto adjacent land
- Typically strong barriers provide protection to lower – lying grounds by acting as a levee
- Helps to confine the movement of water by allowing it to flow faster and higher without overflowing
- Provide transportation facility during non-flood period
- Provide shelter to the community during flood

Exhibit 8: Kosi Barrage

Timeline of Kosi Embankment Breaches:

1953-54: Major floods and leads to emergence of Kosi project which was aimed at flood control and irrigation. The project led to the creation of a barrage and embankments on each side were designed to protect approximately 2800 km2 of land in north Bihar and Nepal.
1963: The first breach on the western embankment in Nepal
1968: Five breaches in north Bihar
1971: Collapse of the 1969-built Bhatania Approach Bund
1980: Eastern embankment breach
1984: Eastern embankment breach
1991: Breach in the western embankment near Joginia in Nepal
2008: Breach in eastern embankment

Also discuss about 2008 Kusaha breach and its repercussion with the participants.

Structures associated with Embankment:

Name of the structure and description	Exhibit	Relevance to Kosi Embankment
Levee : A *levee* is a short embankment, like a dam, constructed to prevent the overflow of water		• Kosi embankment is an extended/extensive form of levee stretching upto 125 km's from Kosi Barrage
Spurs Spurs are usually provided to deflect the river current away from the bank.		• Spurs are often constructed across the river banks for protection of embankments against the river attack. • 378 numbers of spurs of different lengths extending from embankment have been constructed along eastern and western embankments of River Kosi .
Studs: Stud is a short form of the Spur		• Serves the same purpose as of the Spur. However it is constructed at the place where River action is mild • It helps training the river in the desired course of flow.

Name of the structure and description	Exhibit	Relevance to Kosi Embankment
Sand bagging: A sandbag is used for such purposes as erosion of embankment helping in flood control.		• The advantages are that the bags and sand are inexpensive. When empty, the bags are compact and lightweight for easy storage and transportation. Sandbags may be used during emergencies when rivers threaten to overflow their banks, or when a levee or dike is damaged.
Porcupines: RCC porcupine is permeable structure comprises of six members which are joined with the help of iron nuts and bolts.		Porcupines helps in A) Training the river along the desired course. (b) Reducing the intensity of flow at the point of river attack. (c) Creating a slack flow to induce siltation. (d) Providing protection to the bank by dampening the velocity/ferocity of flow along the bank.
Boulders: Boulders are naturally available materials and are used as construction material in various works, including slope protection of the embankment, bank revetment,		The boulders shape, size, weight, gradation plays an important role in their effective use. The boulders in a revetment should be well graded throughout the layer thickness. The boulders used should be angular and regular in shape.

Name of the structure and description	Exhibit	Relevance to Kosi Embankment
Sluice Gates: Sluices Gates are used for regulating the flow of water In the drainage channel/ canals.		The size of sluice will depend upon volume of water to be drained from river to the country side and vice versa. In Kosi numerous sluice gates constructed are used for the purpose as mentioned above.
Vetivers : This type of grass is a perennial type of grass which can grow under extreme and wide type of conditions.		This grass can live upto 5 months under 14 m of water. Due to their long roots and high tensile strength this grass is resistant to the high velocity flow and checks the erosion.

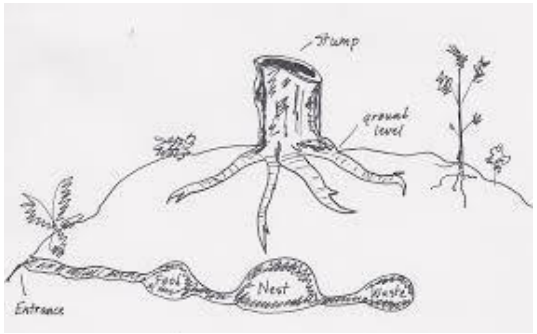
Session 2: Embankment Surveillance - its need, Threats to embankment and preserving the embankment (Govt. mechanisms and role of community)

Day 1 Session 2: 11.15 – 12.30 pm				
Session	**Details**	**Time**	**Medium**	**Resource person**
Session 2: **Module no 2:** Embankment Surveillance - its need, Threats to embankment and preserving the embankment	• Embankment surveillance and its need • Threats to embankment – What activities cause threat (natural, animal and human interference) • How to conserve the embankment • Current system of embankment surveillance (Departmental protocol)	45 minutes	Presentation, Video and site visit (closest to village)	Embankment expert and Expert from JPS
	• Community role in identifying the threats	30 minutes		

Instruction to the Resource person on Plan for Session 1 (One) – Total time 75 minutes:

The trainers need to cover the following concepts:

1. Concept of Embankment Surveillance -10 minutes
2. Need for Embankment Surveillance and the conservation of Embankment - 10 minutes
3. Threats to embankment (natural, man, animal threat) -10 minutes
4. Community role (PRI role) in identifying threats to embankment -10 minutes
5. How to protect the embankment – 10 minutes
6. Current system of Embankment Surveillance – 10 minutes
7. Brief on the embankment surveillance committees - System of proposed embankment surveillance through Embankment surveillance committees -10 minutes
8. QA session – 5 minutes



Perceived threats to embankment:

Embankments are constructed to withstand against water for several purposes including irrigation, supply and flood defence to protect people, land, crops, and property. These embankments can survive up to some limited safety levels and are subject to decay with time and might fail due to several triggering mechanisms. Most frequent embankment failures are causedby overtopping and internal erosion structural defects and piping.

1. Often people staying inside are seen cutting embankments to save themselves from rising water where as people belonging to the outer side of the embankments patrol embankments to stop such incidents.
2. The bed level of the river has become higher than the level of land outside the embankment.
3. At places, the Kosi river bed level has aggraded leading to formation of perched river. The spurs try to push the flow away from the embankments, thereby protecting the embankment from breaching. However, due to the variation in direction of flow owing to change in discharge and sedimentation, the conditions near the spurs change from repelling to sometimes attracting, whereby the flow tends to attack the embankments. The possibility of such a condition can even occur during annual flows also.
4. The site engineers are required to be on guard for such happenings and take necessary remedial protection measures. In few cases, it is not possible to divert the flow safely and the embankments are breached. These kinds of disasters have occurred and the people of Bihar have faced large scale flooding of their lands and villages
5. Cuts in embankment due to human and animal interference

Discuss on the following:

1. What are the threats to embankments health?
2. Which are the methods to identify the element who are danger to embankments?
3. Who will identify these threats?
4. After identifying the threat, who is to be informed?
5. How will the communication flow?

Exhibit 9: Erosion due flow of river and rain cuts (Erosion in Li Fyang Embankment in china)

Exhibit 10: Damages done by Animals

Exhibit 11: Erosion in Ukishwar Dam in Australia

Embankment Surveillance

- Embankment Surveillance is observation of the embankment for its safety and preservation

- Embankment must be preserved because they protect the community from floods
- It protects man, animal natural resources from being washed away in floods
- It keep the flow of water restricted within the embankments
- Earthen embankments in Kosi are beset with multi-facetted problems.
- The design and construction methods used to build the embankments, the nature and extent of erosive forces to destabilize them and above all the attitude of the local people for whom they are built altogether determine the magnitude and degree of instability.
- Most earthen embankments face light to moderate erosion problems arising out of rainfall splash, animal actions and the nature of human uses
- While human , animal actions is controllable and within the control of the community(aware community), natural problems like erosion, breaches if identified early could be corrected to minimize the catastrophic impacts that it can create if un attended
- It is therefore necessary to conserve the embankment

Ask few questions-

1. Why it is important to protect the embankments?
2. At present, who is responsible to keep the embankments protected?
3. Whether community is involved in protecting the embankments and if not is it important to involve community in embankment protection?

Methods of embankment protection

- Surveillance must be on proper time
- Community should participate voluntarily in surveillance
- Department should get information about defects in timely manner

What can be done to protect the embankment?

- Embankment surveillance is key to protecting the embankment
- Timely action will reduce the threat of breaches
- Govt. action - community interface will resolve the problem to a large extent
- Community involvement is the key to sustainable existence of the embankment

What is the process of embankment surveillance as of now – Current system of embankment surveillance?

Ask Questions-
- Have you heard about TAC, SOP and SRC?
- Do you know the current mechanism of embankment surveillance?

- At present it is done by the Water Resources Department of Governme of Bihar
- The Government of Bihar (GoB) thus far has focused on structur interventions, such as constructing, raising, and strengthening embankments (levees), river training, and river bank and town/villag protection measures.
- Maintenance and strengthening of existing embankments ar planning/strengthening anti-erosion control works is done by fiel engineers.
- A high level Technical Advisory Committee (TAC) reviews the schemes submitted by field engineers, and makes suitable suggestions.
- The field engineers prepare working estimates as per recommendation by Technical Advisory Committee (TAC).
- These selected proposals are placed for approval by the Department through a Departmental Committee known as Scheme Review Committee (SRC).

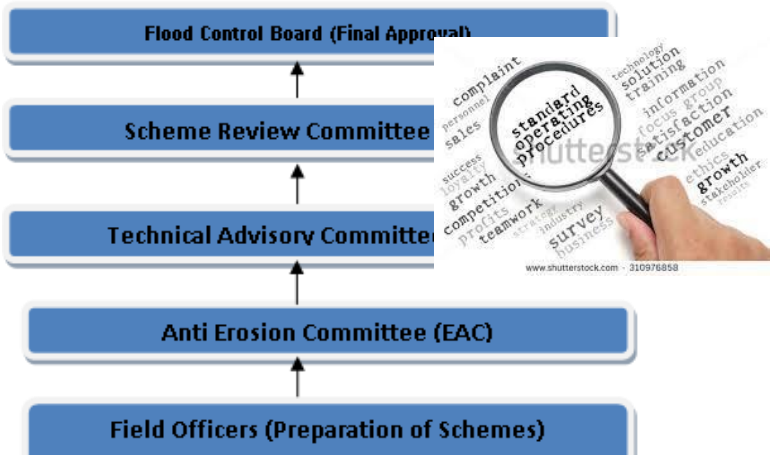


Figure 1: Action Plan framework at the Department level

- SRC provides sanction after reviewing the available resources and economic viability of such schemes. The Flood Control Board then approves the schemes sanctioned by the SRC. These approved schemes are taken up for completion before the onset of next monsoon**.**

- WRD has very clear guidelines for the field staff as mentioned in the Standard Operation Procedures (SOP) where in it has clearly spelt out its mandate for embankment surveillance.
- The document states the timings of visits of Civil and Mechanical engineers and Erosion control committee to the embankments every year.
- The document says that every year before the onset of the monsoons the Executive Engineers in charge of flood control at the Water Resource Divisions will patrol their respective areas to identify and repair any breaches, erosion, pot holes, rain cuts , rat holes, or any damages to the embankment before the 31st. of May every year.
- The SOP says that the Chief Engineer will also have to prepare a list of all vulnerable areas and notify it to the respective division so that guidelines for the surveillance of embankments (specific to the concerned area) can be prepared beforehand.

Community Participation – An Introduction

Community involvement in Embankment surveillance and protection in Bihar:

- As of now, there is no community participation in embankment surveillance in Bihar in an organized manner.

Need for community involvement in Embankment Surveillance:

- Community has the key to Embankment Surveillance.
- They are closest to the embankment and embankment is a part of their lives.
- They traverse the embankment throughout the day for some work or the other
- If trained they can easily identify the threats to embankment
- If made aware about the threats to embankment the community can take adequate steps for its protection
- Since the benefits of embankment is enjoyed by the community the community will be in a position to safeguard it better than any other agency

Ask Questions:

- **What is community Participation?**
- **Why and for what community participation?**

Why participation can be possible in embankment surveillance?

- People living near embankment very well understand that embankment provide them safety and it is the protection provided by the embankment which give stability to their life and livelihood. In such case if anything happen to embankment they will have to pay the price first.
- This information is good enough for them to participate in surveillance. If efforts are made they will be happy to participate.

Module 3: Approach to community participation in Embankment Surveillance

Session	Details	Time	Medium of instruction	Resource person
Session 3: **Module 3:** Approach to community participation - Embankment Surveillance committee/s and its functions	Rationale for community participation for Embankment Surveillance: Concept of Embankment Surveillance Committees • What are embankment safety committees, Why they are required, How to form • Composition, role and responsibilities of members of the embankment surveillance committee • Meetings, periodicity of meetings and recording the proceedings of the meetings, action points required • Role of embankment surveillance committee before , during and after floods	1.5 hours	Lecture	Embankment expert and Expert from JPS

The Approach to Community Participation - Rationale

- Being at the forefronts, communities living near embankments understand that if they are the first beneficiary of the embankments then if anything happen to embankment they will be the first one to pay the price.
- This is enough to understand them to participate in the surveillance.
- Decentralization in decision making has potential to

Formation of Committee by villagers in Bangladesh

bring transparency in inclusive development.

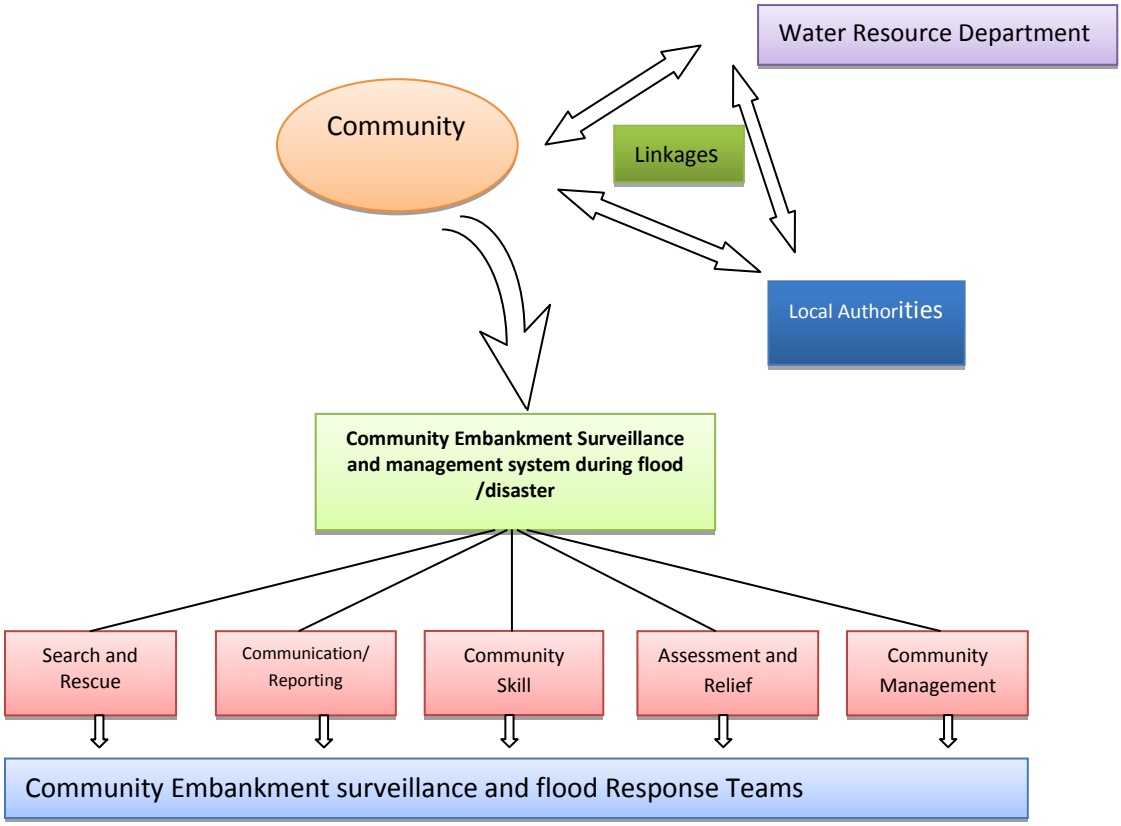
- It prepares the local communities for making informed decisions and has a say in policies that directly affects them.
- The flood control measures equipped with backup support from technical measures have a tendency to cope with the emergency situation, community participation has the potential to make such measures part of daily discourse.

- Based on the existing models of community participation world-wide it has been argued that it has to be seen not merely as means to enable the people to get, through mutual help initiatives and possibly with outside help, the basic needs which, otherwise, would elude them, but also a mean to influence decisions about issues affecting them.

Example: Exhibit:

- A live example of how community participation can aid the public delivery system is that of **participatory irrigation management** within the Irrigation Department in Bihar.
- While details still need to be validated, however, PIM improved the revenue collected as irrigation charges. It also, substantially cut down the cost on machinery for revenue collection.

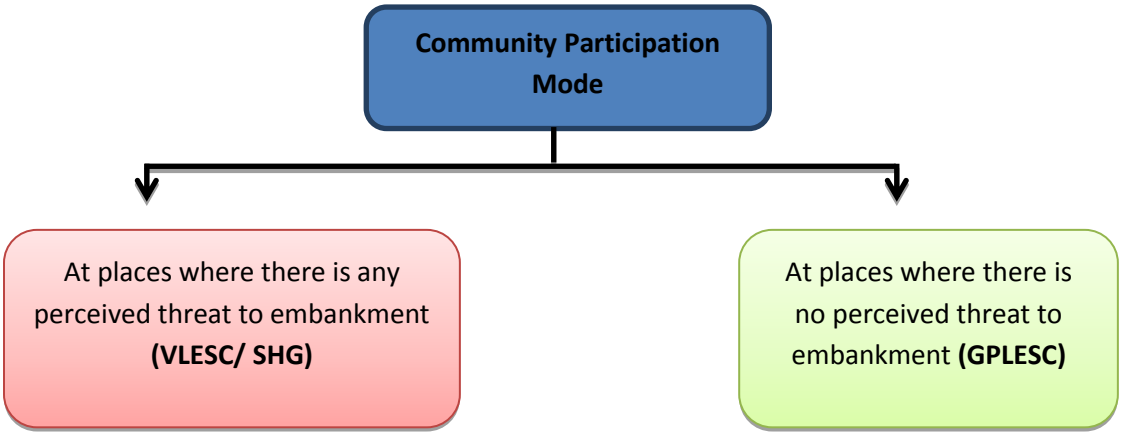
Figure 2: Probable mode of community participation:



Concept of Embankment Surveillance committee - Formation of Committees/Groups among select communities:

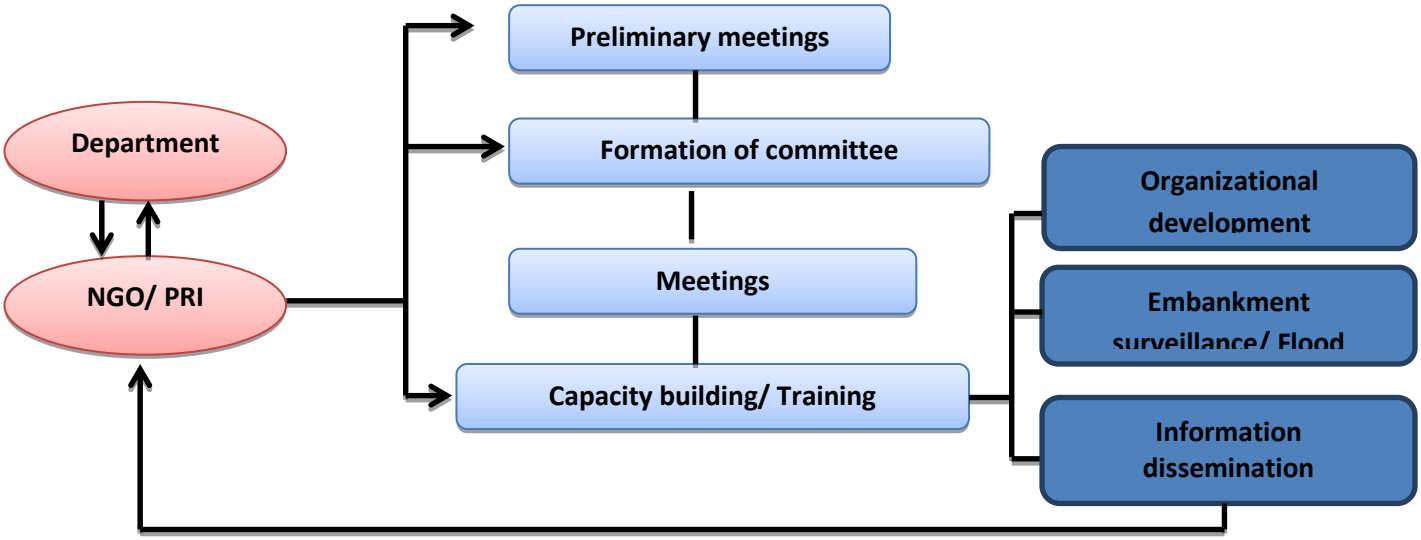
The following modes of community participation is to be discussed

Figure 3: community participation modes



Protocols for community participation in identified areas where embankment is perceived to be under any sort of stress:

Figure 4: Protocols for community participation



Note: *The area where VLESC is to be formed has to be identified and certified as area under any perceived threat by the Junior /Assistant Engineer after due visits to the site.*

Process of formation of committee VLESC:

The Junior Engineer will have to identify areas where there are threat and areas where there are no threat to embankment during his normal field visit or from the feedback from home guards in position. With the help of local NGO / PRI members/ Home guards in the identified areas which are under threat the Junior Engineer will:

- Organize village /RD level preliminary meetings with the village community/ SHGs or any other existing peoples' organization in the village. This will be done before the onset of monsoons (preferably during February – March) of the year.
- Two preliminary meetings will have to be held before the committee is actually formed.

Structure/ constitution of the Embankment Surveillance Committee (VLESC) in areas where there is any perceived stress / threat to the embankment

Protocols for group formation

i. Group formation will require careful representation of all sections of population in the area.
ii. Extra care needs to be taken to ensure representation of vulnerable and marginal sections of the population. This will make them feel part of the entire process.
iii. Regular meetings of the committee/group will be required to sustain their interest in the entire process.
iv. The field level functionary of the WRD from time to time should initiate and be present in group deliberations.
v. Such interactions will also be useful for the department to discuss the on-going and up-coming works for maintenance.
vi. The forum can also be utilized for imparting training on various aspects of embankment surveillance and maintenance.
vii. The process, it is hoped will help in ensuring an informed participation of community in embankment surveillance.

The members in the committee may include:

i) The committee may contain 7or 9 members
ii) 2-3members from the PRI (ward member and mukhiya or his nominated representative etc.)
iii) 2-3 local but influential and responsible members from any existing committee (VHSC, VEC, YuvakSangha/ NariSangha)
iv) 2 members from SHGs (women)
v) One WRD staff (Junior Engineer/ Assistant Engineer)
vi) Home guard

Mobilizing SHGs for Embankment Surveillance:

- Potential SHGs in the areas where any threat to embankment is perceived have to be identified by the agency entrusted to form community organisations. They can meet the Jeevika coordinator and discuss the matter of involving the SHG in embankment surveillance.
- The SHG can be a potential body for embankment surveillance. The SHGs are formed for a particular objective of promoting economic independence by group activity (lending and recovery). They function under inbuilt rules and the dynamics of group formation and capacity building is already there in the Jeevika program.
- Adding the dimension of embankment surveillance through some sort if incentivisation will not be a difficult option.

During formative stages SHGs must be taught to stick by 10 commandments such as:

- All members registered in the SHG will have to send their children to school
- SHG members will have to take care of the health and hygiene of the children
- SHG members shall conduct 4 meetings a month
- SHG members shall document all transactions and meeting proceedings in a register
- SHG members will open a bank account and deposit all the group savings in the bank
- SHG members will be involved in some sort of community development activity such as village sanitation
- SHG members will try to mediate in issues like wife beating , alcoholism affected member
- SHG members will initiate kitchen garden in their backyards for proper dietary supplementation of the family members , particularly children
- SHG members will coordinate with lead banks for availing credit
- SHG members will take an active part in monitoring school and education committee and the Village health and sanitation committee to ensure that all children are sent to school and no children/ mother in the village remains non-vaccinated.
- The element of embankment surveillance can be integrated into the existing system of SHG code if there is any or the Jeevika coordinator may be contacted to introduce this component in the group dynamics of SHGs.
- Making embankment surveillance mandatory to the SHGs criteria for qualifying for credit linkages can evolve as a great initiative in embankment surveillance.

Committee formation meeting in a village

Meetings

Purpose of the meetings:

In the preliminary meetings issues such the importance of embankment in context to the lives of the community, embankment management and protection for safety etc. will be explained. The junior engineer may like to take the villagers/ some PRI members/ members of SHGs to the vulnerable points in the embankment and show them the threat factors.

- Discuss on general condition of embankment
- Discuss on human, traffic, animal activity causing any sort of threat to the embankment
- Discussion on settlements coming up on the embankment
- Discussion on roles and responsibilities of the committee/ committee members during normal times and during flood times.
- Discussion on issues related to flood preparedness
- Discussion on networking with different line departments for other related works such as for income generation, road works
- Discussion on modes of information flow (actors involved, process and modality)
- Discussion on organizing labour / skilled labour for the department during emergency situation

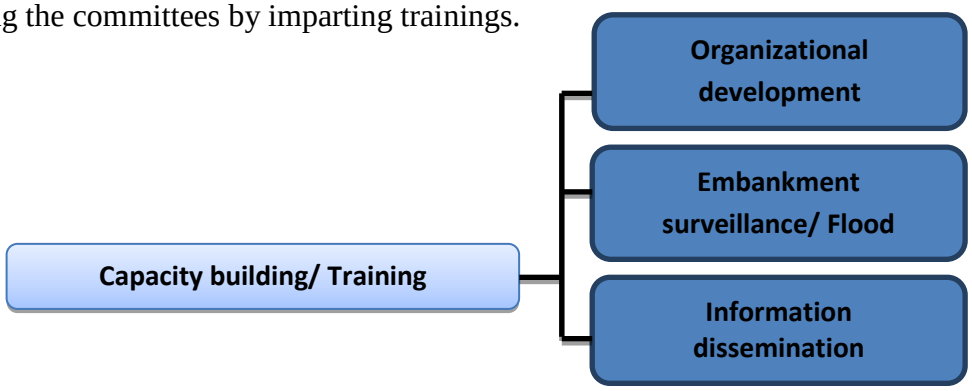
Timing of the meeting:

The VLESC will have to hold regular meetings and the proceedings of the meetings have to be recorded.

i. Initially the VLESC will have to meet on a weekly basis (during formative stage only)
ii. Once the capacity building is over they can meet on a monthly basis or quarterly depending on the situation.
iii. A month before onset of monsoon the VLESC will have to meet weekly.

Capacity building/Trainings for empowerment of the committee (VLESC) formed

Once the committee is in place and regularity of meetings is maintained the department can think of strengthening the committees by imparting trainings.



Roles and responsibilities of Embankment Surveillance Committee (VLESC//SHG) during normal times and during flood situation:

Role	During Normal times	During Flood season
Preparatory stage: Planning for embankment surveillance	Meetings to be held during Feb/March	Meetings to be held with community on receiving any emergency update from the department
Awareness building in the community:		
• Create awareness on early warning system, flood preparedness, disaster mitigation	Quarterly activity	Daily - Intensified through loudspeaker – camp mode
• Create awareness on flood warning, classification of floods based on intensity and threat, safety measures (indigenous measures), creation of common resources such as tarpaulins, lantern, floating bags, grain banks, places of safety etc. Creating awareness on officials to be contacted during vulnerable periods	Quarterly activity	-do-
• Involving community in activities related to reducing community irritation during execution of works during and after floods or any emergency or even at normal times	Quarterly activity	Daily
Patrolling	Weekly patrolling	Daily patrolling
Updation of perceived threat situation to embankment (condition of embankment) (Identify threats to embankment health (Rat holes, cuts, breaches) with location specific information - relative distance (RD) wise	Monthly activity	Updating required daily, even hourly messages will be of importance
Communication of relevant messages: Communicate reliable information (coded/digital/ photos) needed by the Department in proper , organized manner periodically on a monthly basis during rainy season / vulnerable periods)	Fortnightly/ Monthly activity	Daily activity
Arranging for local labour during execution of embankment maintenance works	As and when required	Daily activity – in emergency – immediate

Protocols for Community- Department Interface: Towards Arriving at a Consensus Approach

Though people do realize that embankment is for their safety and has enabled them to earn their livelihood in a more secure environment, however, in the present system of embankment management by the department they feel distanced from its affairs. As such the primary function of embankment of providing protection to people has taken a back seat in the minds of general people sparing few months of monsoon. It is important to regenerate the interest of the community for their round the year interest in embankment protection. People need to be brought in the center stage of embankment management not only for the proposed participation of community in embankment surveillance but also for its more efficient management. Some of the measures for consolidating the interaction between the WRD and community members are provided below:

i. Regular interaction in the form of meetings with community members on aspects of embankment safety, eliciting community's suggestions for improvement of embankment management is of vital importance. It is important for the department to ensure that in such meetings field officials at different levels are present on different occasions.

ii. These frequent meetings will help in bringing the department closer to community's aspirations with regard to embankment management and will also help in allaying several of the existing apprehensions on both sides.

iii. The WRD should explore the possibility of bringing greater transparency in the maintenance works undertaken in the embankment and try to adopt procedures of construction and maintenance adopted in other road and bridges project. This measure has the potential to allay misplaced grudges of the people with regard to functioning of the department for the various works undertaken for embankment maintenance. In the long run this will enable the department to command greater respect of the people near the embankment.

iv. For many habitations embankments are the only link for commuting. Consolidation and creation of black top roads will considerably place a curb on encroachments. This will also ease the movement of department vehicles on the embankment during regular and emergency inspections.

Session 4:

Session 4: **Module 4:** Embankment Surveillance and Information dissemination	• What are the main information's (with codes) required by the department for embankment safety • When and how is the information required to be disseminated (When, how and whom) • What information does the community require from the department • When, where and how the information available • Integration of information into K-EAMs • Contact details of the Department official posted at the division • Contact details of key members of the embankment surveillance committee	1 hour	Lecture and demonstration	Expert Embankment Surveillance, Core team experts, K-EAMS official

FORMAT & CONTENT FOR COMMUNITY REPORTING

The format & content for community reporting has been designed to keep the entire process in a structured manner and present the participants with well-defined parameters. This will hopefully keep the process simpler and encourage participation by the community.

- The idea here is to put together all possible problems that an embankment generally has to face during flood and normal period.

- The messages contained in the format for community reporting are mostly non-technical in nature.

- The numbers before every message are intended as code numbers that will enable EAMS to recognize the content of the message.

- These alerts have been prioritized based on the gravity of threat they pose to embankments.

Alerts & Its Prioritization:

S. No.	Alerts	Priority	SMS Code
1	Erosion, caving on the river side slope of embankment is occurring.	1	WRD 1 A
2	Cracks have been observed on the embankment.	1	WRD1 B
3	Damage or caving of protection work done on the river side of embankments has been observed.	1	WRD1 C
4	The river is flowing at the edge of embankment and erosion/caving of embankment is taking place.	1	WRD1 D
5	Seepage or sand boils have been observed on the embankment slope and in nearby areas.	1	WRD1 E
6	Surface of the embankment is in bad shape and needs immediate attention.	2	WRD2 A
7	Country side toe-cutting has been observed in the embankment.	2	WRD2 B
8	The river is flowing at a distance of 100 mts. From the embankment and displays a tendency of coming nearer.	2	WRD2 C
9	Depressions greater than 6 inches have been observed on the embankment.	2	WRD2 D
10	Rain cut has been observed on the embankment that requires soil filling.	3	WRD3 A
11	Several animal burrows present on the embankment that require immediate attention	3	WRD3 B
12	Construction of hutment & animal shed is taking place on the embankment	4	WRD4 A

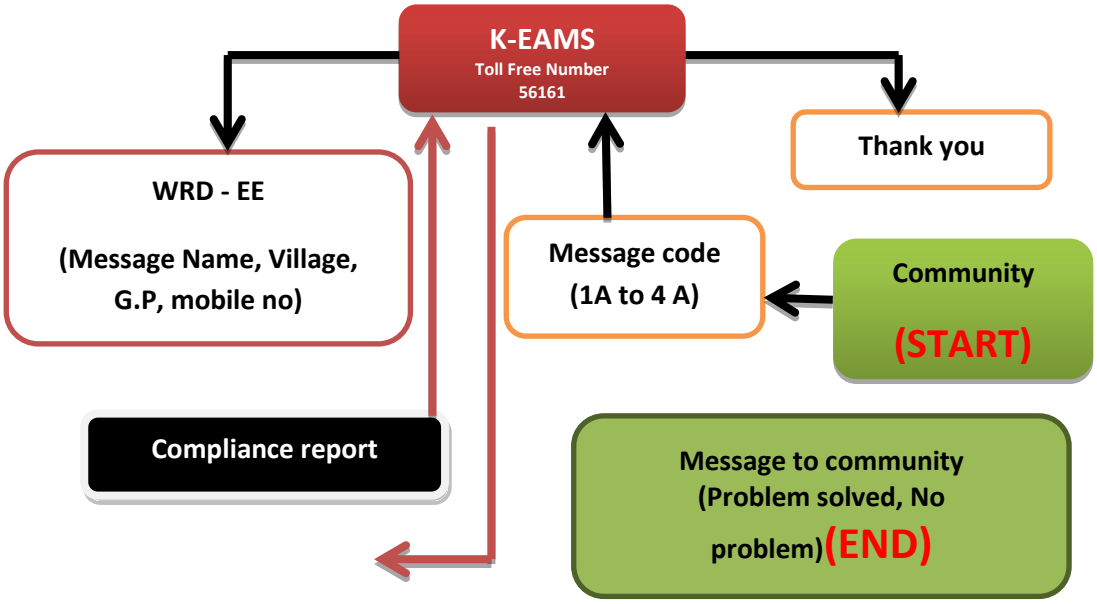
The Hindi translation of these alerts will be displayed on big hoardings at key locations in the embankment selected with due consultation of the filed level functionaries and community members of the concerned area. Further, they will also be pasted in the Panchayat Bhawan of the selected Panchayats on the embankment for integration with EAMS.

MODALITY

- K-EAMS will receive message from the community on **Number 56161 in the Community page.**

- The coordinates of the selected people/groups will be stored in the EAMS in the following format.

Sl. No.	District	Block	Village	Name of the embankment	Location on the embankment (RD)	Contact person(s)/VLSC	Contact No.



Code of Type of Problem

- Code will be send to the number (56161) to the KEAMS.
- A database of contact numbers of selected persons can be registered in the CP section in EAMS that will help identify the location instantly on receiving messages from any of these.
- On receiving the message the EAMS will generate a gratitude note which the sender will immediately receive.
- The message received from the community will be forwarded to the Executive Engineers (EE) of the respective division.
- Messages received on KEAMS will


बिहार सरकार
जल संसाधन विभाग
तटबंध सम्बन्धित खतरों की सूचि एवं कोड
निम्नलिखित में से किसी भी प्रकार के खतरे की सूचना कृपया 56161 पर SMS द्वारा सूची में दिए गए कोड को पंजीकृत मोबाइल नम्बर से प्रेषित करें।
उदाहरण के लिए 12 नम्बर पर वर्णित खतरों की सूचना को प्रेषित करने के लिए टाइप करें WRD(Space) 4A

Sl.	सुरक्षा संदेशों की सूची	Priority	Code
1.	तटबंध के नदी भाग के ढलान में कटाव हो रहा है तथा ढलान की मिट्टी धंस रही है।	1	WRD 1A
2.	तटबंध में दरार दिख रहा है।	1	WRD 1B
3.	तटबंध पर किए गये सुरक्षात्मक कार्यों में क्षति देखी गई है।	1	WRD 1C
4.	नदी तटबंध के नजदीक पहुँच चुकी है और पास में कटाव एवं धसान हो रहा है।	1	WRD 1D
5.	तटबंध से सुरक्षित क्षेत्र के तरफ का ढलान एवं आस-पास जमीन से जल का रिसाव हो रहा है या बुलबुले निकल रहे हैं।	1	WRD 1E
6.	तटबंध के ऊपर की सतह खराब स्थिति में है और इसके रख-रखाव की आवश्यकता है।	2	WRD 2A
7.	कुछ लोग तटबंध के ढलान (सुरक्षित क्षेत्र के तरफ का) से मिट्टी काट लिए हैं।	2	WRD 2B
8.	नदी तटबंध से लगभग 100 मी. की दूरी पर है इसकी प्रवृत्ति और नजदीक आने की है।	2	WRD 2C
9.	तटबंध पर एक बिता (6 इंच से ज्यादा) के गड्ढे बन गये हैं।	2	WRD 2D
10.	तटबंध पर बर्षा के कारण नालियाँ बन गई है जिसे मिट्टी से भरने की जरूरत है।	2	WRD 2D
11.	तटबंध में जानवरों द्वारा बिल बनाये गये है और इस पर तुरन्त ध्यान देने की आवश्यकता है।	3	WRD 3A
12.	तटबंध पर लोगों ने अवैध स्थल और झोपड़ी बना रखे हैं।	3	WRD 3B
		4	WRD 4A

कार्यपालक अभियंता
वीरपुर डिवीजन-II
सम्पर्क नं:-9473197059

also be forwarded to BAPEPS and State Disaster Management Authority. Action Taken Report on messages received from Community will be uploaded on the page. Community can check these reports on the Community page of the website.

- Information related to flood will be send by the Department to the surveillance committee through KEAMS or by telephone.