

TRAINING MODULE

COMMUNITY BASED WATER QUALITY MONITORING FOR LAB EXTENSION WORKERS

1 DAY

PARTICIPATORY TRAINING

SaciWATERS



WaterAid

ABOUT THE MODULE

This training module is intended for the purpose of training the Water testing lab officials of govt set up labs. Dissemination of Water Quality testing results to the level of panchayats, villages and to the effected households and initiating remedial actions is depends on the quality of participation of the local communities. Both the demand and supply side connect is highly essential. The current module is an attempt to pilot a day training among the water testing lab staff who are responsible for dissemination of results in an easy and yet comprehensive manner with an objective of engaging Communities in an effective manner.

The training module attempted to bridge the skill gaps of these functionaries in communicating the water quality testing results; enhancing the community participation in self-monitoring of water.

The trainers would make use of the module with a bit of preparation before the training, content and methodology is designed with a clear session flow. Couple of charts or Ppts to be prepared by the trainer before starting the training. Few handouts to be printed and handover during the sessions.

This is a basic version of the module, once a training is rolled out, there may be further modifications based on the session flow and methodologies used.

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Date:

CONTENTS

1. Training Objective Setting
2. Communication
3. Community Mobilization
4. Water Quality& Health Impacts
5. Prevention of water contamination
6. Role of different entities in the managing water quality for better health
7. Monitoring of WQ system

TRAINING SCHEDULE

Date	Name of the session
9.00 to 9.30 am	Registration
9.30 am - 10.00 am	Welcome and Introduction of participants
10.00 am – 10.30 am	Setting the training objectives& Training Pre-test
10.30 – 11.30 am	Effective Communication for disseminating water quality issues in villages
11.30 – 12.00 pm	Community Mobilisation
12.00 – 01.00 pm	Water quality& human health impacts
01.00 – 01.30 pm	Lunch Break
01.30 – 02.15 pm	Methods of preventing source contamination
02.15 – 03.00 Pm	Water Sustainability – Community Lead Water Recharge
03.00 – 05.00 PM	Monitoring of contaminated sources
05.00 – 05.30 pm	Feedback and conclusion

Pre-test questionnaire

1. What is the meaning of communication?
2. Why communication is important in water quality results dissemination?
3. What is community mobilisation? Why Community mobilisation is important?
4. What is the meaning of water quality?
5. What are the standards of water quality?
6. What is the meaning of contamination? What are various types of contamination?
7. What are the health effects of contamination?

8. How to prevent contamination?

9. How to monitor the source contamination?

10. Who are the responsible persons/institutions/organisations in a village in monitoring the source contamination?

11. How do you communicate the test results in an easy way to the panchayat?

12. What are the institutional mechanisms to communicate the water quality testing results?

13. What is your role in water quality testing and dissemination of tests results?

14. After the training, what changes do you see in your work?

Session 1: Training Objective Setting

Objective of the session:

To give an overview of the proposed training and set a congenial environment among participants for highly productive learning

Expected outcomes of the session:

By the end of the session all the participants are able to acquire clarity on the purpose of the training, what they will be doing once the training is completed, their intended role in impacting Communities in the water quality related aspects.

Methodology:

- a) Card storming – for collecting expectations
- b) Interactive lecture method
- c) Large group discussions

Contents covered in the session:

1. What are the expectations of participants?
2. Why they want to learn?
3. What they will do using the knowledge they acquired?
4. How they will disseminate the knowledge they acquired?

Tools required for the session:

- a) Prepared flip charts written in local language
- b) A power point presentation (if the training premises is equipped with Audio Visual equipment)

How to conduct the session:

After the registration, welcome and introduction of the participation is completed, let the participants settle down in few minutes and initiate the session on setting the training objective

ASK the participants why they are here?

Collect few responses from participatns and write it on a flip chart.

ASK whatthey want to learn are related to their roles?

CIRCULATE two Flash cards (if possible give two colour cards) and a sketch pen for each participant, ASK them to write at least one expectation on each card - what each participant want to learn about Water Quality, one method on how they communicate to communities.

Give 5 minutes to write 2 points on the flash cards and collect all the cards from the participants.

CLASSIFY the collected cards in to different categories –

- Learnings related their job roles
- General expectations
- Also classify the methods of communication they want to use in the dissemination of water quality information. Cluster various methods

SUMMARISE what want the participants want learn from the training.

THEN open the ppt or show the flip chart where you have written the training objectives and explain the core objectives of the training.

Use the following few points in developing your ppt or a flip chart

1. To enhance the skills of participants on various communication mechanisms on disseminating water quality related aspects to communities
2. To enhance the understanding on the participants on various aspects of community mobilisation and importance of community mobilisation on improving water quality
3. To impart knowledge on various elements of water quality, various contamination mechanism, preventing source contamination, various health hazards etc
4. To impart knowledge on various aspects of community lead self-monitoring of water quality in villages through various local institutional mechanisms

Expected outcomes of the training:

By the end of the two days training, all the participants are well equipped and feel confident of dissemination of water quality information in a very effective and timely manner across the villages, which leads to improvement in the health indicators in the panchayats.

RECAP once again on the important points once again

SUB SESSSION: Setting norms of the training

ASK the participants –what is the meaning of a Norm. Collect few responses. List them out on a flip chart. Ask why norms are important. Ask do they need to set up various norms for the current training.

What are those norms?

List down those norms on a flip chart. Tell participants, once the norms are agreed, no one should breach the norms.

Write the norms and paste at a visible place in the training hall.

TIPS: Few norms for information to the trainer:

1. Time management
2. Full participation
3. Encouraging others to participate
4. Nothing is right or wrong
5. Mobile phones – silent and switch off
6. No sub group discussions once the training is happening

FURTHER move to the next session, take a smooth transition to the next session

Session 2: Effective Communication for disseminating water quality issues in villages

Objective of the session:

To enhance the skills of the participants on various means and mechanism of Communication of Water Quality issues

Expected outcomes of the session:

Once the session is completed all the participants enhanced their skills on communicating effectively among the village water and sanitation committees and among the community.

Methodology:

1. Interactive lecture method
2. Discussions
3. Large group discussions

Contents covered in the session:

1. Communication
2. Various channels of Communication
3. Effective communication tools

Tools required for the session:

1. Prepared flip charts written in local language
2. Posters and flip book if any

How to conduct the session:

Ask the participants one by one with a gap and summarise the participants points one after the other..(do not ask all the questions at once, rather ask the questions one after the other)

1. What is the meaning of communication
2. What is the importance of communication in her/his work?
3. Why do we communicate?
4. What to communicate?
5. When and where to communicate
6. Are there any guidelines for effective communication?

ASK

What is the meaning of communication?

GET the participants responses,

TELL

Use the following content by writing in a flip chart after getting participants responses.

Communication

- Communication is the basis of all social interactions
- Role of communicator is to break the barrier in the way of human interaction in order to achieve mutual understanding

ASK various forms of communication

GET the answers from participants, put it on to a flip chart

TELL

Forms of communication

- Verbal – with words
- Non-verbal – without words

Verbal: Speaking, writing, reading, listening, and thinking

Non-verbal: other than sending words or receiving words. Includes signs, body language, visuals etc

ASK the communication process

GET the answers from participants

TELL

Communication process:

Consists of 4 components

- 1) Sender – Who initiates the communication
- 2) The message – The content
- 3) The channel or the medium – spoken words, print, electronic, non verbal signs, graphics, photographs etc
- 4) The receiver – Who is intended to receive the message.

Any communication is not complete without these 4 components

Why do we communicate?

- 1) To inform
- 2) To persuade

3) To entertain

A good communicator from the point of view of a good motivator, should be persuasive. This means that the receiver understands the message being communicated and accepts it or is influenced by the message.

We must be careful about the unintentional communication. Often our tone, voice, facial expression, or body motion conveys messages entirely different from the spoken words.

If we are not careful, the entire communication goes to a waste, we are not good communicators.

Reasons for this could be sender related or receiver related gaps –

Sender related gaps –

- 1) Message is not clear or ambiguous
- 2) Associated non-verbal communication is faulty
- 3) Inappropriate selection of medium
- 4) Too much information
- 5) Lacks confidence or emotional appeal

Receiver related:

- 1) The listener does not like the sender
- 2) Engaged in something else
- 3) The listener might have made up his mind on something else
- 4) Lack of faith or trust in the speaker

How do we communicate?

We communicate by sending meaningful messages. Effective communication should result in the following:

- 1) The message is understood by the receiver
- 2) The message accomplishes its purpose
- 3) The sender and the receiver of the message maintain a favourable relationship

What to communicate?

- The communicator has to decide she/he is going to communicate
- The message should be simple, well focused and above all, interesting to the listener
- Motivator/communicator knows the subject and should be prepared to answer questions in a convincing way.
- Listening is part of the effective communication process.
- If you are not a good listener, you will not be a good communicator.

Importance of listening and non-verbal messages in oral communication

- In oral communication, we can get the feedback immediately from the listener's reactions.
- For successful interpersonal communication, the speaker should have sincere respect for the other person in the shared communication process.
- Impartiality in listening to points of view is a great aid

Effective and efficient listening:

Listening, like other forms of communication, must be sincere to be effective. Check your listening habits to be a good communicator. Watch against some of these.

- Disregard for what the person is saying because you do not like his/her physical appearance, voice, accent, mannerism etc.
- Listening only towards and paying attention to not to the underlying meaning much of which is communicated by non-verbal methods.
- Lack of attention because you tired, and want to go home
- Inability to keep your mind on the subject
- Interrupting, not allowing the other person to speak

To be a good and efficient listener

- Listen sympathetically and critically
- Concentrate, remain alert
- Listen for meanings and ideas
- Notice the non-verbal communications, especially the body language

Generally, a motivator has to communicate either to individuals like villagers, school teachers, panchayat members, block officials, members of voluntary agencies, etc., are to small groups of people such as school children, women groups, VWSCs, panchayats etc.

The motivator should develop the skill of communicating with both individuals and groups.

Whereas communicating with individuals is easy, communicating with a group calls for greater skills. Some useful tips for effective communication with groups are given below:

Tips

- The speaker should have a comprehensive and correct knowledge of the subject which he/she going to talk about
- The speaker should have self-confidence and the correct poise
- The speakers should establish a friendly environment, and should be able to hold the attention of the people

- The speaker should gain the confidence of the people, by encouraging lively interactions
- He/She should use a conversational tone as if talking rather than lecturing
- He/she should respond well to questions
- He/she should understand the occasion and the environment

When and where to communicate?

- Since the purpose of communication is to inform and persuade people, it is important that the motivator selects the time convenient to the receiver/s.
- Going to individuals rather than calling to your place, should be the norm.
- If the individual is busy in something else, that is not the right time to communicate.
- Similarly the location is important when the motivator interact. If you have to communicate to a panchayat leaders or a VWSC members the Panchayat office will be a right place.

Guidelines for effective communication:

If one does not try to understand and adapt to other participants in a transaction, interference is like to occur. Without empathy, the interaction will certainly fail.

Some of the short comings which have been experienced are listed below –

- Not speaking loud enough
- Cutting jokes which hurt peoples feelings
- Choosing to here only what you want to here
- Missing the chance to gather new ideas and values
- Selecting an improper communication channel

Ask the

Often the motivator will be required to counsel and willing or resistant villagers. For this, he or she will have to adopt a suitable mix from the following approaches –

Door to door visit:

Communicating one to one: the motivator can counsel individuals keeping the water point clean to protect it from contamination.

Communicating to a group:

While counselling to a small group, it is important to ensure that the group assembles at a common point.

Group to Group Communicating:

When the motivator finds resistance, it is advisable to use peer group as a pressure group for counselling.

- Visit such people individually, or with someone in the community who is an early acceptor
- Develop personal relationship, strike conversation on things which are of his or her interest rather than the message you are interested in.
- Encourage, endorse, agree with their real problems, and emphasise with his or her involvement in solving these problems
- Use others to influence them rather than confronting them yourself
- Never admonish people, no wants to be told that he or she is not doing the right thing.

GROUP WORK:

Divide the participants in to 3 to 4 groups based on the number of participants, ask them to work on the following few questions. Let them work on these for 15 minutes, put on to a flip chart, present in the large group

Give 5 minutes for each presentation, once the presenter completes his presentation, give 3 minutes to discuss on the presentation.

ASK - How to you communicate in your regular work?

Ask participants various mechanisms of communication.

1. WHAT do you communicate?
2. HOW do you communicate?
3. WHERE do you communicate?
4. WHEN do you communicate?
5. WHOM do you communicate?
6. HOW MUCH do you communicate?
7. WHAT are the barriers of the effective communication?
8. Which is an effective way of communicating –either to individual or to a group?

Session 3: Community mobilisation

Objective of the session:

To enhance the skills of the participants on various community mobilisation techniques using Participatory methods

Expected outcomes of the session:

Once the session is completed all the participants enhanced their skills of community mobilisation and various participatory methods

Methodology:

1. Interactive lecture method
2. Discussions
3. Large group discussions

Contents covered in the session:

1. Meaning of community and community mobilisation
2. Why community mobilisation is important in WQ management
3. Various PRA tools used in Community mobilisation for water quality projects

Tools required for the session:

1. Prepared flip charts written in local language
2. Posters

How to conduct the session:

Ask the participants, what is their understanding of community?

GET the answers from the participants and write on a flip chart

MEANING OF COMMUNITY

Community can mean different things in different contexts.

Individuals or groups who share a common geographic location;

Individuals or groups who have common language, culture or values;

How the groups or individuals interact or have relationships with each other; and How members of the community use common resources and make decisions.

ASK once again, what is the meaning of Community mobilisation.

GET the answers from the participants and write on a flip chart

COMMUNITY MOBILISATION – MEANING

Community mobilization is the process of building community capacity to identify their own priorities, resources, needs, and solutions in such a way as to promote representative participation, good governance, accountability, and sustained change

Sustained mobilization takes place when communities remain active and empowered

Go to the next level and ASK what they know about the participation.

Get the answers and spend some time here.

PARTICIPATION - MEANING

With community mobilization, participation is about meeting the interests of the whole community.

NOTE TO THE TRAINER: When every member of a community has the chance, directly or through representation, to participate in the design, implementation and monitoring of community-level initiatives, there is a higher likelihood that the program accurately reflects their real needs and interests.

The approach takes into consideration the different experiences, needs and capabilities of various groups in a community – women and men, youth and the

elderly, persons with disabilities and the able bodied, ethnic/religious/language minorities and majorities.

NOTE TO THE TRAINER: Participation can take a number of forms. At one end of the spectrum is “passive participation” in which community members participate by being informed about something that will happen or has already happened. At the other end of the spectrum is “self-mobilization”, when communities organize and take initiative independent of any external actors.

ASK, why Community Mobilisation is important for water quality management?

GET the answers from participants

TELL the following few points ...

Why community mobilisation is important in Water quality management

1. Increases participatory decision-making processes by bringing diverse stakeholders into a common process
2. Expands inclusion of often marginalized populations, such as women, youth, persons with disabilities, the elderly, and religious or ethnic minorities
3. Depends on local resources, both human and material
4. Fosters stronger relationships between local government, businesses, community members and CBO/NGOs
5. Ensures local ownership of development
6. Promotes a more active and informed citizenry

ASK the participants – do they know any tool to enhance participation of community in Water Quality improvement.

PUT them on a flip chart.

TELL that there are several tools which are helpful in improving participation of local communities in Water Quality called PRA (Participatory Rural Appraisal) tools.

THE MOST COMMONLY USED PRA TOOLS

COMMUNITY MAPPING

Community members make a physical map of their community that identifies the resources available in it. This can be used to start a discussion about existing resources and gaps.

TRANSECT WALK

Often done following the mapping activity (ies), the PRA team walks around the community with local leaders to confirm the data on the map and any additional information needed.

Semi-Structured Interviews

Usually done one-on-one with key community members to get more information about specific elements of the issues and resources discussed during mapping activities.

Focus Group Discussions

Conducted with various affinity groups from the community, such as a group of youth or women, a farmers' cooperative or trade union, etc. in order to collect information from people whose perspective might not come out in gatherings of the whole community.

NOTE TO THE TRAINER:

Core PRA Principles

Sustained learning process: Enhancing cumulative learning for action by participants is the focus and has three outputs: identifying strategies for improvement, motivating people to undertake these strategies, and enhancing their capacity for solving problems.

Different perspectives in group-based analysis: PRA explicitly seeks insights from and an understanding of the needs of different individuals and groups, which may be conflicting but will better show the complexity of local situations to aid appropriate program planning.

Key role for facilitators: including different perspectives often means challenging local traditions of communication, which requires sensitive facilitation.

Systemic and methodological basis: creating a structured process that explores problems within the wider context and not just focusing on a narrow slice of reality - from description to analysis and action.

Context-specific: unique social/physical conditions requires building a process of discussion, communication, and conflict resolution - which by necessity evolves out of the specifics of the local context

Session 4: Water quality& human health impacts

Objective of the session:

To enhance the knowledge of participants on meaning of water quality, its health impacts; impart the skills of communicating the Water Quality issues to Communities.

Expected outcomes of the session:

Once the session is completed all the participants enhanced their skills on communicating effectively among the village water and sanitation committees and among the community on various health issues of water quality.

Methodology:

1. Interactive lecture method
2. Discussions
3. Large group discussions

Contents covered in the session:

1. Meaning of Water Quality
2. Meaning of contamination
3. Various sources, causes of contamination
4. Impact of Biological contamination
5. Impact of chemical contamination
6. Preventing the health hazards

Tools required for the session:

1. Prepared flip charts written in local language
2. Posters and flip book if any

How to conduct the session:

Ask the participants the following questions -

1. What is the meaning of Water Quality?

Give few minutes for participants to respond the points,

THEN, summarise the answers on what your participants told on flip chart. Use the following meaning of Water quality and explain to the participants.

Water quality refers to the chemical, physical, biological, and radiological characteristics of water. It is a measure of the condition of water relative to the requirements of one or more biotic species and or to any human need or purpose.

Once explain the above definition ask the participants to paraphrase what they understood.

THEN move on next step

Ask the participants the following question

What is the meaning of Water Contamination?

GET the answers from the participants and allow them to express every ones views; put on a flip chart

THEN share the meaning of CONTAMINATION/POLLUTION

Water pollution is the contamination of water bodies (e.g. lakes, rivers, oceans, aquifers and groundwater). This form of environmental degradation occurs when pollutants are directly or indirectly discharged into water bodies without adequate treatment to remove harmful compounds.

Water pollution affects the entire biosphere – plants and organisms living in these bodies of water. In almost all cases the effect is damaging not only to individual species and population, but also to the

What are various sources of contamination?

Surface water and groundwater have often been studied and managed as separate resources. Surface water seeps through the soil and becomes groundwater. Conversely, groundwater can also feed surface water sources. Sources of surface water pollution are generally grouped into two categories based on their origin.

Point sources

Point source water pollution refers to contaminants that enter a waterway from a single, identifiable source, such as a pipe or ditch. Examples of sources in this category include discharges from a sewage treatment plant, a factory, or a city storm drain.

Non-point sources

Non point sources refers to diffuse contamination that does not originate from a single discrete source. NPS pollution is often the cumulative effect of small amounts of contaminants gathered from a large area. A common example is the leaching out of nitrogen compounds from fertilized agricultural lands.

Groundwater pollution

Interactions between groundwater and surface water are complex. By its very nature, groundwater aquifers are susceptible to contamination from sources that may not directly affect surface water bodies, and the distinction of point vs. non-point source may be irrelevant. A spill or ongoing release of chemical contaminants into soil (located away from a surface water body can contaminate the aquifer below, creating a toxicity.

What are the causes of contamination?

The specific contaminants leading to pollution in water include a wide spectrum of chemicals, pathogens.

Disease-causing microorganisms are referred to as pathogens.

Coliform bacteria, which are not an actual cause of disease, are commonly used as a bacterial indicator of water pollution.

Other microorganisms sometimes found in surface waters that have caused human health problems include:

- *Cryptosporidium parvum*
- *Giardia lamblia*
- *Salmonella*
- Norovirus and other viruses
- Parasitic worms including the *Schistosoma*

High levels of pathogens may result from on-site sanitation systems (septic tanks, pit latrines) or inadequately treated sewage discharges.

Pathogen discharges may also be caused by poorly managed livestock operations.

CHEMICAL CONTAMINATION

What is the meaning of chemical contamination of water?

Contamination of Water sources/water bodies by various chemicals

HEALTH IMPACTS OF WATER CONTAMINATION:

It is a well-known fact that clean water is absolutely essential for healthy living. Adequate supply of fresh and clean drinking water is a basic need for all human beings on the earth, yet it has been observed that millions of people worldwide are deprived of this.

Freshwater resources all over the world are threatened not only by over exploitation and poor management but also by ecological degradation. The main source of freshwater pollution can be attributed to discharge of untreated waste, dumping of industrial effluent, and run-off from agricultural fields.

Industrial growth, urbanization and the increasing use of synthetic organic substances have serious and adverse impacts on freshwater bodies. It is a generally accepted fact that the developed countries suffer from problems of chemical discharge into the water sources mainly groundwater, while developing countries face problems of agricultural run-off in water sources.

Polluted water like chemicals in drinking water causes problem to health and leads to water-borne diseases which can be prevented by taking measures can be taken even at the household level.

Groundwater and its contamination

Many areas of groundwater and surface water are now contaminated with heavy metals, POPs (persistent organic pollutants), and nutrients that have an adverse effect on health.

Water-borne diseases and water-caused health problems are mostly due to inadequate and incompetent management of water resources. Safe water for all can only be assured when access, sustainability, and equity can be guaranteed.

Access can be defined as the number of people who are guaranteed safe drinking water and sufficient quantities of it. There has to be an effort to sustain it, and there has to be a fair and equal distribution of water to all segments of the society.

Ground water can be contaminated through various sources and some of these are mentioned below.

Pesticides. Run-off from farms, backyards, and golf courses contain pesticides such as DDT that in turn contaminate the water. Leachate from landfill sites is another major contaminating source. Its effects on the ecosystems and health are endocrine and reproductive damage in wildlife. Groundwater is susceptible to contamination, as

pesticides are mobile in the soil. It is a matter of concern as these chemicals are persistent in the soil and water.

Sewage. Untreated or inadequately treated municipal sewage is a major source of groundwater and surface water pollution in the developing countries. The organic material that is discharged with municipal waste into the watercourses uses substantial oxygen for biological degradation thereby upsetting the ecological balance of rivers and lakes. Sewage also carries microbial pathogens that are the cause of the spread of disease.

Nutrients. Domestic waste water, agricultural run-off, and industrial effluents contain phosphorus and nitrogen, fertilizer run-off, manure from livestock operations, which increase the level of nutrients in water bodies and can cause eutrophication in the lakes and rivers and continue on to the coastal areas. The nitrates come mainly from the fertilizer that is added to the fields. Excessive use of fertilizers cause nitrate contamination of groundwater, with the result that nitrate levels in drinking water is far above the safety levels recommended. Good agricultural practices can help in reducing the amount of nitrates in the soil and thereby lower its content in the water.

Synthetic organics. Many of the 100 000 synthetic compounds in use today are found in the aquatic environment and accumulate in the food chain, for example, industrial chemicals and agricultural pesticides. These chemicals can accumulate in fish and cause serious damage to human health. Where pesticides are used on a large-scale, groundwater gets contaminated and this leads to the chemical contamination of drinking water.

Chemicals in drinking water

Chemicals in water can be both naturally occurring or introduced by human interference and can have serious health effects.

Fluoride. Fluoride in the water is essential for protection against dental caries and weakening of the bones, but higher levels can have an adverse effect on health

Arsenic. Arsenic occurs naturally or is possibly aggravated by over powering aquifers and by phosphorus from fertilizers. High concentrations of arsenic in water can have an adverse effect on health. A few years back, high concentrations of this element was found in drinking water in six districts in West Bengal. A majority of people in the area was found suffering from arsenic skin lesions. It was felt that arsenic contamination in the groundwater was due to natural causes. The government is trying to provide an alternative drinking water source and a method through which the arsenic content from water can be removed.

Lead. Pipes, fittings, solder, and the service connections of some household plumbing systems contain lead that contaminates the drinking water source.

Recreational use of water. Untreated sewage, industrial effluents, and agricultural waste are often discharged into the water bodies such as the lakes, coastal areas and rivers endangering their use for recreational purposes such as swimming and canoeing.

Petrochemicals. Petrochemicals contaminate the groundwater from underground petroleum storage tanks.

Other heavy metals. These contaminants come from mining waste and tailings, landfills, or hazardous waste dumps.

Chlorinated solvents. Metal and plastic effluents, fabric cleaning, electronic and aircraft manufacturing are often discharged and contaminate groundwater.

HEALTH IMPACTS:

Biological contamination

Bacterial infections: Typhoid, Cholera, Paratyphoid fever, Bacillary dysentery

Viral infections: Infectious Hepatitis (jaundice), Poliomyelitis

Protozoal infections: Amoebic dysentery

NOTE TO THE TRAINER

Water-borne diseases are infectious diseases spread primarily through contaminated water. Though these diseases are spread either directly or through flies or filth, water is the chief medium for spread of these diseases and hence they are termed as water-borne diseases.

Most intestinal (enteric) diseases are infectious and are transmitted through faecal waste. Pathogens – which include virus, bacteria, protozoa, and parasitic worms – are disease-producing agents found in the faeces of infected persons. These diseases are more prevalent in areas with poor sanitary conditions.

These pathogens travel through water sources and inter fuses directly through persons handling food and water. Since these diseases are highly infectious, extreme care and hygiene should be maintained by people looking after an infected patient. Hepatitis, cholera, dysentery, and typhoid are the more common water-borne diseases that affect large populations in the tropical regions.

IMPACTS OF CHEMICAL CONTAMINANTS

Fluoride. Excess fluorides can cause yellowing of the teeth and damage to the spinal cord and other crippling diseases.

Arsenic. Arsenic poisoning through water can cause liver and nervous system damage, vascular diseases and also skin cancer.

Ask the participants – Are they aware of preventing the Water born health hazards?

GET the answers from the participants and explain the ways and controlling the water born health hazards for reducing health impacts.

PREVENTIVE MEASURES

Water-borne epidemics and health hazards in the aquatic environment are mainly due to improper management of water resources. Proper management of water resources has become the need of the hour as this would ultimately lead to a cleaner and healthier environment.

In order to prevent the spread of water-borne infectious diseases, people should take adequate precautions. The water supply should be properly checked and necessary steps taken to disinfect it. Water pipes should be regularly checked for leaks and cracks. At home, the water should be boiled, filtered, or other methods and necessary steps taken to ensure that it is free from infection.

Whose role is this?

Who is responsible to check the water quality?

What is the role of Panchayat?

What is the role of Village Water and Sanitation Committee (VWSC) in monitoring the quality of water?

What to check for proper Water Quality in order to check whether polluted or not?

Tell the participants that you will be discussing various water quality parameters in your next session.

ASK the participants – What they know about the water quality standards.

GET the answers from participants

PUT them on a flip chart

TELL

Water quality standards

The quality of drinking water should be such that it must be safe to drink, it should also be acceptable to the community. In other words it should be wholesome as well as palatable.

Wholesome, water is free from

1. Disease producing organisms
2. Harmful chemicals like excess fluoride, Arsenic and other Toxic chemicals.

Palatable water

Palatable water is that which is physically acceptable, does not have any bad taste, odour, or colour and is clear, that is not turbid.

Buzz group exercise:

Form the participants in to 3 members of each in to a small buzz group and ask them to discuss on the two types of standards (handover the HANDOUT WQ standards before telling the methodology of the session)

1. Essential physico-Chemical standards of water quality &
2. Essential bacteriological standards

After 5 minutes, ask key questions and extract answers. Write on a flip chart. Once you are confident that the participants understood the concept, ask some volunteers who can do a role play of communicating the WQ standards to a VWSC.

SAFE WATER

Water is defined as safe if it is free from biological contamination (guinea worm, cholera, typhoid etc.) and within permissible limits of chemical contamination (arsenic < 0.05 mg/l, fluoride < 1.5 mg/l, brackishness < 2000 mg/l, iron < 1 mg/l, nitrate 45 mg/l etc.) as per IS-10500 standard of BIS

HANDOUT – WQ standards (Please printout in a separate page and give one copy to all the participants)

Essential physico-Chemical standards of water quality:

Expert bodies, both international and national, have prescribed threshold limits for various parameters for treated drinking water. It is prudent to bring out the essential elements of these that are usually useful and important for the grassroots level persons in the rural areas. Such standards are tabulated below.

Sno	Characteristics	Upper permissible limit	Upper limit beyond which may cause rejection
1	Turbidity (Measure of clarity in NTU scale)	2.5	10
2	Chlorides, as Cl (mg/litre)	200	1000
3	Flourides, as F (mg/litre)	1.0	1.5
4	Arsenic, as As (mg/litre)	0.05	0.05
5	Iron, as Fe (mg/litre)	0.3	1.0

Essential bacteriological standards:

Sno	Characteristic	Number/100 ml
1	Untreated water entering the distribution system	Faecal coliform 0; 3 coliforms organisms in any one sample, 0 is any two consecutive samples; 0 in any 98% of yearly samples.
2	Un piped supplies	Faecal coliforms 0 Coliform organisms 10
3	Emergency supplies of drinking water	Faecal coliforms 0 Coliform organisms 10

Session 5: Methods of preventing source contamination

Objective of the session:

To enhance the knowledge of participants on various methods of preventing source contamination.

Expected outcomes of the session:

Once the session is completed all the participants enhanced their skills on communicating effectively on ways of preventing source contamination among the rural communities

Methodology:

- (1) Interactive lecture method

Contents covered in the session:

1. Methods of prevention of source contamination

Tools required for the session:

- a. Prepared flip charts written in local language
- b. Posters and flip book if any

How to conduct the session:

Ask the participants the following questions -

Do you have an idea of preventing source contamination?

What are various methods?

GET some answers from participants, write on the flip chart,

THEN, summarise the answers on what your participants told on flip chart. Use the following note to explain to the participants.

NOTE TO TRAINER:

PREVENTION OF SOURCE CONTAMINATION:

- A) **Hygienic maintenance of the Source of water and the prevention of pollution:**

1. The platform of the wells/hand pumps/stand post of the drinking water must be properly maintained. There must be a proper lead-drain to take the used water away. This will prevent the stagnation of water. Also, it will not allow the polluted water to reach the aquifer through cracked, broken platform in case of tube wells/wells
 2. Nobody should be allowed to defecate, bathe or wash in the vicinity i.e., in a 10 meter radius of the source.
 3. If Soak pits or leach pits are constructed for sanitation purposes, they must be located at a safe distances. In the absence of available safe distance, a minimum of 10 m distance should be maintained. Similar stipulations are applicable for Kutcha drains.
 4. Any drain discharging in to the river/pond should be down streamed of the source well/away from the source well. IF that is impossible, it should be diverted safely.
 5. In the case of dug wells, in addition to the above, there must be a parapet wall and a well cover. The outside surface of the parapet wall and inside surface of the well up to at least 5 metres below the ground should be made impervious by plastering it with rich cement mortar.
- B) The other means of preventions is the prevention against possible contamination at the source or during transmission (in the case of piped water, storage and distribution by close vigilance.

Session 6: Water Sustainability – Community Lead Water Recharge

Objective of the session:

To enhance the knowledge of participants on various methods of enhancing water sustainability

Expected outcomes of the session:

Once the session is completed all the participants enhanced their understanding on few ways of recharging water

Methodology:

1. Interactive lecture method
2. Group work

Contents covered in the session:

1. Ground water recharge

Tools required for the session:

- I. Prepared flip charts written in local language
- II. pictures

How to conduct the session:

Ask the participants the following questions -

Where this water is coming from?

Get some answers, don't be panic, you will be getting various answers.

PUT them on a flip chart.

Ask follow up questions, What happens if there are no rains? If the rivers are full?

What happens if the ground water is completely used by people?

Where is the water?

How many households in the you village have access to piped water connections/

What percentage is this?

Why others have not got the connections?

What is the solution for providing water to all households in a continuous manner?

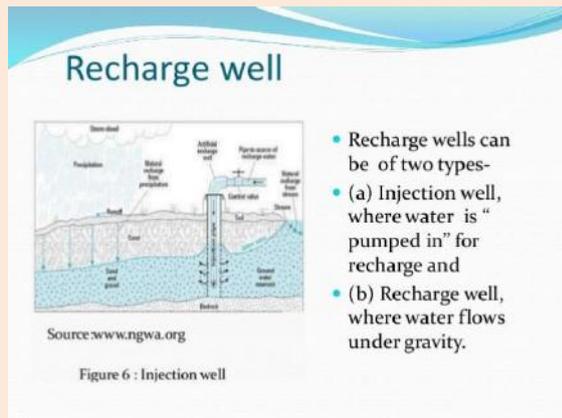
THEN ask how to save water in the ground?

TELL about the concept of ground recharge..

NOTE:

Traditional Recharge Systems





Groundwater is recharged naturally by rain and liquids from various sources. Recharge may be impeded somewhat by human activities including paving, development, or logging. These activities can result in loss of topsoil resulting in reduced water infiltration, enhanced surface runoff and reduction in recharge. Use of ground waters, especially for irrigation, may also lower the water tables. Groundwater

recharge is an important process for sustainable groundwater management.

Design of groundwater recharge structures for Recharge of aquifers:

In places where the withdrawal of water is more than the rate of recharge an imbalance in the groundwater reserves is created.

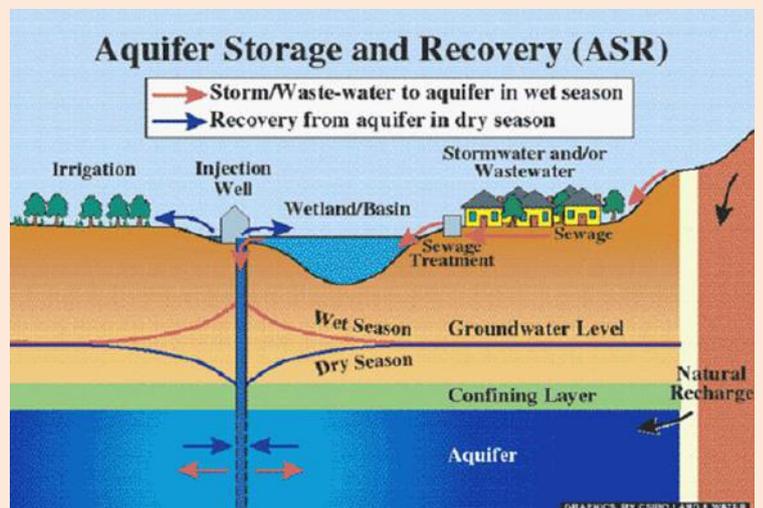
Recharging of aquifers are undertaken with the following objectives:

- To maintain or augment natural groundwater as an economic resource
- To conserve excess surface water underground
- To combat progressive depletion of groundwater levels
- To combat unfavourable salt balance and saline water intrusion
- Design of an aquifer recharge system

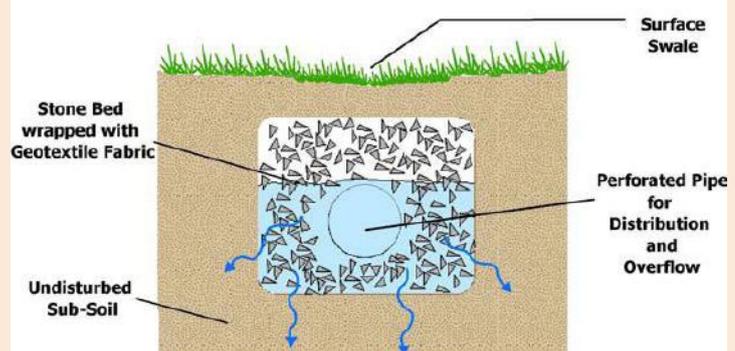
To achieve the objectives it is imperative to plan out an artificial recharge scheme in a scientific manner. Thus it is imperative that proper scientific investigations be carried out for selection of site for artificial recharge of groundwater.

For designing the optimum capacity of the tank, the following parameters need to be considered:

- 1) Size of the catchment
- 2) Intensity of rainfall



INFILTRATION TRENCH



3) Rate of recharge, which depends on the geology of the site

- The capacity of the tank should be enough to retain the runoff occurring from conditions of peak rainfall intensity
- The rate of recharge in comparison to runoff is a critical factor. However, since accurate recharge rates are not available without detailed geo-hydrological studies, the rates have to be assumed.
- The capacity of recharge tank is designed to retain runoff from at least 15 minutes rainfall of peak intensity.

Design of a recharge trench

The methodology of design of a recharge trench is similar to that for a settlement tank. The difference is that the water-holding capacity of a recharge trench is less than its gross volume because it is filled with porous material. A factor of loose density of the media (void ratio) has to be applied to the equation. The void ratio of the filler material varies with the kind of material used, but for commonly used materials like brickbats, pebbles and gravel, a void ratio of 0.5 may be assumed. Using the same method as used for designing a settlement tank:

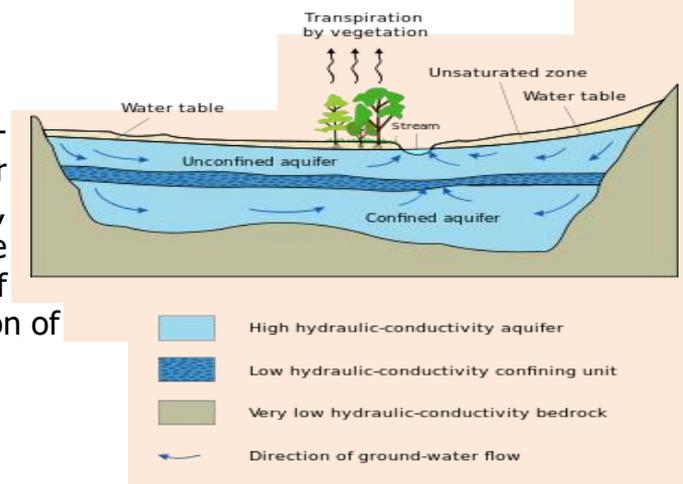
Assuming a void ratio of 0.5, the required capacity of a recharge tank

$$\begin{aligned} &= (100 \times 0.025 \times 0.85)/0.5 \\ &= 4.25 \text{ cu. m. (4,250 litres)} \end{aligned}$$

In designing a recharge trench, the length of the trench is an important factor. Once the required capacity is calculated, length can be calculated by considering a fixed depth and width.

What is the meaning of an aquifer?

An aquifer is an underground layer of water-bearing permeable rock, rock fractures or unconsolidated materials (gravel, sand, or silt) from which groundwater can be extracted using a water well. The study of water flow in aquifers and the characterization of aquifers is called hydrogeology



ASK the participants, whether they are away of any govt schemes which provide support in promoting recharge pits in villages?

GET the answers and TELL that NREGA provides an opportunity to dig recharge pits in villages, both in public and private places. The panchayat need to identify those families who wanted to go for recharge pits and submit applications to the NREGA field assistant to include in the shelf of project. Aim for initiating as many recharge pits as possible in their village. The goal is very household to have a recharge pit so that there will be immense improvement in the ground water level of the village.

GET the commitments from each participant on how many recharge pits they are going to promote in each village.

Session 7: Monitoring of contaminated sources

Meaning of monitoring

Ask the participants what is the meaning of monitoring?

GET the answers

Meaning of Monitoring: Observe and check the progress or quality of (something) over a period of time; keep under systematic review.

Then what is the meaning of water quality monitoring?

Observe and check the quality of water on a periodic basis.

How you will check the quality of water?

Period sample collection of water from various sources and testing them.

Where is testing happens?

Water Testing is done at two places. One is at the labs and one is at the panchayat level

Where are the water testing labs in your nearby panchayats?

The facilitator explains the nearest Water testing laboratories with their exact locations

Also explain the FTK and how this is used, what kind of results are generated out of the FTKs.

Purpose of monitoring?

Ask the participants why there is a need to monitor the water quality?

GET answers from participants and explain the purpose of monitoring Water Quality.

Purpose is to check whether the water quality parameters, standards as we discussed earlier are in permissible limits or beyond the permissible limits.

What to be monitored?

So in the monitoring process what to monitor?

Explain the participants the following chart, while explaining, take some local examples, use certain local methods while explaining.

Use some water samples, use some simple methods to demonstrate the Physical, chemical and biological properties. Please avoid explaining in detailed on the technical terms. The idea is to give the participants an idea of three properties.

Property	What to track?
Physical properties	<ul style="list-style-type: none"> • Water Temperature • Specifics Conductance or EC, Electrical Conductance, Conductivity • Total suspended solids (TSS) • Transparency or Turbidity • Total dissolved solids (TDS) • Odour of water • Color of water • Taste of water
Chemical indicators	<ul style="list-style-type: none"> • pH • Biochemical oxygen demand (BOD) • Chemical oxygen demand (COD) • Dissolved oxygen (DO) • Total hardness (TH) • Heavy metals • Nitrate • Orthophosphates • Pesticides • Surfactants
Biological indicators	<ul style="list-style-type: none"> • Ephemeroptera • Escherichia coli (E. coli) • Coliform bacteria

Who will monitor?

Ask the participants who are responsible to monitor the Water Quality.

GET some inputs from the participants. Participants may say that it is govt's role. Then probe further and explain the participants that who are the victims in case of consumption of contaminated water sources.

TELL the participants on the number of Labs, no of lab technicians per mandal, per district and relate the number of population's vs the number of staff to disseminate the message to Panchayats.

ALSO Panchayats and Village Water Sanitation Committees are advised to take the responsibility of conducting water testing and disseminating the results to the entire village in case of contamination of water sources.

ASK: How to know whether water is contaminated or pure?

Who will do the testing?
Where it is done?
Who will collect the samples?
What is tested?
What to do with the results?

TELL

The District / Sub-division Level Water Testing Laboratory must have facilities of testing the following parameters viz. (*NRDWP Guidelines*)

1. Ph
2. Total Hardness
3. Iron
4. Chlorine demand
5. Residual Chlorine
6. Nitrate
7. Fluoride and Arsenic where ever it has been identified and detected
8. In addition to above tests there will be provision for bacteriological analysis of water to determine if there is any faecalcontamination

FURTHER

ASK How to communicate?

What are various easy and effective ways of communicating water quality testing results in your village?

Ask the participants how to you communicate various common community messages with in the panchayat.

GET the participants responses.

LIST down all the responses.

After spending some time..

SHOW the Water Testing results form to the participants.

ASK the participants, which is the best mechanism to disseminate the testing results/report, certain immediate actions based on the testing.

GET the participants responses.

NOW

Give some ideas on how they can spread the key messages related to Water Quality.

1. Tom Tom (if the message is very urgent)
2. Spreading through SMS alerts (If the water pollution is very serious)
3. Temple mikes (if the water contamination is too serious)
4. Gramasabhas (If the message is not so urgent)

Roles and responsibilities of various stakeholders in the panchayat in monitoring:

Stakeholders	WQ monitoring responsibility	When to monitor
Lab assistants	Test results report sharing to Panchayat	
Panchayat (Sarpanch and Secretary)	Discuss the testing results and immediate actions to be taken in the Village Water and Sanitation Meeting	Immediately after receiving the results
Village Water and Sanitation Committees	Spreading the message to the entire village if there is an emergency of usage of water, in case of critical high limits and contamination, stop order on usage of water Ensure the remedial actions are taken by Panchayat	Immediately after receiving the results
ASHA	ASHA of NRHM. They will also authenticate the test results of Field Test Kits used in the village	Immediately after receiving the results
Anganwadi Workers, School Teachers, GP members, Social Workers etc.	will continue to be utilized for the surveillance programme	Regular
Village Organisations	Spreading the message of water quality results among the SHG members in their monthly meetings and village Organisations meetings	Continuously in their monthly meetings
SHGs	Spread the message among their members	Continuously in their monthly meetings

Sl. No.	Role of VWSC member	Role of ASHA (NRHM)
i	Ascertain drinking water adequacy at the household level including cattle needs.	Ascertain water and excreta related diseases at the household level as per the NRHM format
ii	Identify all sources of drinking water for different purpose	Collect sample for testing and transfer at the PHC for testing biological parameters
iii	Test all the sources by field testing kits	Carry out sanitary inspection of all the sources
iv	Collect sample for testing and transfer to the proposed Sub-division Water Testing Laboratory for testing both chemical and biological parameters	Take corrective measures along with VWSC member (1) to prevent pollution of drinking water sources
v	Record details of water supply sources and system in the village/GP	Record keeping of all water and sanitation disease related data
vi	Tariff collection from every household and management of water supply scheme at the GP level.	Advocacy on hygiene promotion and disease prevention issues at the household level.
vii	Carry out awareness activities on water related issues	Carry out awareness activities on sanitation related issues
viii	Any other task assigned by GP President related to rural water supply activities	Any other task assigned by GP President related to rural sanitation activities

III effects beyond permissible limit, impact on Human health

S.no	Characteristics	Upper limit of concentration	Bad effects
1	Turbidity (Measures of clarity)	10 NTU	Likely to be rejected by users
2	Arsenic	0.05 mg/litre As	As Chronic Arsenic poisoning leads to skin lesions, muscular weakness, lower limb paralysis, and prolonged intake causes skin and lung cancer.
3	Fluoride	1.5 mg/litre as F	Long term intake above 1.5 mg/Litre causes dental fluorosis (Mottling of teeth) and higher exposure causes skeletal fluorosis when born structure is affected badly.
4	Chloride	1000 mg/Litre as Cl	Chloride above 1000 mg/litre makes the water saline and liable to be rejected by the community

5	a) MPN count of Coli form organisms b) E.Coli Count	10/100 ml Nil	Bacteriological count above the permissible limits indicates possible contamination with pathogen leading to diseases like Typhoid, Diarrhoea, Dysentery, Cholera, Jaundice, Polio etc,.
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HANDOUT:

Format for Monitoring Indicators

Habitation Name: _____ Block: _____ District: _____

Sno	Particulars	Status
1	Total no. of Safe Water Sources/ Service access points in the habitation (Nos):Handpumps, (2) Piped Water Supply Schemes (3) Others	
2	Number not functional*, (and %) Since when not functional and Reasons for non-functionality.	
3	Number from which supply is not available round the year/ affected by Seasonal variations (Nos and %)	
4	Hours and quantity of Supply to different areas	
5	Number Affected by Water Quality problem* (Nos and %) Type of water quality problem	
6	Availability of drinking water supply in (1) SC, (2) ST and (3) minority concentrated areas of village.	
7	Type of sustainability structures taken up for drinking water Sources? Number of each type of structure.	
8	Who bears the cost and responsibility of O & M of water supply Schemes? (Gram Panchayat – 1, VWSC-2, Water Supply Department PHED-3, No one or N/A – 4, Others -5 (Please Specify))	
9	No. of Drinking Water sources for which quality test done using (a) Field Test Kits, (% of total sources) (b) in laboratories (% of total sources)	
10	Total no. of Schools in the habitation (Nos)	
11	No. of Government Schools having functional (with %) (a) Safe drinking water supply, (b) handwashing facility (c) Adequacy (Nos)	
12	Total no. of Anganwadis in government building the habitation (Nos)	
13	No. of Anganwadis in government building having drinking water supply and Hand washing facility. (Nos)	

14	Is Village Water and Sanitation Committee in existence? Is it working? What is its role?	
15	Type of water treatment facility or provision – Whether working.	
16	Overall assessment of quality of drinking water in the habitation (Good-1, Average-2 & Poor*-3)	
17	Overall assessment of availability of drinking water in the habitation. (More than sufficient-1, Sufficient-2, & less than sufficient*-3)	
18	Satisfaction level of Villagers regarding (i) Quantity (ii) Quality (Good-1, Average-2 & Poor*-3)	

FORMAT 2:

Assessment of water contamination in a panchayat

1. Type of water source :
2. General information :
 - a. Name of the village :
 - b. Gp name :
 - c. Mandal :
 - d. District :
3. Sarpanch / VWSC/ Community representative Signature:
4. Date visited :
5. Details of water quality :
 - a. Whether collected the water sample Yes / No
 - b. Sample number of any :
 - c. Acceptance of the sample: Accepted / Rejected
6. Examination of contamination:
 - a. Toilet is located 30 metres away from water Bore well : Yes / No
 - b. Toilet is located in High rise which is close to the bore borewell: yes/no
 - c. Are there other sources of contamination located 10 m away from bore well (Dust, Animal excreta, human extreta) yes / No
 - d. Is there a unused dilapidated well, waste water pits close to the bore well yes / no
 - e. Is the water supply line visible clean or not (visible leakages, water stagnation etc) yes / no
 - f. Is there a fencing around the bore well or not to protect from the animals yes / no

HAND OUT:

Water quality information collection and reporting

Following schematic diagram represents the flow of information regarding water quality by legitimate local institutions as approved in the NRDWP guidelines.

School students, NGO volunteers, Angawadi workers, and any trained persons from the villages/panchayats

Responsibilities

Collection of water samples, Physical, chemical and biological tests, Chlorine tests, Observation of Water borne diseases in the village

Village level institutions/agency
Water and Sanitation Committee (VWSC)

Responsibilities

1. Testing of physical, Chemical and Biological properties of water using water testing kits
2. Maintaining the records of Water Chlorine, bacteriological tests, conducting physical and chemical tests
3. Conducting 30% of water samples which were tested in the panchayat, in case of traces of contamination, send them to district labs for further testing
4. Conduct a Water Sanitation survey once in a year and develop water quality maps of the village and panchayat
5. Initiate required remedial actions
6. Send the filled in monthly and quarterly water quality reports in suitable forms to district water and sanitation committee (DWSC)
7. Intimate the higher authorities in case of water borne diseases
8. Conduct required trainings/orientations to the villagers on the importance of water quality, water borne diseases, impact on health, de-fluoridation and remedial measures to be taken

Mandal level Agency

FORM 2:

MONTHLY WATER QUALITY ASSESSMENT REPORT

Month:..... Date of collection:..... Year:.....

Name of the village:

Name of the panchayat:

Mandal:

District:

Place from where the water sample is collected:

Test	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
Physical												
Residues												
CHEMICAL												
Ph												
Hardness												
Chloride												
Iron												
Nitrite												
Fluoride												
Alkalinity												
R.C												
Bacteriological												

Conclusion:

Suitable for drinking:

Not suitable for drinking:

Details of persons who tested water:

Designation:

Date:

Signature:

Form no: 3

Quarterly assessment Report

Community based water quality monitoring and surveillance

FOLLOWING FORM IS USEFUL TO THE COMMUNITY IN MONITORING THE WATER QUALITY ONCE IN A QUARTER. WATER QUALITY TESTING TO BE DONE BEFORE AND AFTER THE RAINY SEASON.

Season:

Month:

Period of Water sample collected:

Name of the panchayat:

Name of the village:

Mandal:

Name of the person who tested the water sample:

No of families benefited due to the water testing:

WQ testing Details	GP water resources			Private Resources		
	Taps	Handpumps	Borewells	Handpumps	Borewells	Taps
Total sources						
Total tested						
Total disinfected						

Names of identified diseases:

Deaths due to water borne diseases:

Actions initiated by VWSC members:

Actions initiated by ASHA/AWW/others:

Details of expenditure:

Bank account no:

Details	Details of expenses			Surplus/Deficit

Date:

Name of the Monitor

Signature

Exercise (Group work)

Group work – form the participants in to small groups of 5 members each. Explain the following task.

Each group will discuss on three aspects

1. Discuss the roles of different entities in the water quality monitoring
2. Discuss what kind of data collected on a monthly basis
3. Discuss what kind of data to be collected on a quarterly basis
4. Also ask the participants how to engage various local institutions in bringing redial measures for the water quality issues in villages

Give 10 minutes for the discussion and ask the participants to present their work 5 minutes each

SUMMARISE THE WORK

OVER ALL SUMMARY OF THE SESSION ALSO

Post-test questionnaire

(This has to be conducted once all the sessions are completed)

1. What is the meaning of communication?
2. Why communication is important in water quality results dissemination?
3. What is community mobilisation? Why Community mobilisation is important?
4. What is the meaning of water quality?
5. What are the standards of water quality?
6. What is the meaning of contamination? What are various types of contamination?
7. What are the health effects of contamination?
8. How to prevent contamination?
9. How to monitor the source contamination?
10. Who are the responsible persons/institutions/organisations in a village in monitoring the source contamination?
11. How do you communicate the test results in an easy way to the panchayat?
12. What are the institutional mechanisms to communicate the water quality testing results?

13. What is your role in water quality testing and dissemination of tests results?

14. After the training, what changes do you see in your work?