DRINKING WATER FOR THE LAST PERSON

A programme of capacity building on rural drinking water supply

August – September 2011
Jharkhand

Centre for Science and Environment

For State Water and Sanitation Mission, Jharkhand

Contents

1. EXECUTIVE SUMMARY

Following the release of the new guidelines of the Department of Drinking Water and Sanitation (DDWS), the Jharkhand government has committed to provide all villages with sustained access to potable drinking water. The new guidelines called the National Rural Drinking Water Programme makes a break from the past in several ways. It calls for deeper involvement by the communities through the Panchayati Raj system and has made improved norms in terms of quantity and quality of water to be supplied. It also has the ambitious aim of 100% coverage of piped water supply.The most important point is the stress on ensuring sustainability of water supply system as a whole. There is an emphasis on rainwater harvesting and recharging to ensure sustainability of groundwater resources as also to switch over to conjunctive use surface and ground water.

As part of the endeavour to set in motion the implementation of these new guidelines, the Jharkhand State Water and Sanitation Mission supported training workshops for PHED engineers, PRIs and NGOs on building sustainability into the water supply systems. These are significant pointers to the way the government of Jharkhand is thinking in terms of institutional structures at the village level for giving effect to participatory management.

In August- September, 2011, 157 participants (40 PHED engineers, 48 panchayat heads, 40 NGO representatives and 29 plumbers and masons) took part in 4 workshops. The objective of the trainings was to demystify some of the aspects of the new guidelines, which aim for universal coverage by March 2012. An important component was to create an understanding of the need to prepare Village Water Security Plans.PHED engineers, panchayat heads and members, NGO representatives and plumbers and masons were trained to understand the availability, demand and usage of water by designing a sound village water security plan.

The training workshops for engineers exposed them to knowledge of new and old ways of ensuring sustainable water supply and gain new perspectives about how communities can be involved in creating a village water security plan for themselves. Workshops for NGOs brought together experiences of successful NGO efforts in water supply and sanitation and those for PRIs put them through the rigor of preparing Village Water Security Plans. Workshops were also conducted for plumbers and masons to give them hands on training on constructing rooftop rainwaterharvesting structures.

Speakers were selected to present diverse initiatives in field of rural drinking water supply like source sustainability, hydrogeology and groundwater recharge, old and new technology to monitor and mitigate water quality and community involvement for developing water security plans. The idea was also to present insights into the main components of the new drinking water supply programme guidelines through case studies. Field exposures were also included in every workshop for a deeper understanding of issues.

The venue selected for the training programmes was Viswa Training Centre, Ranchi. Workshops were conducted in August and September,2011.

2.TRAINING AGENDA

The agenda was designed in a way to present various aspects of water management and community participation including:

- Policy framework
- Assessing availability, need and planning a sustainable village water security plan
- Traditional methods of water harvesting and watershed management
- Scientific principles for water sustainability

The lectures revolved around case studies of community involvement and rainwater harvesting which were supplemented by technical lectures on the science of hydrogeology and recharging. The workshopssaw a mix of audio visuals (power point and videos), visual aids (posters), group discussions, practical exercises and lectures.

The field visits were selected to explore suitable measures for water supply in water-stressed areas. Problem villages were selected in different blocks to give the participants a hands on exercise to collect data to prepare village water security plan and also understand successful practices. Places were also selected to show community work, various ways to harvest and store rainwater for irrigation purpose.

Participants received a workshop folder containing material like a technology booklet (based on water conservation and recharge technique), urban rainwater harvesting manual (based on rooftop rainwater harvesting technique), *Dying Wisdom*: *Rise, fall and potential of India's traditional water harvesting systems : The Fourth State of India Environment Report*(based on Traditional water harvesting system in India),*Down to Earth* (an environmental fortnight magazine), success story brochures, maps, printed and soft copy of the presentation in CD, folder (writing pad, graph & tracing paper, pencil, pen, sharpener, eraser, scale), etc.

The literature developed by CSE (*Dying Wisdom: Rise, fall and potential of India's traditional water harvesting systems: The Fourth State of India Environment Report, Urban Rain Water Harvesting Manual (hindi) and Technological Database of Rural Rain Water Harvesting in India) was* also given to all the participants.

3. BACKGROUND AND OBJECTIVES

In April 2009, the Department of Drinking Water and Sanitation (DDWS), Ministry of Rural Development released the new guidelines for rural water supply namely the National Rural Drinking Water Programme (NRDWP). These guidelines reflect a change in the philosophy and implementation strategy from the previous programme. The aim is to provide safe and adequate water for drinking, cooking and other domestic needs on a sustainable basis to every rural person by 2012. Major emphasis has been on ensuring sustainability of water availability in terms of potability, adequacy, convenience, affordability and equity while also adopting decentralised approach involving Panchayati Raj Institutions (PRIs) and community organisations. The new paradigm means going beyond providing water to habitations- it takes a holistic view of rural drinking water supply.

In order to achieve this goal, DDWS has charted a course for itself. Under the new paradigm the PHED will play a much larger role in the community and have diverse responsibilities such as:

- ensuring source sustainability through catchment's protection,
- rainwater harvesting and recharging,

- encouraging conjunctive use of surface and groundwater,
- ensuring water quality as per prescribed standards,
- ensuring system sustainability through a system of monitoring and periodic checks,
- involving the community at every step of water supply including financial contributions

CSE has been nominated as a Key Resource Centre by DDWS to undertake activities of research, training and awareness creation. As part of this initiative, CSE will conduct a series of training programmes for PHED engineers, panchayat officials, NGOs. These programmes will cover issues of source and system sustainability, community involvement and water quality. The training workshops for engineers aim to expose them to knowledge of new and old ways of ensuring sustainable water supply, plan for sanitation, and gain new perspectives about how communities can be involved in water supply. Workshops for NGOs will bring experiences of successful NGO efforts in water supply and sanitation and those for PRIs will put them through the rigour of preparing Village Water Security Plans.Workshops were also conducted for plumbers and masons to give them hands on training on constructing urban rainwater harvesting systems.

4. ABOUT CSE

The Centre for Science and Environment (CSE) is a public interest research and advocacy organization based in New Delhi. The Centre researchers into, lobbies for and communicates the urgency of development that is both sustainable and equitable.The Centre's work over the past 20 years has led it to believe and argue, both nationally and internationally, that participation, equity and community-based natural resource management systems alone will lead the nations of the world towards durable peace and development.

Though the public awareness programmes of the Centre have been its key strength and focus of work, it has endeavored to move into associated areas of work like policy research and advocacy in the past years. Our aim is to raise these concerns and to participate in seeking answers and more importantly, in pushing for the answers to become policy and then practice. Learning from the people and from the innovations of the committed has helped the Centre to spread the message regarding the environment without its normal association with doom and gloom. Rather, the effort of the Centre is to constantly search for people-based solutions and create a climate of hope.

5. TRAINING WORKSHOP WITH PHED ENGINEERS

5.1. Inaugural Session

The training was inaugurated by Shri Sudhir Prasad, Principal Secretary of Jharkhand's Drinking Water and Sanitation Department. In his inaugural address Shri Prasad urged the engineers to craft new ideas that would be both innovative and applicable to the areas they work in. He stressed that as they all are the protocol authority, they face the responsibility to think from scratch. Thus, an engineer's accountability lies not just in planning and budgeting but also in implementation and monitoring of plans. He also talked about village community and powers that a panchayat holds. Stressing the importance of the leaders and mukhiyas he stated that their role is to communicate the requirements of people and make appropriate plans for their welfare. Shri Shardendu Narayan, Chief- Engineer cum Executive Director of Jharkhand's Drinking Water and Sanitation Department talked about newer applicable technologies and stressed on the importance and need to embark on rainwater harvesting in Jharkhand on a large scale.

Shri Sudhir Prasad, Principal Secretary, DDWS, Jharkhand speaking at the Inauguration ceremony.

5.2. Modules of the training programme

5.2.1. Managing India's water resources: Past, present and future

Objective: *To identify and prioritise key challenges in the area of water supplies and identify appropriate strategies and solutions.*

The participants were divided into four groups. Pre- arranged questions were given out and asked to rate them to understand which aspect is starkly affected and needs attention. The key challenge was to prioritise and then make appropriate strategies to address the issues.

The questions were related to:

- Water supply in your block/district, house
- Water quality in your house, district
- Rainfall in your district
- Water demand planning in your house, block/district
- Source sustainability
- Sewerage system in your house, district
- Sanitation

Conclusion

Water supply is usually a combination of pipe water and ground water extraction in urban areas where the daily average time for supply is around 8 hours (twice a day). Rural areas see a mix of wells, *jharnas* and groundwater usage (through bore-wells). Issues regarding quality brought to notice the high presence of iron, fluoride, arsenic and nitrate in almost all districts. For supply and usage purpose the State's lab tests the samples. Most houses have commercial filters like aquaguard and reverse osmosis (RO) for their usage. The water demand varied largely from 60 -300 LPCD in different districts. The groundwater table has steadily declined in the last decade by a few meters. For recharging the sources to ensure sustainability various practices like afforestation, prevention of cutting down trees and groundwater recharge are done. Some districts had already handed over the hand pump system to the panchayats even though they

were still assisting them with maintenance work. Maintenance work was seen as the major reason for breakdown of hand pumps in villages. Rainwater harvesting is not very popular but the participants stated that they would like to adopt the practice for future. The Total Sanitation Campaign (TSC) has not been seen as successful at all. A change in the mindsets of people and communities is required in addition to providing infrastructure.

5.2.2. Rural drinking water supply and sanitation: Policies and perspectives

Objective:*To inform participants about new policy developments andto provide an understanding of the linkages between water quality, sanitation and health.*

This session began with Dr. T. K Das from the Department of Drinking Water and Sanitation talking about future strategies that are currently being shaped with the aim of universal coverage of drinking water and sanitation. Highlighting major policy shifts,he talked of 100% coverage through piped supply for rural areas. He also spoke of new measures for improving sanitation coverage. He emphasized on the new emphasis on coverage of vulnerable communities, minority districts, and people living HIV / AIDS, remote and difficult areas.

Dr. Nitish Priyadarshi of Ranchi University broadly outlined issue of quality and toxins in groundwater. He also acquainted the participants with the formation of groundwater and the various ways in which it gets contaminated through surface as well as sub-surface sources. Contamination caused by arsenic and fluoride was discussed in detail with case studies from across the state. He concluded his presentation by stating that rainwater is devoid of such contaminations and stressed that one must catch rainwater wherever it falls, as it is safe. The participants talked about their districts and the issues they faced in detail.

The next presentation by Mr. Somnath Basu from Unicef who stressed the need for continued mobilisation and communication activities to enable mindset and behavior change for improved sanitation in Jharkhand.

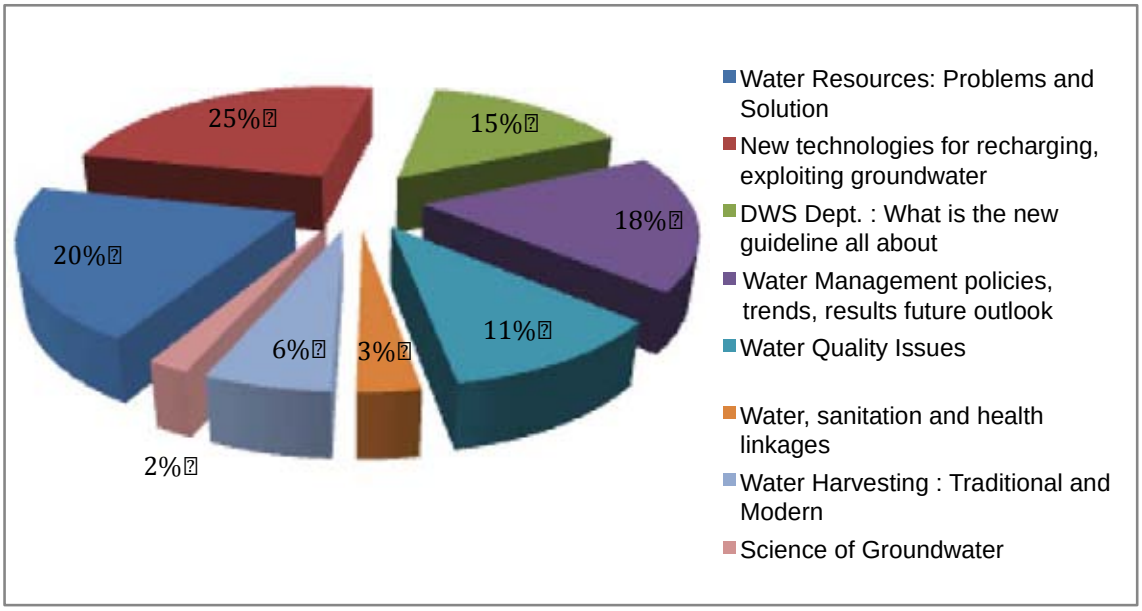
Mr. Somnath Basu addressing the participants on 'Water, sanitation and health: The full cycle'

Quick evaluation

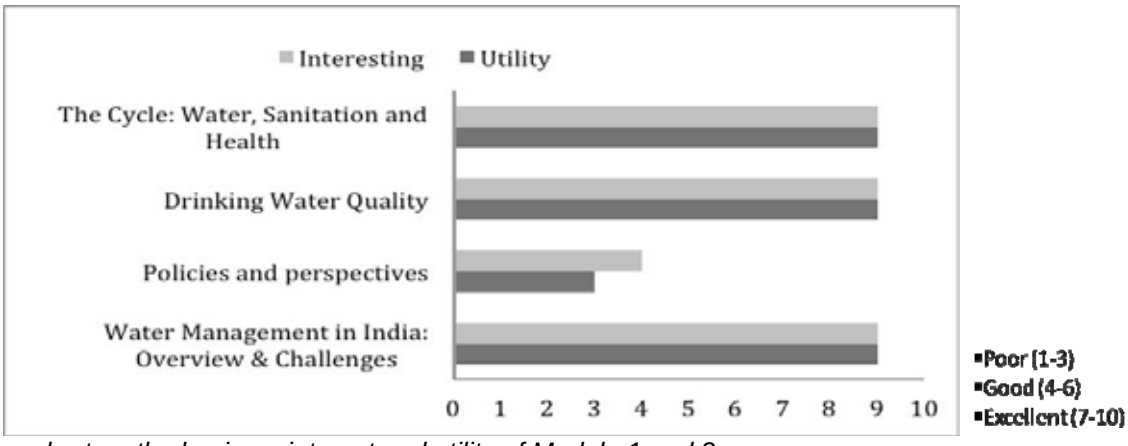
At the end of the day, a quick evaluation was conducted by the participants on the sessions for the day.

Morning sessions on expectations and Jharkhand's water problems: Participants were asked to prioritise the areas in which they were keen to grow their knowledge and understanding within these issues. The categories of new technologies and water quality issues were highly rated.

Water Issues in Jharkhand: PHED Engineer's view



Afternoon sessions on policy, quality and sanitation issues: While the participants found the presentations on Water, Sanitation and Health: The full cycle, Water Quality and Water management in India to be extremely useful and interesting, they felt much was left uncovered when it came to the Policies and Perspectives.



Evaluation chart on the basis on interest and utility of Module 1 and 2

5.2.3. Catch water where it falls

Objectives: *To impart an understanding of India's rich traditions in rainwater harvesting and utilisation of the wisdom to solve modern day urban water scarcity problems*

This session saw lectures and presentations by Ms Gita Kavarana from CSE. The first lecture provided an overview of technologies and traditions of rainwater harvesting for drinking, domestic and agricultural use. Water management strategies, availability of annual rainfall and groundwater and the state of major rive in urban areas wassome of the components discussed in detail. The presentation brought forth the challenge of the growing demand, decreasing availability, costs involved and changes made in water policies over the years. It concluded with a case study that demonstrated how a village overcame all these issues by appropriate planning and rainwater harvesting.

Another lecture gave insights on the principles of urban rooftop water harvesting. The essential elements, collection of key data for planning and general information regarding rainwaterharvesting were discussed in detail. Studying site plans for planning and designing structures were significant parts of this presentation.

5.2.4. Science for Sustainability

Objective: *To provide an understanding of the scientific principles that would help build drinking water sustainability through harvesting and recharging groundwater.*

The next session was revolved around science for sustainability. Dr. Nitish Priyadarshi talked about hydrogeology and groundwater management. His lecture revolved around distribution and movement of groundwater in soil and rocks of aquifers. While discussing the situation of Ranchi specifically he mentioned that groundwater recharge takes place through vertical percolation of rainwater. Although the city experiences about 1000 to 1200 mm rainfall annually, the percolation is hindered by the presence of highly weathered and metamorphosed rocks. The increasing demand for water has created the realization that vast underground reservoirs formed by the aquifers constitute invaluable water storage facilities, their proper management, therefore, has become a matter of considerable interest. Thus, before groundwater is developed in a basin, an investigation of ground water resources should be made like topographic data, geologic data, hydrologic data etc.

Mr. R.S. Bharadwaj from Madhya Pradesh's Council of Science and Technology talked about convergence of technologies for drinking water sustainability. He talked of using remote sensing acquisition of information about an object or phenomenon, without making physical contact with the object through GIS. It can easily capture, store, manipulate, analyze, manage, and present all types of geographically referenced data.

Dr R S Bharadwaj interacting with participants on 'Remote sensing and GIS mapping for water resources'

The technology can be used for mapping geomorphology, geology, structures and lineaments and hydro geomorphology. This helps to envisage demands and supplement it with conservation practices whichwould help in narrowing down difference between demand and supply and for future storage. This would also enable water resource action plan maps with suggested water harvesting structure and artificial recharge sites. He also presented various images of Bhopal to show a case study and explained the images.

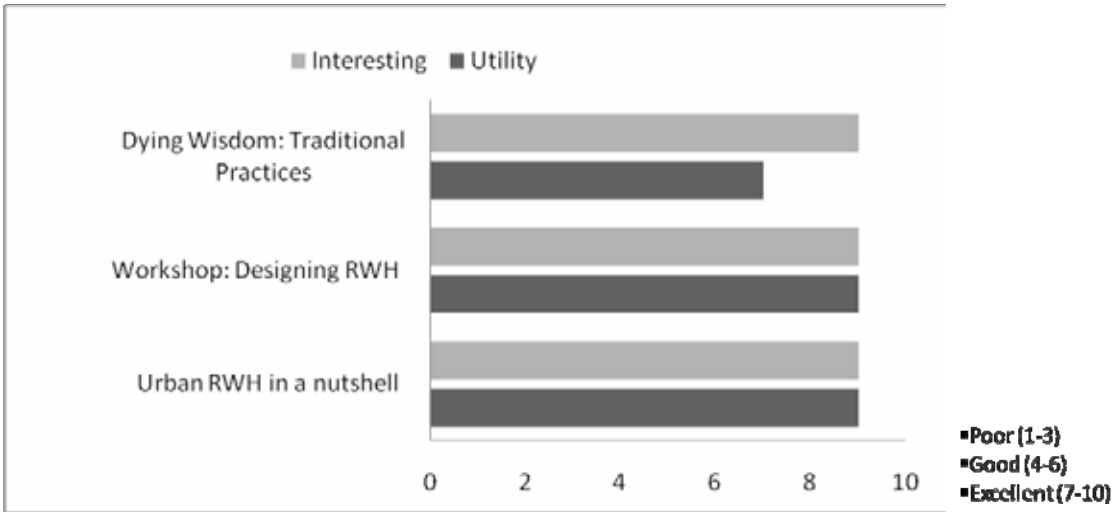
Following this was a practical exercise on planning for water harvesting structures under different hydro-geological conditions. Dr. Devdutt Upasani from Pune University conducted a session on drainage analysis procedure that would help in the selection of on-surface water harvesting interventions and groundwater recharge interventions. This was followed by a presentation on the importance of groundwater. Different types of aquifers and how the relationship between them and watersheds must be understood was discussed in detail.

Dr Devdutt Upasani conducting practical session on drainage analysis

Quick evaluation

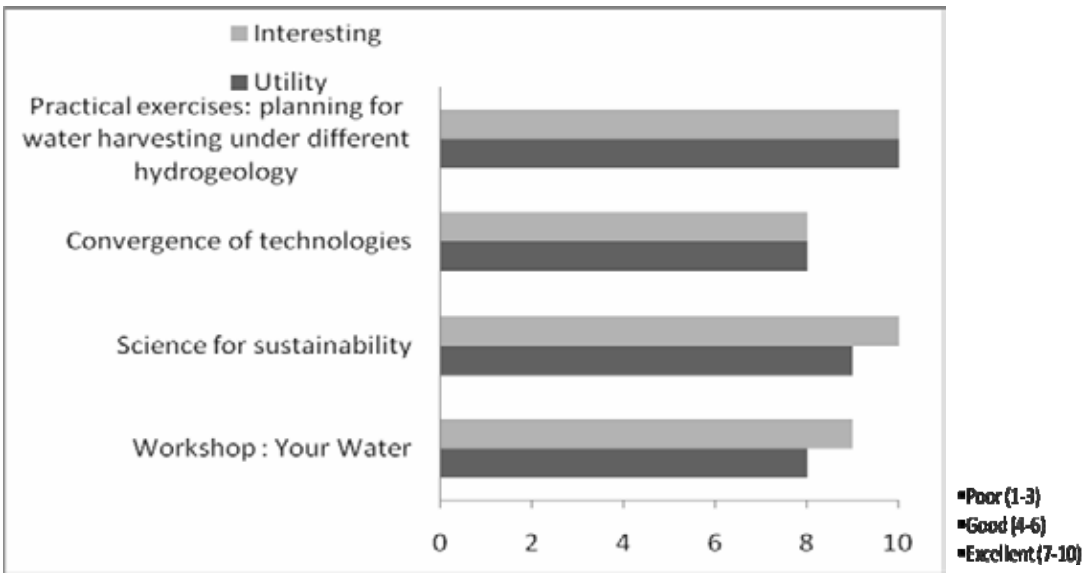
At the end of the day, a quick evaluation was conducted by the participants on the sessions for the day.

Sessions on source sustainability: These presentations were very well received in terms of both utility and interest by the participants.



Evaluation chart on the basis of interest and utility of Module 3

Sessions on Science for sustainability: There was enthusiastic participation in these sessions, particularly the practical sessions on geo-morphology.When it came to utility, a lot of participants voiced their concerns in terms of availability of machinery and training to handle data.



Evaluation chart on the basis on interest and utility of Module 4

5.2.5. Planning for village drinking water sustainability

Objective: *To enabling an understanding of the process of village water security planning*

The participants were taken to Tarup village in Ranchi district to collect basic data to discuss and prepare a village water security plan. A small session was also dedicated to an interactive session with panchayat members. Engineers were shown four check-dams built by Irrigation Department of Jharkhand. The visit was facilitated by Dr. Devdutt Upasani to explain the geology of the area as a case study and help in understanding the kind of structures that would be suitable for the terrain.

There were a lot of queries from the engineers on the methodology adopted for community involvement and how the *pani samiti* has been able to generate funds from the communities to keep the system running. The members of the *pani samiti*and watershed committee shared their efforts for convergence of watershed programmes and of the measures for social regulation in the village for preventing misuse of water. The group also got to interact with water quality monitoring team in the village thatshared the results of seasonal monitoring in the village and the ameliorative measures taken for mitigation.

Interaction of Engineers with the villagers at Tarup village, Ratu Block

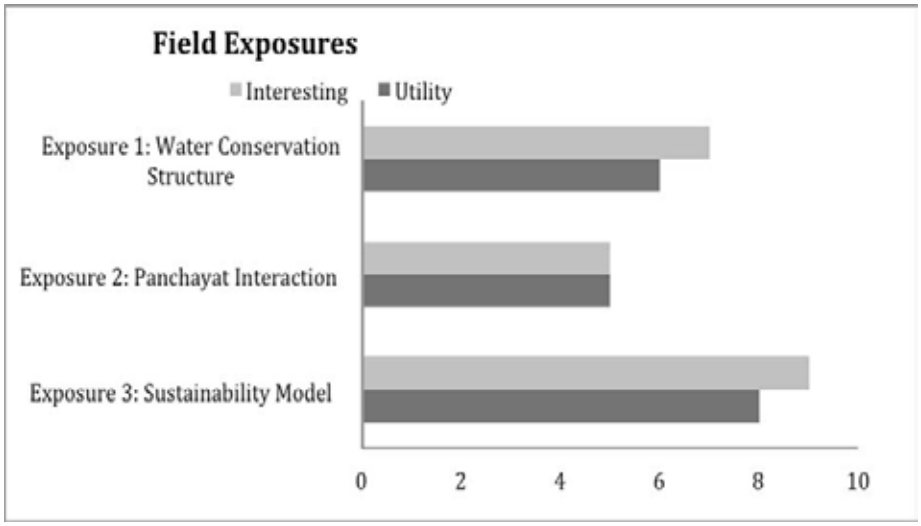
The second exposure to Prof. Indrajit Dey's farmhouse in Rachi enabled discussions around suitable techniques used for the rainwater harvesting and water storage structures. The surface run-off, catchment area, recharge and discharge points, geology and importance of fractures in terms of recharge were some areas that drew queries from the participants. Prof Dey talked at length regarding constructing appropriate structures such as ponds and utilizing the harvested water for agriculture as well as fishery farming.

Prof Indrajit Dey interacting with the engineers at his farm house as part of the field visits

Quick evaluation

At the end of the day, a quick evaluation was conducted on the sessions for the day.

Field trips: The participants found the discussion based on the structures and the village water security plan to be extremely useful and interesting. However when it came to interactions with the panchayat and other village members many engineers avoided and kept away from it.



Evaluation chart on the basis on interest and utility for Field Exposure

5.3. Feedback from participants

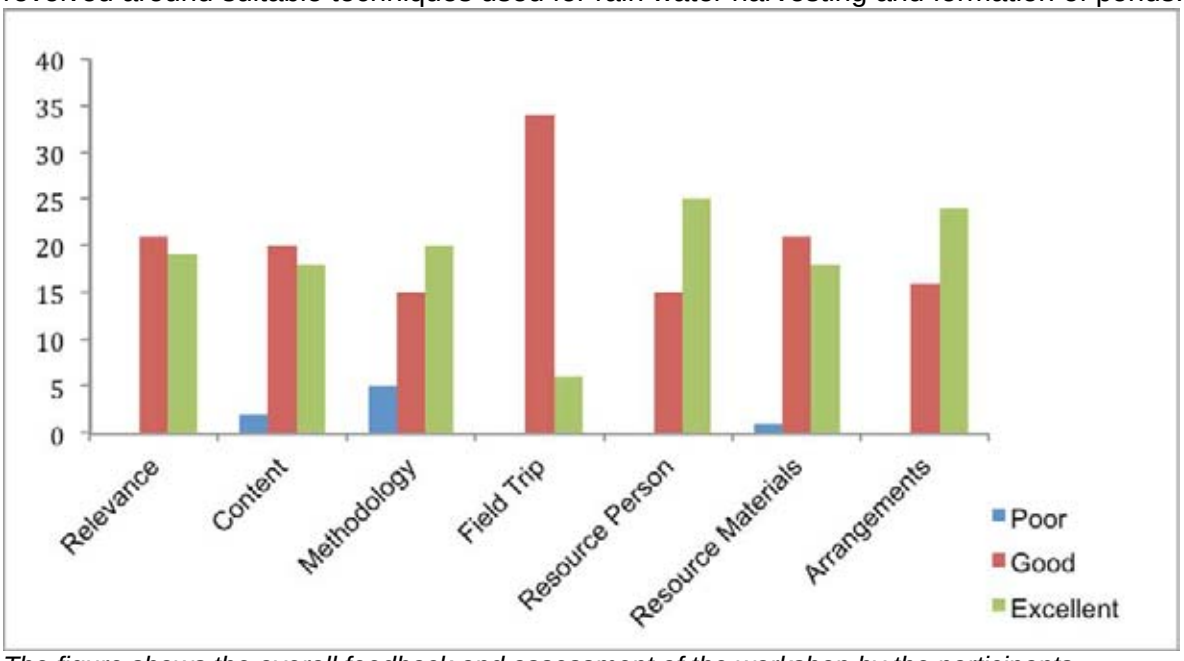
1. We found that participants were more excited in debates around technical information regarding rainwater harvesting and for ground water recharge. Participants wanted that training should be more practical and exercised based. Their concerns revolved around motivating people to know the importance of water and its conservation through rainwater harvesting. It was also discussed that ground water recharge is going to play an important role in the future for drinking as well as agricultural use.

2. A need for greater transparency was felt on the presentation and discussion on the upcoming issues of water management, policy, legal and institutional frameworks, financial investments and the way forward.

3. The session on science of hydrogeology and ground water management was keenly attended. Participants stated that their lack of awareness on the hydrogeology of an area hampers in their scheme planning. A lot of stress was laid on merging traditional knowledge and modern technology for making new schemes. Small-scale innovation and newer technologies was seen as very crucial for integrated approach.

4. There was a lot of interest on issues of water quality and testing. Participants expressed interest in having training on water quality testing.

5. The exposure visit to Tarup village saw a one-on-one interaction ofengineers with village members. While the engineers collected data, the villagers inquired about village water security plans. Both the groups helped each other in understanding and deriving at solutions regarding water supply. Hand-pumps and its maintenance was a major topic of discussion pushed by the villagers. The engineers stated that the money had been released for the villages to take over its working. Rainwater harvesting was suggested as a very useful tool for future use. Villagers insisted that technical training programwas necessary for communities to take over village's water systems. On the field trip to Prof Inderjeet De's farm house discussions and queries revolved around suitable techniques used for rain water harvesting and formation of ponds.



The figure shows the overall feedback and assessment of the workshop by the participants
(Agenda, list of participants and resource persons enclosed as annexure-1).

6. Training Workshop with PRIs

The three days training workshop was attended by forty-eight Panchayati Raj Institution's members (PRIs)from 16 districts of Jharkhand.

6.1. Participants expectation

- To find a solution to solve drinking water problem.
- Technical assistance for water conservation.
- To understand and create awareness on managing water.
- Technical assistance to propose appropriate water conservation structures according to geology and topography.
- To understand and create awareness on water management in drought and flood prone areas.
- To formulate knowledge on improving the water quality.

6.2. Presentation summary & evaluation

Day -1: The first session comprised of introductions of the participants, CSE and its work. It was followed by an activity where the participants discussed the condition of drinking water in Jharkhand. This was followed by a group activity where participants were divided into four groupsand they discussed the importance and usage of water in detail.

Participants interacting with each other at group activity

After this there was a lecture on the importance of rainfallfor India. This lecture included following points:-

1.) Present scenario of rainfall pattern in India.

2.) Total time span of rain fall in one year in India.

3.) The demand of water per person per day in India.

4.) Increasing demands of water.

The second session began with a presentation on rainwater harvesting where the need for rainwater harvesting and where and how it can be done was explained. This was followed by an activity on water budgeting based on calculations. In this exercise the participants learnt how to measure rainfall in particular areas (rooftop, paved and unpaved surface) and how much of it can be stored in a given time.The next presentation was on traditional practices of rainwater harvesting from across the country. The participants were shown many examples and structures that have been designed by people and communities to store water for drinking and agricultural purposes from various corners of India.

Day 2: The field exposure was organized on the second day of the workshop to*Singari* village of Sursu panchayat in Ranchi district.It had received the award for model village in 1979. The village had successfullyadopted differentmethods of rainwater harvestingfor drinking and irrigation purposes.From facing water scarcity issues to constructing water conservation structures to deal with the issue, Singari was successful in changing its fortune through community's work. Participants were shown various structures like ponds, wells, irrigation schemes and fishery management, recharged hand pumps etc. Shri Etva Bedia, village water committee's head facilitated a discussion on the planning and implementation executed by the villagers. Shri.N.Jadav, mechanic with the DDWS, Jharkhand, also guided the exposure visit.

Farm ponds built to hold surface water at Singari village

Wells are full of water around the year due to farm ponds

There was a good interaction between the village community and participants on water management and community participation. The villagers spoke on their problems and how they overcame them. The villagers talked about the challenges they face initially and how they graduallycame together over a period of time to work on issues of water scarcity. Villagers also expressed their current challenge on water quality and asked several questions to the participants as well.The field exposure visit has played a key role in a social cum technical training workshop.

Day 3: The day began with a session on the last day's field exposure where the participants talked of challenges faced by them in terms of community mobilization and gaps in technical knowledge and training. This was followed by a presentation on rural technologies where various techniques and structures of storing water were shown and discussed in detail.

The next presentation was on rooftop rainwaterharvesting focused on techniques used for storage of rainwater from rooftops. This presentation also included an exercise wherein the participants were taught to calculate the amount of rainwater that can be stored within a time frame and the kind of structure that would be required to store it in accordance with the demand.

This was followed bythe film*Chukru Dharti ka Nark,* produced by Manthan, a local NGO working in Jharkhand. It is based on contamination of fluoride in drinking water and its effects on the human body.

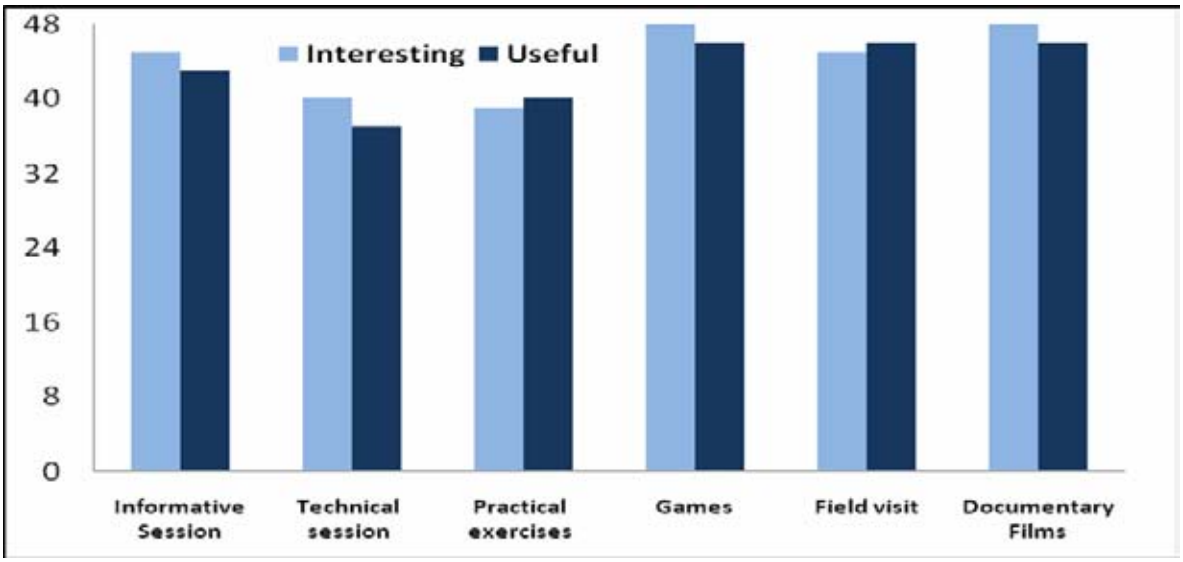
Valedictory session: The closing session was chaired by Mr. Shardendu Narayan, Chief Engineer cum Executive Director of DDWS, Jharkhand. He sought feedback from the participants about the workshop. He urged them to plan out a sound village water security plan and realise their roles and duties towards their village

Mr Shardendu Naryan distributing certificates to training participants at the closing ceremony

(Agenda, list of participants and resource persons enclosed as annexure-2).

Quick evaluation

The results of evaluation conducted on the programme is shown:



Evaluation chart on the basis on interest and utilityfor all sessions as rated by 48 participants

7. Training Workshop with NGOs

Forty participants from 19 district of Jharkhandattended the training program for NGOs held from September 12-14, 2011.

Day 1: The first session comprised of introductions of the participants, CSE and its work.This was followed by technical sessions that included the need of RWH in India, where and how it can be done. This was followed by a lecture on village water budget. This involved calculationswhere the participants learnt about the measurement of rainfall in particular areas and how rainwatercan be store in ahectare of land.

The second session began with a lecture on village water security planning. In this session the participants learnt how to store the water during the rainy season and why water is vital to the villagers.

The third session began with a lecture by Mr. Meghnath B of Akhra organisation . He talked in detail regarding the use of traditional methods to harvest water and how the people of Jharkhand can overcome scarcity issues by storing water. He also threw light on community mobilisation among people to solve water problems on their own.

The day ended with a presentation made by Dr.D.K.Rusia, from the Birsa Agricultural University. He explained the construction of surface structures appropriate for rainwater management technologies. His lecture was on the schematic of land situation and hydrology.

Day 2: The second day involved a field visit to Mandar in Ratu block. Dr. D.K.Rusia guided the field trip. The purpose of field visit was to show low budget (economical) water conservation structure funded by the Birsa Agricultural University. These were 2*2 pits built at the edge of agricultural fields by the farmer.

Surface water storage structure at Mandar village

"I spent two days to built four pits in my land and now I have store enough water for vegetable harvesting and earn 2000-3000 a month" said a local farmerEtwa Munda .

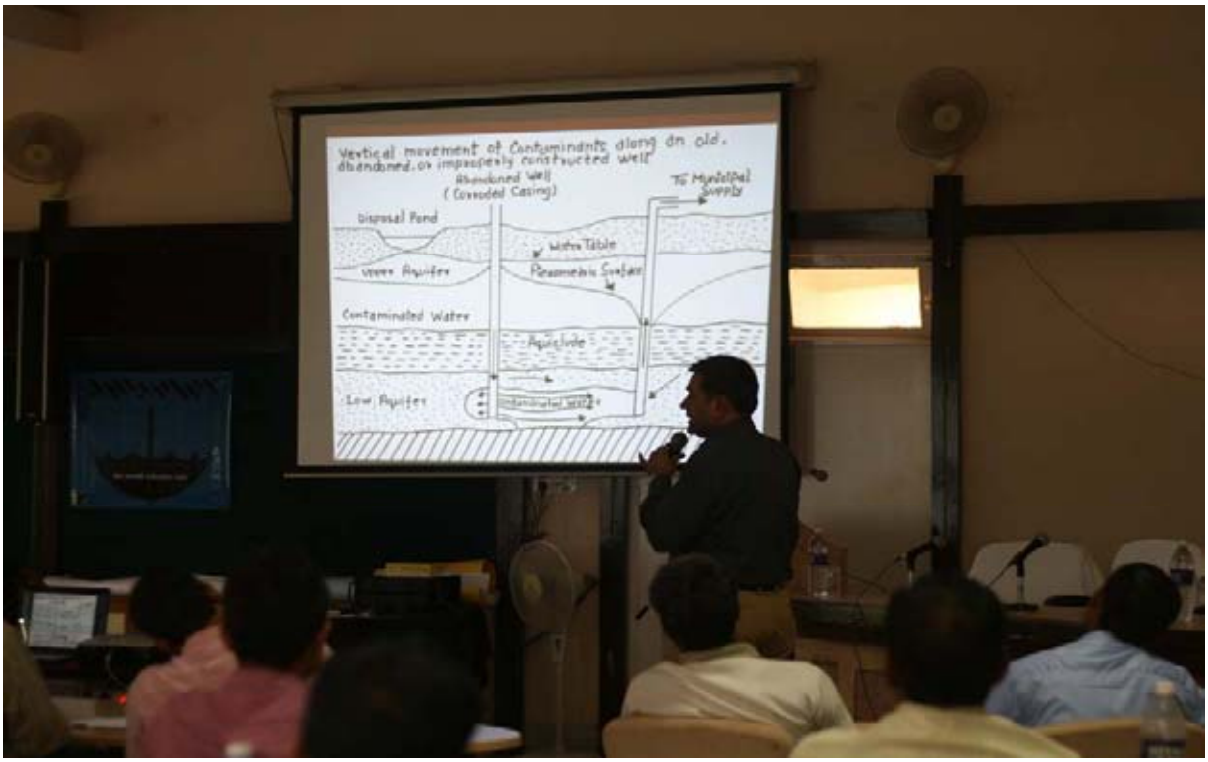
"The agriculture field's pits has work on a simple principle whereit stops the soil-moisture on an average of 6cu m. The pit takes 10 hours to replenish and irrigates 400sq meter land," said Dr. Rusia. "It costsaround 200-300 rupees only," he added. After an interactive feedback from the participants a presentation on rural technologies for storing water followed.Various cost effective techniques were shown and discussed for conserving and recharge the water.

This was followed by a lecture of Dr. Nitish Priyadarshi (Professor of Ranchi university). His lecture was on application of remote sensing in the context of water resources and pollution identification. He stated that remote sensing plays a major role in identifying water zones and also help in the identifying pollution.

Day 3: The last day opened with an interactive session with Mr. Arvind Kumar (Secretary, Lok Jagriti Kendra, Madhupur). He talked at length regarding watershed management andthe MNREGA. He discussed the construction of water conservation structures and tradition water harvesting practices in Jharkhand. He also spoke on the water rights and forest conservation movement in Northern part in Jharkhand.

This was followed by the lecture on rooftop rainwater harvesting. The focus of this presentation was to talk about the techniques that are used for the storage of rain water from the rooftops. Participants were also made to calculate their water need, availability and the solutions to solve their problems.

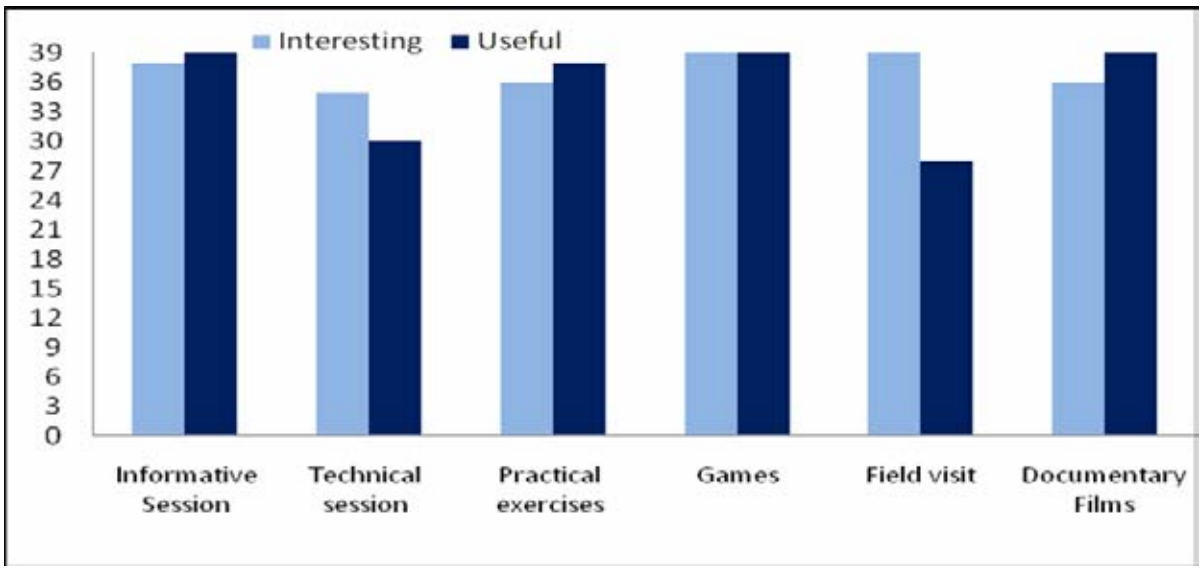
The final session of the day was delivered by the Dr. Nitish Priyadarshi. His session focused on water quality and components of water contamination. He also explained its impact on human's health specifically to the context of Jharkhand. He mainly talked about the metals and biological pollution in the water like fluoride, arsenic, nitrate, mercury etc. He drew attention as to how these pollute ground and surface water and what are its negative impacts on human bodies.



Dr Nitish Priyadarshi at a session on water quality and its contaminants

The workshop's feedback session wasattended by Shri Jhariyu Oraon (Director of DWSM). The discussion circled on problems related to water scarcity and various schemes of the government in the area of water and sanitation practices.

The workshop concluded with the distribution of certificates and photos.
(Agenda, list of participants and resource persons enclosed as annexure-3)



Evaluation chart on the basis on interest and utilityfor all sessions as rated by 39 participants

8. Training workshop with plumbers and masons in Ranchi

This training was held from September 15-16, 2011 in Ranchi for plumbers and masons of 2 districts. Twenty nine people attended this workshop in Ranchi.

Day 1: The first lecture provided an overview of the technologies and traditions of rainwater harvesting for drinking, domestic and agricultural use. Water management strategies, availability of annual rainfall and groundwater and the state of major rive in urban areas was some if the components discussed in detail. The presentation brought to light the challenge of the growing demand, decreasing availability, costs involved and the changes made in the water policies over the years. It concluded with a case study that demonstrated how a village overcame all these issues by appropriate planning and rainwater harvesting.

Participants explaining the rainwater harvesting structures of Viswa training centre

This was followed by presentations by Ms. Sushmita Sengupta from CSE's Urban water program. She presented an overview ofrainwater harvesting and its techniques.

Participants was divided in two groups and taken around the Viswa campus to observe and take notes of its rainwater harvesting structures.Following this was an exercise where the participants drew a site map of Viswa to explain the structures and their placement. After this a presentation was made to show rainwater-harvesting structures from other cities.

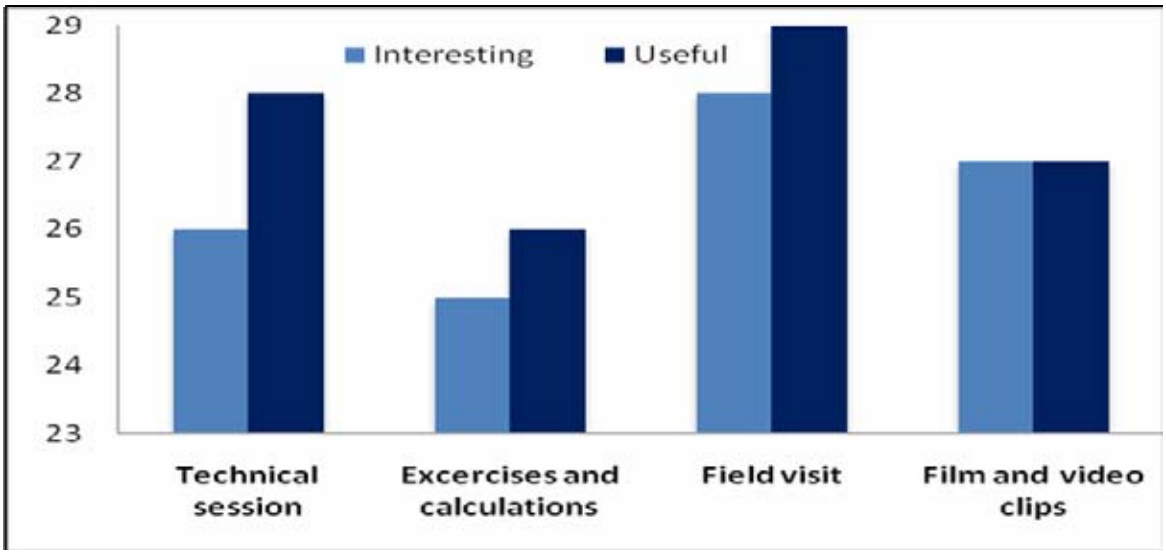
The next session was based on calculations explaining how much rainwater can be stored and which could be the different kind of structures to store them in accordance with the available area. The participants learnt about runoff calculations. The day first ended with short clips on cleaning and maintenance work of recharge wells.

Day 2: The second day began with a run through of last day's sessions. This was followed by a film show based on rainwater harvesting practices invillages. This was followed by a lecture on the runoff calculations and also included exercises and the practice session.

The participants were made to go around Viswa's campus again as earlier. It was aimed as an exercise where the participants were asked to make a small presentation regarding the merits and demerits of the rainwater harvesting structures. This was done in order to understand the participant's understanding of the structure's construction and placement.

The last session was attended by Mr. Manoj Kumar Chowdhary,Deputy Director of PHED.He also sought out feedback from the participants about the workshop. He stressed on the need to identify the core of water conservation issues and understand it in totality to arrive at planning solutions.

(Agenda, list of participants and resource persons enclosed as annexure-4)



Evaluation chart on the basis on interest and utility for all sessions as rated by 29 participants