

West Bengal Accelerated Minor Irrigation (WBADMI) Project



Participatory Hydrological Monitoring (PHM) Workshop

16-17 March 2015

Venue: Hotel Ratnadeep, Jalpaiguri

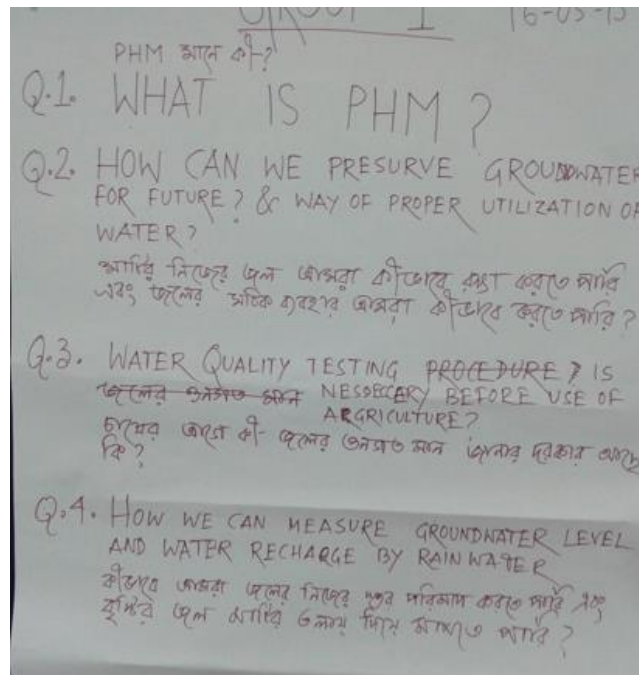
Introduction

Two-day training was organized for the District Project Management Unit (DPMU), Support Organization (SO), State Water Investigation Directorate (SWID), and Water Users Association (WUA) representatives of the Jalpaiguri district unit of the West Bengal Accelerated Minor Irrigation (WBADMI) Project on 16th and 17th March 2015 to introduce them to the concept of Participatory Hydrological Monitoring (PHM) and develop an action plan for PHM implementation. Participants list is enclosed as *Annexure 1*.

Training Objectives

The workshop objectives were:

- Introduce DPMU, SO, WUA representatives to the Participatory Hydrologic Monitoring (PHM) concept;
- Develop a methodology for initiating PHM in select drainage units in Jalpaiguri;
- Needs assessment for implementation of PHM;
- Role of various institutions in the implementation of PHM; and
- Develop an plan for implementation of PHM



Methodology

Group activities, small group discussions, field level interaction, cultural activities towards building an action plan.

Facilitators

Dr.K.A.S.Mani, Dr.C. Konda Reddy, Ms. Debalina Roy Chowdhuri

DAY ONE: 16 March 2015

1. Participants Introductions:

After participants formally introduced themselves, participants were formed into small groups to discuss their expectations from the workshop. The output of that exercise is enclosed below:

Participants Expectations

Group I

- What is PHM?
- How can we preserve groundwater for future through proper utilization of water?
- Is it necessary to test water quality before use in agriculture
- How can we measure groundwater level and recharge by rainwater?



Group II

- Main goal of PHM
- Artificial technique for underground water recharge
- Surface water availability
- Modern techniques of hydrology monitoring
- Selection of crops according to need of water requirement season-wise (except rainy season)
- Hydrological criteria for selection of groundwater scheme
- Technical feasibility of watershed area
- Different techniques of water conservation
- Rules and regulations if any?
- Water quality maintenance in watershed area
- Water quality soil texture and crop-yield relationship

Group III

- Concept of PHM
- How community people manage and monitor ground or surface water level as well as rainfall to get clear knowledge about water availability or budget
- Crop planning pattern matching with water availability
- How scientist/experts share their knowledge with villagers/cultivators?
- Varieties or crops suitable in water-stressed condition

Group IV

- Giving emphasis on rainwater harvesting by minimizing groundwater exploitation
- Cropping pattern according to availability of water (like harvesting vegetables)
- Water budgeting and irrigation schedule
- Controlling increasing salinity caused by over exploitation of groundwater
- Is rainwater sufficient for irrigation?

2. Assessment of Participants Knowledge:

Participants were shown 12 posters, one after the other, along with a question for each poster. Participants were asked to state whether they had a comprehensive understanding of the concept illustrated in the poster and the question. They were asked to share their responses as: 'yes', 'no', and wish to 'learn more'. Here below is an analysis of participants' responses to 12 poster questions. The participant's knowledge gaps were addressed over the two days largely through group activities with nominal guidance from the facilitators



Poster	Know	Do not know	Want to know more
1	0	9	29
2	0		38
3	0		38
4	0		38
5	0		38
6	0	38	
7	0	38	
8	0	38	
9	0		38
10	0		38
11	0		38
12	0		38

3. PHM Concept:

Dr. K.A.S. Mani made a presentation on 'Participatory Hydrological Monitoring'. The key aspects covered in the presentation include:

- What is Participatory Hydrologic Monitoring (PHM)
 - PHM is the first step in a long journey of water users taking ownership of the various technical data collection related to various water use in different schemes and relate it to the overall water availability in the watershed
 - Men, Women, Youth need to volunteer as data collectors
 - Project will provides the necessary instruments, trainings , skills, capacity, records and hand holding support
 - WUA will collect all the required data related to climate, water use, irrigation, cropping, meticulously and put up the data on notice board for all to see for improving water use efficiency and enhance economic output per unit water
 - PHM data need to be discussed by WUA in its meetings and use the message derived from the data for managing the system optimally and thereby improve the sustainability of the water availability in the watershed as a whole
 - WUA shall use PHM data to develop a crop water requirement plan, manage the water distribution efficiently, evaluate the water demands for various cropping system and develop the best water efficient cropping system plan.
 - PHM will provide WUA with knowledge to only manage the available water but to get the best economic return for every drop of water used.



- Basic requirements for implementing PHM
 - WUA should work as a democratic organisation that will provide opportunity to all the members in the different schemes to participate in PHM
 - PHM will look at water as a community resource that needs to be managed together by all
 - PHM involves several activities beginning with data collection, data analysis, estimating water balance, assessing the crop water use, improving water use efficiency and water governance
- PHM
 - All WUA groups part of the same drainage get to know each other
 - Understand the boundary of the watershed and location of each WUA within the watershed (who is upstream and who is downstream)
- Rainfall Data Collection
- Stream Flow Data Collection
- Groundwater Data collection
- Training
- Train WUA to handle technology and share data
- WUA enabled to transform data to information

Based on the presentation the participants appreciated the significance of quantities and values related to rainfall, runoff, water levels, discharge, soil moisture, crop water demand, irrigation losses, crop yields, economic output from unit water. They were eager to get the appropriate tools, skills and training to measure these parameters and make sense of the data gathered.

4. WUA: platform for improving knowledge on local water resources

Konda initiated the discussion on the need for WUA to emerge as a strong democratic institution to work in partnership with GP, SO and other local bodies for effective implementation of PHM.

Discussion on the topic was initiated using the following points:

Critical Role of WUA in Project

- Composition
- Social groups representation amongst WUA Office bearers, executive committee and sub-committees
- WUA – democracy
- WUA: scope of work
- WUA Capacity Building & ongoing assistance



Later, participants worked in small groups to discuss the following questions:

- How do you ensure that all social groups (marginal groups, women and youth) are adequately represented in WUA, amongst its office bearers and committees?
- How are the WUA office bearers and members of Executive Committee and Sub-Committees chosen? How can the democratic processes in WUA be strengthened?
- What should be the WUA's scope of work (responsibilities) for effective management of the irrigation scheme?
- What additional capacities need to be built for WUA to manage the irrigation scheme effectively? What kinds of ongoing assistance will WUA need for effective management of the irrigation scheme?



Following are the outputs of the group discussions:

Group – 1

- 1) Awareness generation among the community about WUA
- 2) To select local marginal Farmers, young, and women through discussion
- 3) Division of responsibilities
- 4) To involve local social workers, ICDS workers, teachers, ASHA worker etc. into the WUA

Group – 2

- 1) To increase the number of members of WUA
- 2) To ensure the regularity and participation of the members in the meeting.
- 3) Should have some educational background and leadership quality
- 4) Well known and respectful persons are welcomed in WUA
- 5) To give importance to every words as well as opinions of the each and every members.
- 6) Have to discuss on every work in meeting
- 7) Transparency in all sections is required



Group – 3

1. Identification of Human Resource and Distribution of responsibilities.
2. Induce knowledge and capacitate the WUA members/ community on importance of Hydrology monitoring
3. Handling of Technology, data collection, analysis and sharing

Group – 4

- 1) Additional capacity
 - a) Capacity building on PHM
 - b) According to the cropping programme, awareness programme have to be organized.
 - c) Women participation should be 50%.
 - d) Utilization of corpus fund.
- 2) On-going Assistance
 - a) Community hall
 - b) PHM equipment
 - c) Operation & maintenance knowledge on machine
 - d) Display Board including Map & Cost

5. Role of Surface Water and Groundwater in Economic Development:

Dr. K.A.S. Mani made a presentation on 'Role of Surface Water and Groundwater in Economic Development'. The key aspects covered in the presentation include:

Surface water

- Surface water is contributed by rainfall
- Surface Water occurs on land surface in streams, ponds, lakes, rivers.
- Surface Water is visible can be measured, can be stored in reservoirs and shortages can be anticipated in advance
- Surface-water movement is controlled by rainfall intensity, topography, soil, vegetation, rock types.
- Surface water can cause floods, can be easily polluted, is exposed for evaporation, and transferred to another place using various technologies.



Role of Biomass, vegetation, Forest cover, in the flood management in Jalpaiguri

Groundwater

- Ground water is contributed by rainfall, seepage from surface water, irrigated area
- Surface Water occurs within the ground in aquifers at various depths
- Surface Water is invisible can be measured indirectly, is stored in aquifers and shortages cannot be easily anticipated in advance
- Groundwater movement is controlled by rainfall intensity, topography, soil, vegetation, rock types.
- Groundwater can cause water logging, water quality issues (Arsenic, Fluoride, Iron etc.) bring in land sea water, vulnerable to contamination, can be easily polluted, is not exposed to evaporation, and cannot be easily transferred to another basin which is not their natural flow path.
-



Use of kettle as an example for understanding the flow system from Jalpaiguri to Bay of Bengal

Discussion Questions

- How will you choose which water resources (surface water or groundwater) are to be used for developing minor irrigation?
- What are the sequence of steps to be taken for constructing a lift irrigation scheme?
- What is the sequence of steps to be taken for constructing a check dam?
- What is the sequence of steps to be taken in the construction of dug well and tube well?
- What are the steps to be taken by WUA for ensuring any scheme is constructed properly?

DAY TWO: 17 March 2015

6. Field Visit

Participants visited Uttar Khalpar mouza in Mal Block to interact with Uttar Khalpara Nayanmoni Water Users' Association and observe the Shallow Tube Well irrigation schemes. Participants worked in small groups and used the following questions to guide their field visit interactions

1. Infrastructure

- a. Type of Scheme
- b. Stage of Scheme

2. Command Area

- a. Command Area Extent
- b. Livelihood Activities – agriculture, fisheries, others



3. WUA Formation and Representation

- a. WUA Formation Stage: Executive Committee, Office Bearers, Sub-Committees, Membership fee collection, Corpus, Water Charge
- b. Representation of diverse groups in WUA
- c. How were WUA Office Bearers, members of Executive Committee & Sub-Committees, etc. chosen?



4. WUA Scope of Work

- a. WUA Current Activities
- b. WUA members/office bearers understanding of WUA Scope of Work

Following the field visits, participants worked in their respective groups to discuss and document their field visit observations. A simple framework guided participants' discussions —‘what was good?’ and ‘how to improve?’ Here below is the summary report of their observations:

Group – 1

What is Good	How to improve
<ol style="list-style-type: none"> 1. Women participation in WUA is apparently good (15%). 2. Young representatives in WUA are also good. (40%) 3. Single cropped land becomes double or triple cropped land using the irrigation facilities. 4. Record Keeping is good 5. Almost all the members have clear idea about ADMI project. 	<ol style="list-style-type: none"> 1. Through continuous discussion amongst women and also men, women participation have to be increased (At least 50 %.) 2. Preference should be given to young members in Executive body and sub-committee. 3. Through awareness generation member's participation in monthly meetings has to be increased. 4. To increase productivity of fertile land, new/improved technology to be introduced.

Group – 2

What is Good	How to improve
<ol style="list-style-type: none"> 1. Agricultural activity through minor irrigation is apparently good. 2. Crop planning exists. 3. Members are paying subscription regularly. 4. Members are attached to social activities. 5. Participation in regular meetings is good. 	<ol style="list-style-type: none"> 1. To provide training on different agricultural practices (composite farming) 2. To encourage the women for participation/joining in WUA. 3. Committee reshuffle/re-organize through monitoring & evaluation of works. 4. To assist committee through identifying suitable water area for fisheries purpose. 5. To make platform for tube wells and increase the height of the pipes.

Group – 3

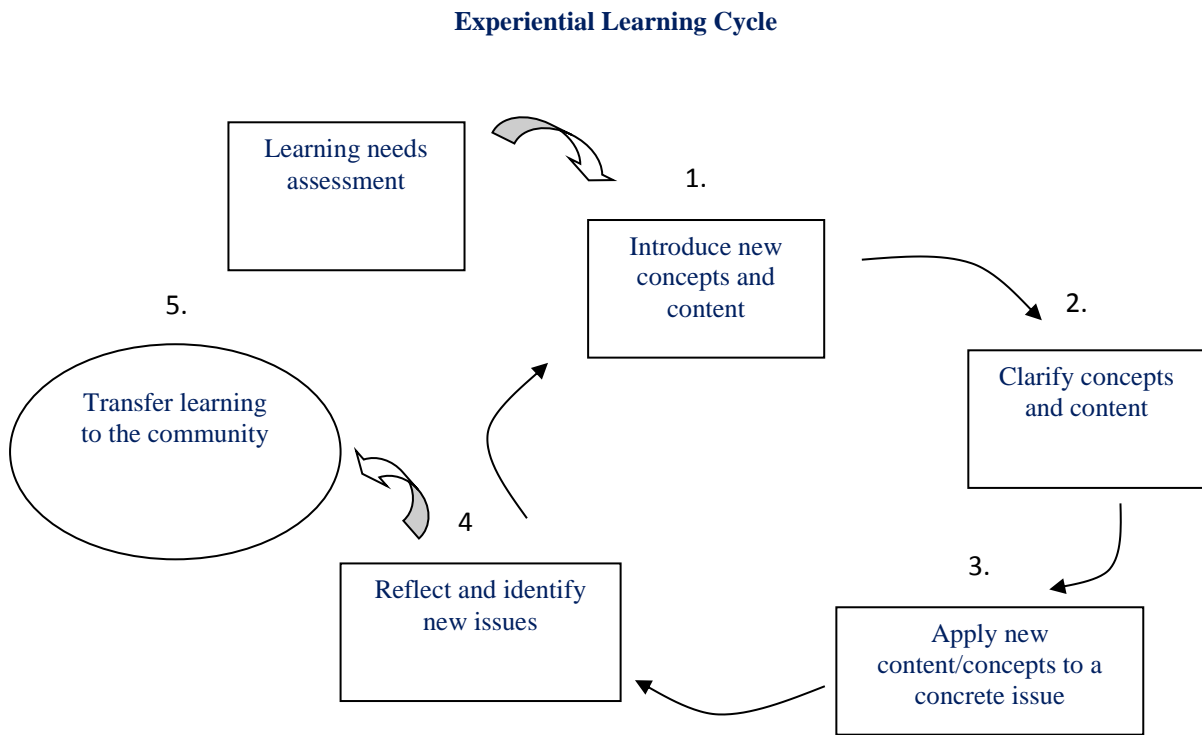
What is Good	How to improve
<ol style="list-style-type: none"> 1. Participation of the members of the WUA. 2. Water aquifer is good 3. Agriculture practice is very good 4. Application of organic fertilizers and pesticides 5. Adoption of new technologies. 6. Presence of diverse community in the WUA 	<ol style="list-style-type: none"> 1. Improve women participation through mass awareness programme. 2. To create awareness on organic farming & new technologies through FFS etc. 3. Identify human resources & train them to improve the capacity of the community.

Group – 4

What is Good	How to improve
<ol style="list-style-type: none"> 1. Mutual understanding amongst the WUA members. 2. Following SRI culture methods. 3. Variety of crop cultivation 4. Collection of membership fees. 	<ol style="list-style-type: none"> 1. SRI method should be followed in a proper way. 2. Women participation should be increased. 3. Fishery activities should be increased. 4. More precautions must be followed to maintain the structures 5. Intensification of monthly meeting.

7. Experiential Learning Processes

Participants were introduced to the concept of experiential learning processes using a pictorial representation of experiential learning cycle. The summary of the points presented is as follows:



Learning needs assessment:

- The learning process is preceded by a *learning needs assessment*.
- It is conducted to determine the types and levels of learners' needs concerning a given issue or topic.
- Through this assessment, we can find out "where the learners are".
- This is the crucial starting point of all our education programs

Step One: Introduce new concepts and content:

- This first step starts with learners where they are
- It starts with a discussion that brings out their level of familiarity and knowledge, both correct information and incorrect information about the new content being presented.
- This first step is typically introduced through a guided group discussion where the facilitator uses one of a variety of participatory teaching aids— for example, visuals that are related to the topic under discussion, a role play, or a demonstration

Step Two: Clarify concepts and content:

- The facilitator provides clarification (reinforces right information and corrects misinformation) on views that participants have expressed and presents "new information" on the content or concept.
- Learners discuss how the new information introduced about the topic/concept can help improve the existing situation. They discuss, as well, how these changes could be recognized in their lives and in their communities.

- At the same time, they begin discussing what resources are available locally to assist individual learners and the group or community in addressing a specific problem and how one could access those resources.

Step Three: Apply new content/concepts to a concrete issue:

- Participants are provided with an opportunity to apply what they have discussed and learned in the first two steps to a concrete development issue in their immediate environment.

Step Four: Reflect and identify new issues:

- In this step, the facilitator organizes an activity or set of activities that help learners individually and collectively reflect on and assess what they have learned and how the learning activities have helped them achieve the goals (indicators of change) identified during the third step of the learning process.
- At this point of the process learners are engaged in the identification of new learning needs that have emerged as a result of past learning and the application of that learning to specific development issues.

Step Five: Transfer learning to the community:

- This community outreach and education activity is an IEC¹ activity, in which the program participants themselves disseminate the "message" to a broader spectrum of the community.
- In taking this approach, we are taking a critical step in helping build the sustainability of educational activities at the community level as well as transferring learning abilities to others in the community.

Later, participants worked in their small groups to design an intervention strategy for one of the issue/s identified under ‘how to improve’ from their field visit discussions. The outputs of those discussions are enclosed below:

Group : 1

Need assessment: Requirement of improved technology for cultivation

1. Agriculture income is gradually decreasing day by day with increase of family members as the land is being split. Conduct Awareness building campaign among community and start discussion with the community to overcome the problem.
2. Through discussion community will realize the need of new/improve technologies to improve the productivity.
3. Implementation of new/improved technology
4. Identification of gap of new technologies after implementation as well as start searching for more and other improved technologies.
5. Conduct mass campaign for neighbouring villagers to share the information about implementation of new/improve technology and its result.

Group : 2

Need Assessment : There is no concrete platform of STW(D) structure

1. The STW pipe may be polluted by the contaminated water during rainy season.
2. Not visible during the rainy season as low head shallow pipe may be submerged
3. Shallow pipe may be blocked by children throwing obstacle into the pipe
4. It is difficult to install/set pump set as there is no concrete platform.

Group : 3

Need assessment :

1. Improper SRI practice.
Find out / clarify the problem through discussion, poster.

¹ “Information, Education and Communication” (IEC) means a comprehensive, multi-media and participatory approach to disseminating information.

2. Introduction of proper SRI method.
Discussion/Clarification.
Training.
DC.
Local Resources.
3. DC implementation.
4. Transfer / Introduce in community.
5. Analyse the result.

Group : 4

Need assessment :

1. Increase women's participation.
2. Awareness programme.
Women are more responsible.
Time save of other.
3. Giving them more responsibility.
Play (local play / drama co.)
4. Community acceptance problem.
New idea helps woman to share idea as well as increase ability.
5. Transfer learning to community.

8. Identification of area//s for launching PHM

Participants discussed the utility of PHM, the potential area for implementation and the way forward. Following are the outputs of the discussion on 'identification of area/s for launching PHM:

Slogan for PHM pilot

- Water Availability Linked Utilization
- Measure to Manage
- Assess Value of Every Drop of Water



PHM Outcomes (anticipated)

- Prevent water abuse
- Add to the knowledge
- Understand economic value of water
- Monitor water quality
- Treat water as a common property resource

Reasons why PHM should be initiated in Jalpaiguri District

- Geographical advantage—foothills of Himalayas
- Diversity in the community
- Large forest area
- Adequate rainfall
- Ridge portion
- Water recharge is high
- Largest number of WUAs

Scheme Details of Jalpaiguri (110 schemes)

- 60% shallow tube wells (Mal, Alipurduar, Sadar, Dhupguri, Falakata)
- 30% Pump-dug wells (Metali, Falakata, Kumargram)
- 10% MDTW & RLI (Maynaguri, Dhupguri)

Reasons why PHM should be initiated in Mal Block, Jalpaiguri District

- Huge number of schemes
- Active WUAs
- Watershed boundary available
- Favourable geographic conditions
- Irrigation has led to farmers moving from single crop to multiple crop-seasons
 - Kharif – paddy
 - Rabi – vegetables, potato, and wheat
 - Pre-kharif – jute and nut

9. Activity Plan for Implementing PHM Pilot in Mal Block Jalpaiguri

Participants developed a plan for initiating PHM pilot in Mal Block of Jalpaiguri district. Here below are the list of activities and a plan for taking this forward.

	Activity	Plan
1	Exposure Visit to Andhra Pradesh	One more Additional visit
2	Training Workshop	Design and implement similar PHM orientation training in all habitations
3	Selection of Area /schemes for Implementation	Mal Block
4	Develop Hydrological Unit map/ schemes wise map and carry out all technical analysis.	GIS analysis by SPMU
5	Use Kalajatha (cultural team) and develop different PHM theme skits	Kalajatha theme to be developed by SPMU and message passed to DPMU
6	Introduce PHM concept in different WUA through Kalajatha	DPMU /SO to take Kalajatha to community
7	Identify volunteers in each scheme, sub project	Two volunteers for data recording; two for data dissemination; and two for data analysis.
8	Train WUA in conduct of meetings, recording minutes, approve resolutions, gender mainstreaming and finance management	Conduct training for WUA Executive Body by the SO

	Activity	Plan
9	Identify sites for establishment of PHM stations	
	1. Rain gauge (9 non-automatic rain gauges)	Identification of site (without any obstruction, preferably non-agriculture land); agreement on land provided for establishment of rain-gauge station , agreement with GP to take ownership of the infrastructure;
	2. Stream gauge (1 automatic and 2 non-automatic)	One for each watershed (automatic); and one for each RLI scheme in the watershed (non-automatic);
	3. Groundwater discharge (180 flow gauges, 180 gate valves, 9 drums, 9 stopwatches)	Identify the proper location for discharge measurement
	4. Water quality kit /testers (9)	Ownership of GP
10	Train Volunteers in Data Collection	Training by SO
11	Procure PHM data monitoring equipment's	By SWID (9 non-automatic rain gauges, 1 automatic and 2 non-automatic stream gauges, 180 flow gauges, 180 gate valves, 9 drums, 9 stopwatches, 9 water quality testers)
12	Install PHM data monitoring stations	By SWID, DPMU, and SO
13	Initiate PHM data gathering, disseminate results	SO & WUA
14	Conduct Farmer Water Schools	Integrate PHM into FFS curriculum
15	Implement scheme wise data analysis, data interpretation and convert data to knowledge for practice	FFS curriculum will look into: water audit, improved water-use efficiency, increased economic output per unit water, and upkeep and monitoring of the schemes.
16	Implement scheme level water audit, water use efficiency, integrated crop system and improve output per unit water	SO & WUA
17	Conduct Crop Water Budgeting Workshop at watershed scale (federation of WUA)	Federation of WUA, upscale the study to watershed level.

10. Participants Feedback

Participants were asked to mark their feedback on their experience in the workshop as 'like, 'ok', 'fair', and 'didn't understand'. Here below is a summary of participants' responses:

Like	OK	Didn't Understand
19	13	0

11. Distribution of Certificates

Participants were given participation certificates at the end of two-day training workshop.



Annexure 1: Participants List

S. No.	Name	Designation & Department
1	Mr. Sanjiv Ranjan Chakraborty	DPD (Tech.) Jal.-DPMU & SE (A-M), Siliguri Circle
2	Mr. Subrata Mitra	E.E. (A-I), Jalpaiguri SWI Div.-IV & D.O., Jalpaiguri DPMU, WBADMIP
3	Mr. K.A.S. Mani	World Bank Consultant
4	Mr. C. Konda Reddy	World Bank Consultant
5	Mr. Dherya Kumar Roy	MIS Manager, SPMU, WBADMIP
6	Ms. Debalina Roy Chowdhuri	ID Coordinator, SPMU, WBADMIP
7	Mr. Shamik Chatterjee	Geologist, Jalpaiguri SWID
8	Mr. Arun Barman	A.E.(A-I), SWI Div.-IVA, Jalpaiguri
9	Mr. Supriyo Gupta	A.E.(A-I), I&P Sub-Div., Jalpaiguri
10	Mr. A.R.Mallick	A.E.(A-I), SWI Div.-IVB, Coochbehar
11	Mr. Himangshu Das	SAE, SWI Division-IV, Jalpaiguri
12	Mr. Rajesh Agarwalla	SAE, SWI Div.-IVA, Jalpaiguri
13	Mr. Subhash Kundu	SAE, I&P Sub-Div., Jalpaiguri
14	Mr. Padmalochan Roy	SAE I&P Sub-Div., Jalpaiguri
15	Mr. B.N.Bandashu	Head Clerk, SWI Division-IV, Jal.
16	Mr. Krishanu Ghosh Choudhury	Surveyor, I&P Sub-Division, Jal.
17	Mr. Nikhil Ranjan Dey	Surveyor, SWI Division-IV
18	Mr. Subhendu Pramanik	P.C., Jalpaiguri DPMU, WBADMIP
19	Mr. Subhankar Chakraborty	P.E., Jalpaiguri DPMU
20	Mr. Sayak Basu	Env. Specialist, Jalpaiguri DPMU
21	Mr. Pranjal Pratim Goutam	Fish. Specialist, Jalpaiguri DPMU
22	Ms. Dola Guha Neogi	Agri. Specialist, Jalpaiguri DPMU
23	Mr. Amaln Dutta	Database Manager, Jalpaiguri DPMU
24	Mr. Sayak Basak	Surveyor, Jalpaiguri DPMU
25	Mr. Jyotirmay Datta	SAE, DPMU-Jalpaiguri
26	Mr. Saikat Patra	SAE, DPMU-Jalpaiguri
27	Mr. Sourav Kumar Basu	Office Assistant, DPMU-Jalpaiguri
28	Mrs. Chandrima Chakraborty	T.L., Hijli Inspiration S.O. of Jal-DPMU

S. No.	Name	Designation & Department
29	Dr. Sudhish Chandra Chowdhuri	Agriculture Expert, Hijli Inspiration S.O. of Jal-DPMU
30	Mr. Prafulla Roy	SAE, S.O. of Jal-DPMU
31	Mr. Puspendu Sinha	Office Manager, S.O. of Jal-DPMU
32	Mr. Raju Kheriya	Secretary, Salabri Paschimpara WUA
33	Mr. Ranjit Oraon	C.W., Matiali Block
34	Mr. Bulu Roy	C.W., Matiali Block
35	Mr. Babul Roy	C.W., Sadar Block
36	Mr. Jaydeb Ch. Sarkar	C.W., Sadar Block
37	Ms. Ajifa Kahtun	Dakshin Dhupjhora kishanbandhu WUA
38	Mr. Sukumar Roy	Samaj Kalyan WUA
39	Mr. Hapna Mardy	Uttar Khalpara Nayanmoni WUA
40	Mr. Jogen Sarkar	C.W., Mal Block
41	Naba Kanto Roy	Secretary, M.B.V.N. WUA
42	Mr. Bharat Barai	Secretary, Upojona WUA
43	Ms. Dipali Barai	Upojona WUA
44	Mr. Sunny Deol Oraon	Matiali Block
45	Mr. Khudiram Roy	Mathachulka Krishi Kalyan WUA