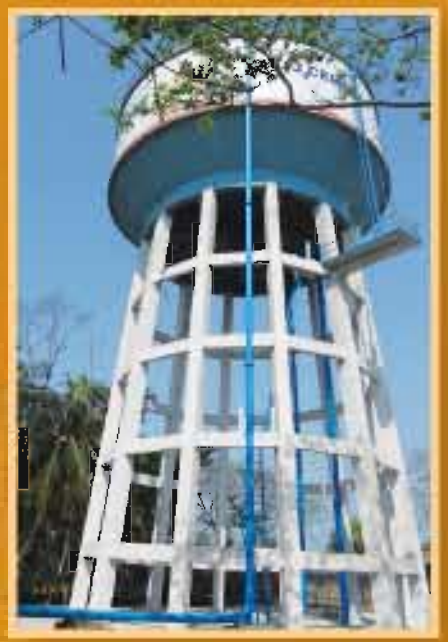
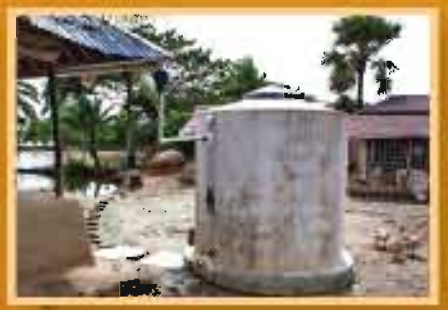
Water Safety Plan

WATER SAFETY PLAN
FLIP CHART





WATER SAFETY PLAN – FLIP CHART

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Water Safety Plan

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Water Safety Plan

Flip chart on WSP and few words

Users : The Flipchart has been prepared for the field staff for using in the courtyard meetings.

Objectives : To raise awareness of municipality or rural people on Water Safety Plan (WSP).

Particulars of the Flipchart:

- Pictorial presentation is made in one side of each page of the chart whereas information and questions are placed on the other side for the convenience of discussion by the field staff.
- This module contains 16 topics. Several topics may be discussed in a day or two topics can be discussed in a single session.
- During discussion of each issue, examples based on actual scenarios should be cited. Participants need to be questioned to perceive their understandings.
- The book titled "Let us know how to keep water safe" can be distributed among the participants of the courtyard meeting. This will help them to share the discussions with their family members.

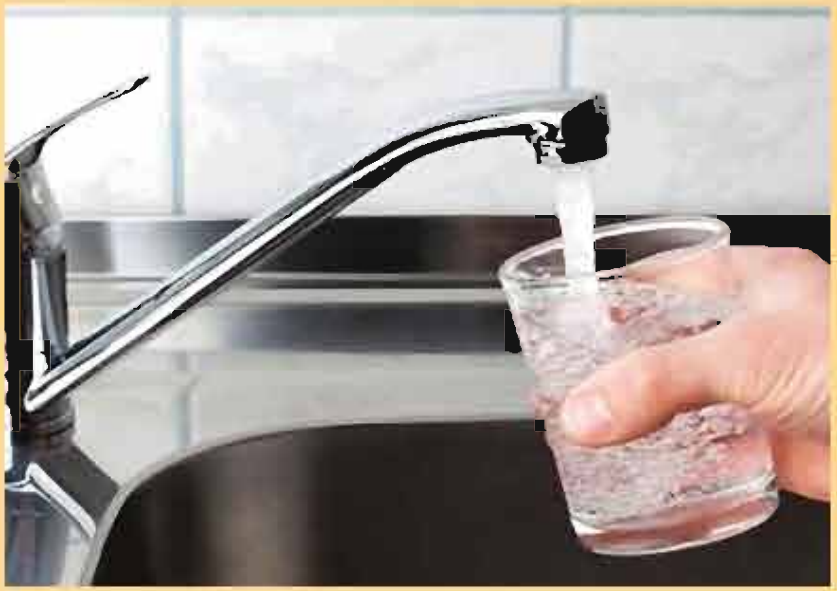
Water Safety Plan

Courtyard Meeting-wise contents of the flipchart

Meeting - 1	:	Topic-1	: What is safe water? What is WSP? Who needs to know about WSP?
Meeting - 2	:	Topic-2	: How water is contaminated? What are the health concerns of drinking contaminated water?
		Topic-3	: From what sources, and using which technologies, do we get water?
Meeting - 3	:	Topic-4	: What will indicate risk of contamination in piped water supply system?
		Topic-5	: What will indicate safety of water in piped water supply system?
Meeting - 4	:	Topic-6	: What will indicate risk of water contamination in tap-stand?
		Topic-7	: What will indicate water safety in tap-stand?
Meeting - 5	:	Topic-8	: What will indicate risk of water contamination in tubewell?
		Topic-9	: What will indicate safety of water from tubewell?
Meeting - 6	:	Topic-10	: What will indicate risk of water contamination in PSF?
		Topic-11	: What will indicate safety of water from PSF?
Meeting - 7	:	Topic-12	: What will indicate risk of water contamination in rainwater harvesting system?
Meeting - 8	:	Topic-13	: What will indicate risk of contamination and safety of ring-well water?
Meeting - 9	:	Topic-14	: How can we have safe water during emergency?
Meeting - 10	:	Topic-15	: How to keep water safe during collection, transportation, preservation and use?
Meeting - 11	:	Topic-16	: What are the different stages of WSP?
Meeting - 12	:	Topic-17	: What are the mechanism for information and complaint on water supply?
		Topic-18	: What are the social responsibilities to keep water safe?

Water Safety Plan

Topic-1: What is safe water? What is WSP?
Who needs to know about WSP?



Water Safety Plan

Topic-1: What is safe water? What is WSP? Who needs to know about WSP?

- Water is essential for human body. However, the typical saying of 'water is life' is only true if water is safe. Many people deem clear and transparent water as safe. This conception is not correct, as harmful microorganisms, which are generally tiny in size and cannot be seen with bare eyes, may be present in clear water.

- Water free from microorganism and contains chemical and minerals in allowable limit is Safe water. Safe water is potable and free from color and odor.

- Water safety plan (WSP) is a comprehensive risk assessment and risk management approach that encompasses all steps in the water supply from catchment to consumer to ensure the safety of a drinking-water supply consistently. Objective of keeping water safe is to protect health from various waterborne diseases. To realize the desired health benefit all of us (be it general people or water supply operators or water entrepreneurs) should know and practice WSP.

Questions for discussion:

Do we all want to drink safe water? Why is so?

What is WSP? What is the purpose of WSP?

Who needs to know about WSP?

Next topic of discussion: How is water contaminated? What are the health concerns of drinking contaminated water?

Water Safety Plan

Topic-2: How water is contaminated?
What are the health concerns of drinking contaminated water?

Health concerns of using contaminated water

Germ affected water is contaminated water. Diseases like diarrhea, cholera, dysentery, typhoid, hepatitis and jaundice are caused by drinking this water.

Water with excessive arsenic i.e more than the tolerable level is contaminated water. Arsenicosis disease breaks out by drinking this water.

Water with excessive salt and iron i.e more than the tolerable level is contaminated water. Generally, people drink this water less than required causing dehydration and skin diseases.

If affected by these diseases

- Body will be weakened
- Work will not be done
- Income will be less
- If disease turns serious it can even cause death

Water Safety Plan

Topic-2: How water is contaminated?
What are the health concerns of drinking contaminated water?

Means of water contamination:

Water becomes contaminated if groundwater contains high level of chemical contaminants (e.g., arsenic, chloride, manganese) or water is exposed to microorganisms. Dumping of waste pollutes surface water. Water can be contaminated if the water supply system is not operated properly, and/or the distribution line is faulty or leaking, and/or operation and maintenance (O&M) is not carried out regularly. In addition, poor hygiene practice like use of unclean container during collection, transportation, preservation and use may lead to recontamination of water.

Health impacts of drinking contaminated water:

Drinking of water contaminated with microorganisms causes diseases like diarrhea, cholera, typhoid, hepatitis and jaundice. Drinking of arsenic contaminated water causes Arsenicosis. People generally drink less amount of water than required if it is saline or have high amount of iron causing dehydration. The diseases caused by drinking of contaminated water weaken the body, hinder regular work/activities and lessen the income. If disease turns serious, it can even lead to death. Certainly, no one of us wants to suffer from diseases or die due to unsafe water. Therefore, we have to maintain safety of water and implement WSP.

Questions for discussion:

Which water is contaminated?

What are the health concerns of drinking contaminated water?

Do we want to suffer from disease or die because of unsafe water?

Next topic of discussion: From what sources, and using which technologies, do we get water?

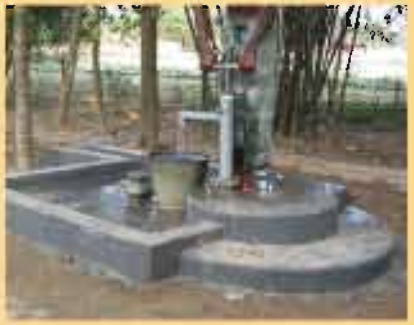
Water Safety Plan

Topic-3: From what sources, and using which technologies, do we get water?

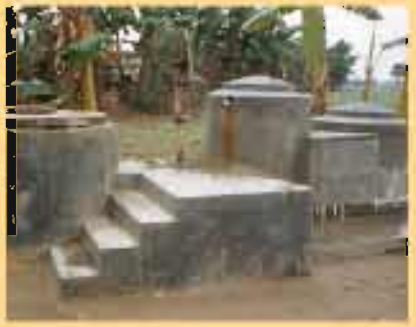
Different technologies to abstract groundwater

Piped water supply system

Deep/Shallow Tubewell



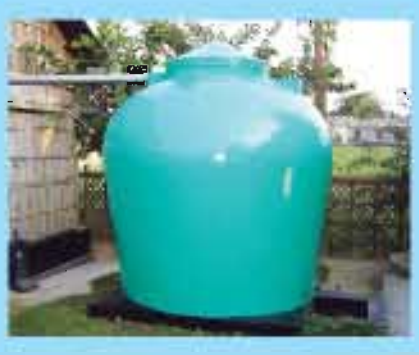
Tara pump



Ring-well/Dug-well

Different technologies to fetch surface and rainwater

Piped water supply system



Rainwater harvesting system

Pond Sand Filter (PSF)

Gravity Flow System (GFS)

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Topic-3: From what sources, and using which technologies, do we get water?

- Generally, we get water from three sources: (a) surface water (b) groundwater and (c) rainwater. We collect water from these sources through various technologies. It is easier to take preventive measures to keep water safe if we know how water becomes contaminated in these sources.

- We abstract groundwater using various technologies such as piped water supply, deep/shallow tubewell, tara pump, ring-well/dug-well etc.

- Many of us get water from surface water or rainwater sources through technologies like piped water supply, rainwater-harvesting system, pond sand filter (PSF), gravity flow system (GFS) etc.

Questions for discussion:

What are the sources of water?
Through which technologies do we get water from these sources?

****Ask the participants about the source from which they collect water at home.**

Next topic of discussion: What will indicate risk of contamination in piped water supply system?

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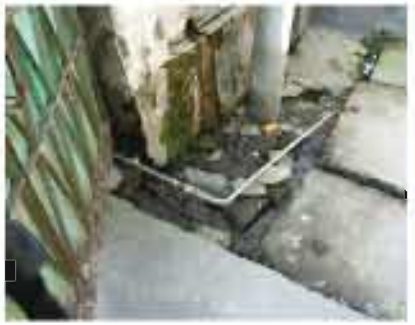
Topic-4: What will indicate- risk of contamination in piped water supply system?

Water connections is not made properly with standard material

Leakage in pipeline

Pipes are not well protected while crossing canal/drain



Weak joints in pipeline at drain crossing

Lichen has grown on the surface of the water reservoir

Water reservoirs is not cleaned regularly

Opening of manhole is at the same level of the top surface of the reservoir

If lid is not attached with the manhole of the reservoir

Water Safety Plan

Topic-4: What will indicate- risk of contamination in piped water supply system?

- In piped water supply system treated surface and groundwater is provided to consumers either by direct pumping or through overhead tank. Consumers collect water directly or by means of ground and/or overhead reservoir. In this process, there are some risks of water contamination as illustrated in the pictures of the opposite slide.

- Dirty water may ingress through leaking pipe if improper connections are made through unskilled plumbers. If inferior quality materials are used in pipe-joints and house connections the chances of damage and leaks increase eventually posing high risk of water contamination. Illegal connections results various holes in the pipelines that are not sealed properly causing mixing of dirty water from the surroundings. If the earth cover of the distribution line is washed or thrust blocks are not placed in the bends of the distribution line, the pipes can easily be damaged that poses risk of water contamination. Chances of leakage and hence water contamination increases if the pipes are very old and poorly maintained.

Questions for discussion:

How can we understand that water is being polluted in piped water supply system?

Next topic of discussion: What will indicate safety of water in piped water supply system?

Water Safety Plan

Topic-5: What will indicate- safety of water in piped water supply system?

Connections are properly done in pipe network

Pipes are well protected in canal/drain crossing

Manhole is slightly raised than the top surface of the reservoir and it is covered firmly with a lid

The reservoir surface is neat and clean and has no crack in it

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Topic-5: What will indicate- safety of water in piped water supply system?

Important measures to control the risks of water contamination in piped water supply system are pictorially presented in the opposite slide. Few more aspects that need to be ensured are as below.

- Reservoir should be cleaned regularly (at least quarterly) so that it is free from dirt such as lichen, cobweb, weeds etc. The manhole of the reservoir should be raised (4 to 6 inches) from the top surface of the reservoir so that stagnant water from outside cannot seep through the manhole. Any leakage or crack in the reservoir should be repaired instantly.
- The pipelines should be regularly monitored for leakages and damages as well as status of protective covers. If the protective earth cover is eroded, it should be refilled immediately. Very old and dilapidated pipes should also be replaced.
- House connections should be done by skilled plumber using high quality materials.

Questions for discussion:

What are the measures to keep water safe in piped water supply system?

Next topic of discussion: What will indicate risk of water contamination in tap-stand?

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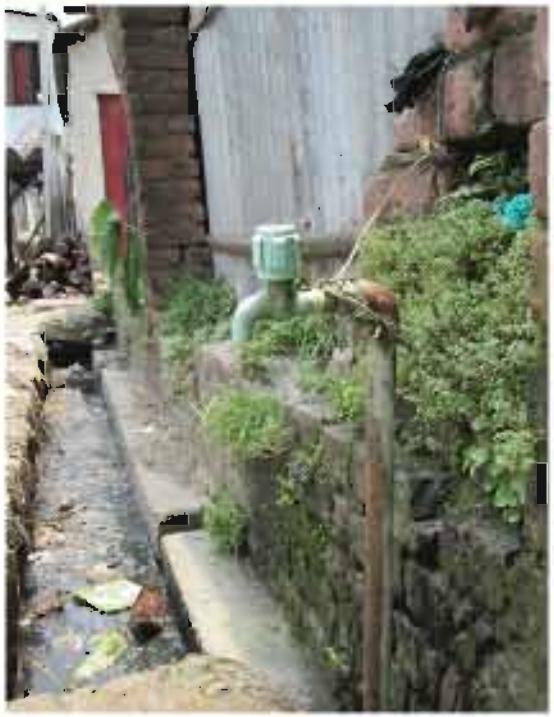
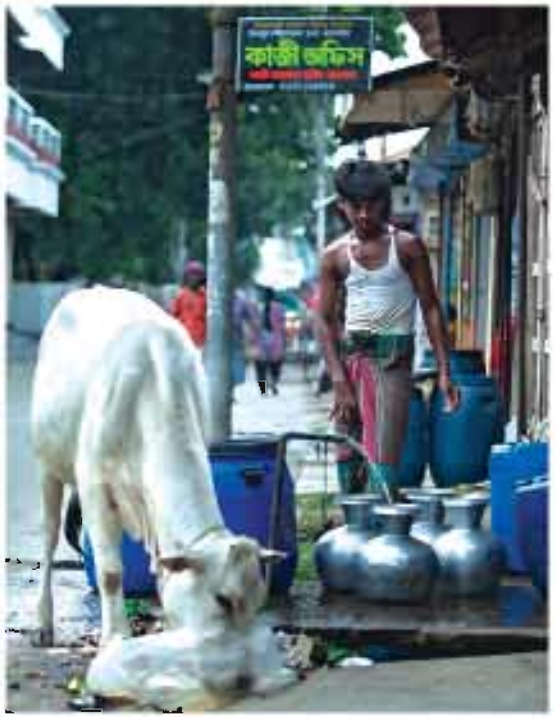
Topic-6: What will indicate- risk of water contamination in tap-stand?



Tap-stand is placed adjacent to waste drain; platform of the tap-stand is broken or missing; water stagnates at the base of the stand



Garbage is dumped adjacent to the tap-stand

Water is stored and collected in unhygienic way by making open hole in the ground

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Topic-6: What will indicate- risk of water contamination in tap-stand?

Risk of water contamination in tap-stand is pictorially presented in the opposite slide. Major threats of water contamination are:

- Surrounding of the tap-stand is dirty and there are feces or other waste adjacent to the tap-stand.
- There are unsanitary urinal/ latrine near the stand post.
- The pipes are leaking and/or the tap is missing.
- Tap-stand is placed adjacent to sewerage line or waste drain using low quality materials.
- Water is stored and collected in unhygienic way by making open hole in the ground.

Questions for discussion:

How can we assess the risk of water contamination in tap-stand?

Next topic of discussion: What will indicate water safety in tap-stand?

Water Safety Plan

Topic-7: What will indicate- water safety in tap-stand?

Bibcock is used in the tap-stand; there is no leakage in the pipe or the joints of the tap-stand

There is no waste drain adjacent to the tap-stand; the platform is tidy and well built; there is no stagnant water in the base of the tap-stand and the surroundings are neat and clean

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Topic-7: What will indicate- water safety in tap-stand?

If the situation of tap-stand is as presented in the opposite slide then it should realize safe water. Different issues that need to be observed in this regard are:

- Pipelines should not be laid adjacent to sewerage or waste drains. If the situation cannot be avoided, sufficient sand envelope should be used around the pipeline.
- Unhygienic urinals/ latrines do not exist close to (within 30 feet) the tap-stand.
- There is a well-maintained platform at the base of the tap-stand. The drainage system is good and no water stagnates in the platform.
- Instead of digging hole to collect water in unhygienic condition, water supplier should be consulted to increase system pressure. If necessary, a proper underground reservoir should be constructed.

Questions for discussion:

What are the measures to keep tap-stand water safe?

Next topic of discussion: What will indicate risk of water contamination in tubewell?

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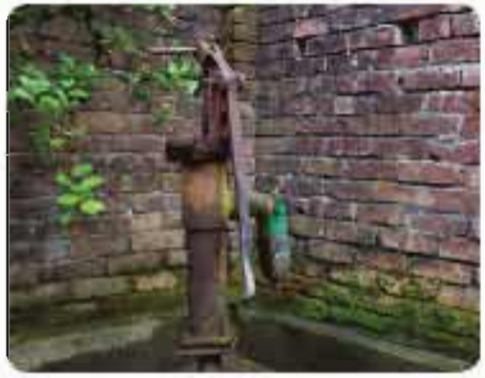
Topic-8: What will indicate- risk of water contamination in tubewell?

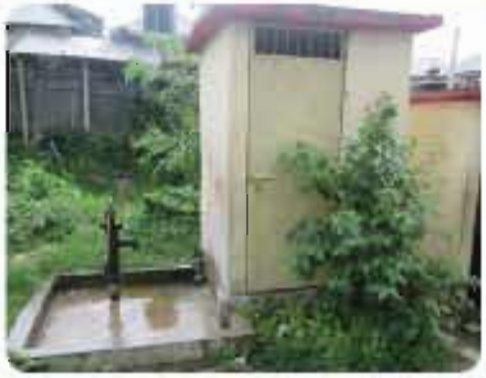
Tubewell platform is damaged or missing

Tubewell platform is unclean and/or water stagnates on it

Dirty cloth is fastened to the spout of the tubewell



Dirty plastic bottle or part of it is attached with the spout of tubewell



Latrine exists within 30 feet of the tubewell

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Topic-8: What will indicate- risk of water contamination in tubewell?

Potential risks of tubewell water contamination are presented in the opposite slide. In addition to those tubewell water may be contaminated:

- If the aquifer from which tubewell is abstracting groundwater is arsenic contaminated.
- If the platform is broken and/or dirty.
- If there is no sanitary seal at the base of the tubewell.
- If lichen grows on the body of the tubewell/ hand-pump.
- If there is no cover on the head of the tubewell so that bird dropping may enter into the tubewell.
- If contaminated water is used during generation of tubewell or while repairing of components like check-valve.

Questions for discussion:

How can we understand that tubewell water is contaminated?

Next topic of discussion: What will indicate safety of water from tubewell?

Water Safety Plan

Topic-9: What will indicate- safety of water from tubewell?

No dirty cloth or bottle is fastened with the spout of the tubewell; the tubewell body/ hand-pump is clean and its head is covered

Surrounding of the tubewell is clean and no water stagnates around the tubewell; There is a well maintained drain that quickly drains out extra water

Sanitary seal exists at the base of the tubewell and the platform is clean and well-built; The latrine is constructed more than 30 feet away from the tubewell

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Topic-9: What will indicate- safety of water from tubewell?

Tubewell water is generally considered safe, which is not always true. Because, the aquifer from which the tubewell abstract groundwater may be contaminated with various chemical elements such as arsenic, manganese, nitrate etc. Tubewell water is often passed through different technologies such as iron and/or arsenic removal filters to bring those chemical contaminants in tolerable level. Tubewell water may also be contaminated by microorganisms. Hence, to keep tubewell water safe we must have clear understandings on the risk of contamination and measures to control those risks as well as we need to act accordingly. Few pictorial presentations in this regard have been made in the opposite slide.

Questions for discussion:

What should be done to keep tubewell water safe?

Next topic of discussion: What will indicate risk of water contamination in PSF?

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Topic-10: What will indicate- risk of water contamination in PSF?

Cattle are grazed in the vicinity of the pond

Latrine is installed adjacent to the pond; lichen, water hyacinth etc. has grown in pond water

Chemical fertilizer or fish feed is used for aquaculture in the pond

Platform of PSF is broken or unclean or lichen has grown on the surface of filter chamber

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Topic-10: What will indicate- risk of water contamination in PSF?

Pictures regarding various potential risks of PSF water contamination are showed in the opposite slide. Important risks concerning contamination of PSF water are as below:

- The bank of the pond is at the same level or lowers than its surroundings and hence, contaminated floodwater or surface runoff may enter into the pond.
- The pond is used for bathing, washing clothes and utensils, and cleaning domestic animals.
- Latrine is installed adjacent to the pond; pit/septic tank of latrine is connected with the pond; cattle are grazed or waste are dumped adjacent to the pond.
- Water is not regularly extracted from the pond using tubewell or pump posing the risk of drying of filter bed. This will result loss of useful microorganisms cover at the top of the filter bed and hamper the treatment effectiveness of the PSF.
- Lid/cover of PSF is damaged, missing, or unclean; the tap is nonfunctional or missing and dirty bamboo strip or wooden cork is plugged instead of tap.
- Filter ingredients (e.g., sand, brick-chips, stone etc.) are not cleaned and refilled at regular intervals.

Questions for discussion:

How PSF water get contaminated?

Next topic of discussion: What will indicate safety of water from PSF?

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Topic-11: What will indicate- safety of water from PSF?

The platform of the PSF is tidy and water does not stagnate on it; the filter chamber and its surroundings are neat and clean

PSF is covered by a clean lid/cover and no lichen has grown on the surface of the filter chamber

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Topic-11: What will indicate- safety of water from PSF?

To get safe water from PSF we must have clear understandings on the risk of contamination and take necessary measures to control those risks. Important necessary measures are as below:

- The banks of the pond should be raised so that floodwater and surface runoff cannot enter into the pond. The pod should be protected by fencing all around to protect grazing cattle and other animals and other unwanted activities near the pond.
- Bathing, washing clothes and utensils and cleaning the domestic animals in the pond are prohibited. The overhanging tree branches are removed regularly. Lichen or hyacinth are not allowed to grow and cleaned regularly.
- No latrine is installed or no waste is dumped within 30 feet of the pond.
- The pond is not used for fish culture; no chemical fertilizer or fish feed is used in the pond.
- Water should be collected regularly trough pumping so that the filter bed is always wet. Filter media (e.g., sand, brick-chips, stones etc.) are cleaned regularly, and replenished when required.

Questions for discussion:

What are to be done to keep PSF water safe?

Next topic of discussion: **What will indicate risk of water contamination in rainwater harvesting system?**

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Topic-12: What will indicate- risk of contamination and safety of water in rainwater harvesting system?

Risk of water contamination

Measures to keep water safe

Water Safety Plan

Topic-12: What will indicate- risk of contamination and safety of water in rainwater harvesting system?

Risks of water contamination	Measures to keep water safe
■ The roof catchment is dirty and there are overhanging tree branches above the catchment. ■ The C.I sheet of roof catchment is rusted. ■ The tank surface is unclean or lichen has grown on it. ■ The gutter is unclean or clogged with dirty materials. ■ The first flush of rain is collected instead of using it clean the catchment and the gutters. ■ Asbestos roof is used as catchment.	■ The roof catchment is kept clean and overhanging tree branches are cut-off. ■ Roof having corrugated C.I. sheet is not used as catchment. ■ The tank is cleaned regularly and no lichen is allowed to grow in the surface. ■ The gutter is clean and free. ■ Before starting of rainy season, the tank and the roof are cleaned thoroughly with detergent. The first flush of rain is not collected allowing cleaning of the catchment and the gutter. ■ The surrounding of the system is kept tidy and asbestos roof are not used as catchment.

Questions for discussion:

How the water in rainwater harvesting system becomes contaminated?
What are the measures to keep water safe in rainwater harvesting system?

Next topic of discussion: What will indicate risk of contamination and safety of ring-well water?

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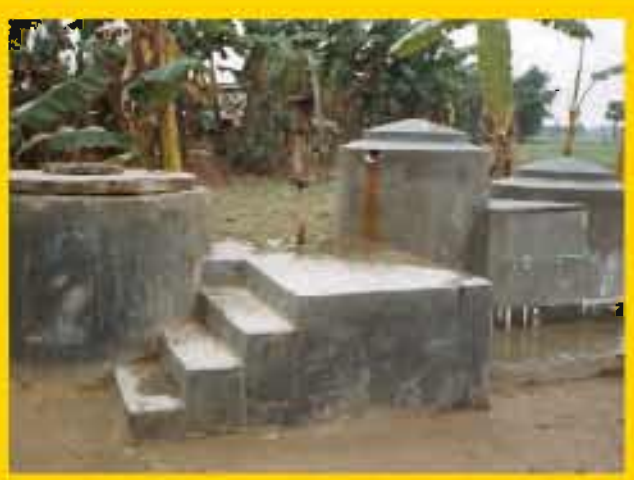
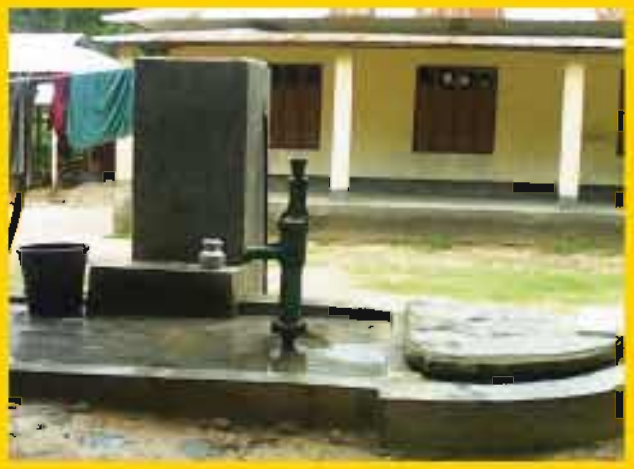
Topic-13: What will indicate- risk of contamination and safety of ring-well water?

Water may be contaminated if the ring-well is not covered; the platform is damaged or missing; water is lifted using rope and bucket.





The water from ring-well should remain safe

- if the well is covered preventing ingress of contaminated water into the well;
- the platform is undamaged, neat and clean;
- Instead of bucket and rope, water is lifted through hand pump.

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Topic-13: What will indicate- risk of contamination and safety of ring-well water?

Ring-well is used for fetching water where it is difficult to install tubewell or geo-physical condition is not favorable for other type of technologies. Different measures required to keep ring-well water safe are shown in the opposite slide and listed as below.

- The surrounding of the ring-well is kept neat and clean.
- Water is lifted using hand pump instead of bucket and rope.
- There is no latrine or dumped waste within 30 feet of the ring-well.

Questions for discussion:

What are to be done to keep ring-well water safe?

Next topic of discussion: **How can we have safe water during emergency?**

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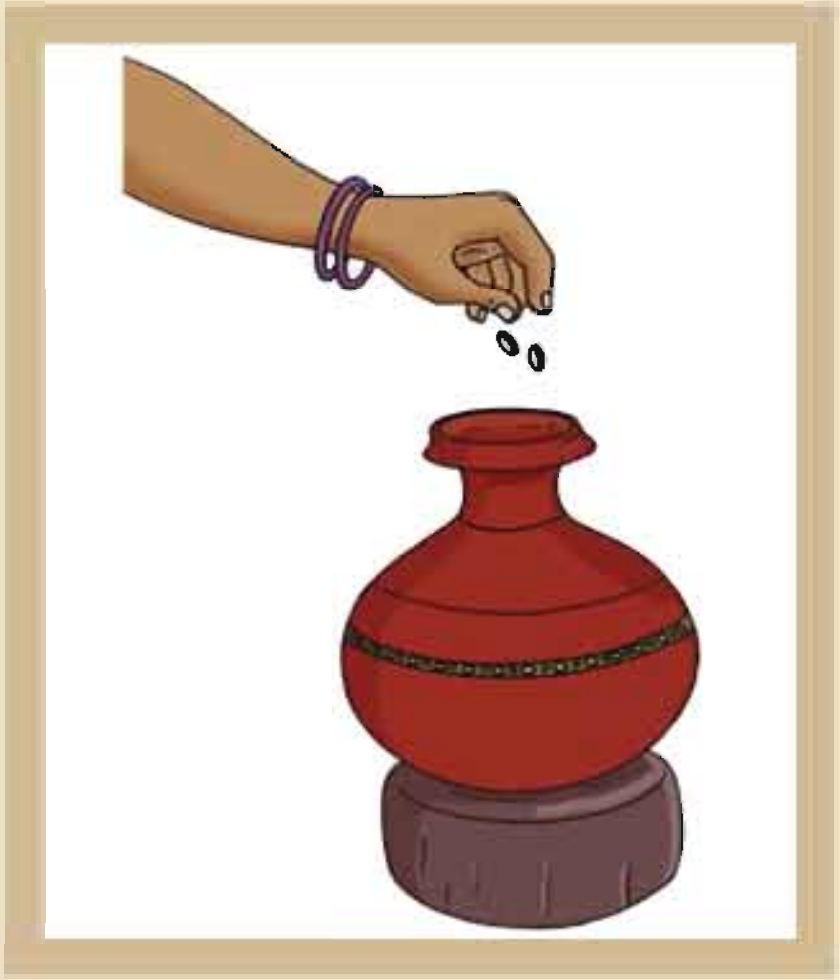
Topic-14: How can we have safe water during emergency?

By boiling water



Treating by alum/ water purification tablet

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Topic-14: How can we have safe water during emergency?

Simple measures can often ensure safe water for people during emergency. These include:

1. **Boiling water:** Water becomes safe if it is heated for 1-2 minutes more after started boiling.
2. **Using alum:** Half teaspoon of alum need to be properly mixed with 20 liters of water in a pitcher and after one hour around 90 percent of the top layer water should be poured into another vessel. The rest of the water with residues in the pitcher should be disposed of.
3. **Using water purification tablet:** Water can be made safe by adding chlorine tablets to it. During collection of tablets, it is important to known how many tablets are required to purify a certain amount of water.
4. **Using bleaching powder:** Turbid water can be made clear by mixing it thoroughly with alum and then filtering the stagnant water through strainer. Water becomes fully safe if water purification tablet or bleaching powder is applied to this clear water. Generally one-fourth (1/4) teaspoon of dry and white bleaching powder is required to disinfect 20 liters of clean water. During collection and use, bleaching powder can be checked for chlorine odor to verify the strength.

Questions for discussion:

How do we get safe water during emergency?

Next topic of discussion: How to keep water safe during collection, transportation, preservation and use?

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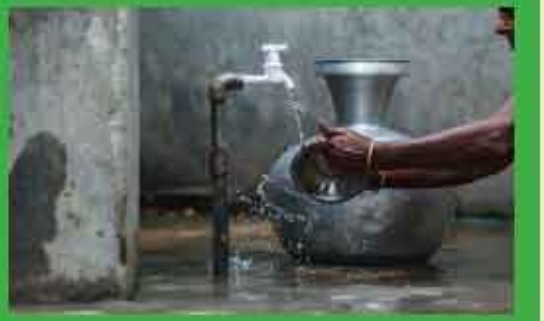
Topic-15: How to keep water safe during collection, transportation, preservation and use?

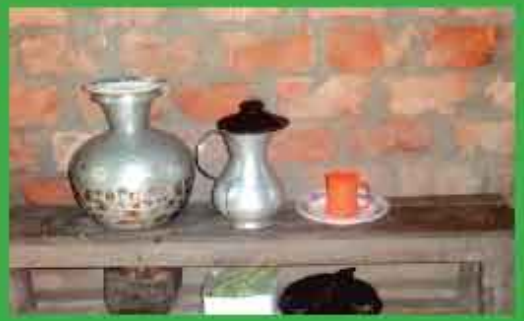
Should be avoided



Should be practiced





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Topic-15: How to keep water safe during collection, transportation, preservation and use?

Desired practice during collection and transportation	Desired practice during preservation and use
■ At first two hands should be washed properly with soap and clean water. ■ Then the water container and the lid need to washed similarly. ■ The lid of the water container should be slightly larger than the spout of the water container. ■ Water should not be carried without lid; water container should not be covered by dirty napkin or any part of dress. ■ After collecting water, hand or finger should not be dipped into the water.	■ The container filled with water should be preserved in raise and clean place. ■ The lid of the container should be kept in a clean place with upside-down during pouring water in the jar or glass. ■ Smaller mug or pot should not be sunk into the water container to collect water. ■ Fingers should not be in contact with water during pouring.

Questions for discussion:

What should be done to keep water safe during collection, transportation, preservation and use?

Next topic of discussion: What are the different stages of WSP?

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Topic-16: What are the different stages of WSP?

WSP ensures necessary control measures at five stages

1. Source/media

2. Collection

3. Transportation

4. Preservation

5. Use

Water may be contaminated at five stages from source to point of use. Appropriate control measures at these stages can ensure safe water by preventing contamination.

Water Safety Plan

Topic-16: What are the different stages of WSP?

Water safety plan (WSP) is a comprehensive risk assessment and risk management approach that encompasses all steps in the water supply from catchment to consumer to ensure the safety of a drinking-water supply consistently.

As part of this risk assessment and management process for the whole system from source to mouth, WSP seeks to:

- Identify the hazards that the water supply is or could be exposed to, what hazardous events would introduce those hazards into the water supply and what the level of risk is of the hazards being introduced to the water supply;
- Implement control measures to prevent, reduce or manage those risks;
- Carryout operational monitoring of the control measures;
- Perform corrective actions to restore control if control is lost; and
- Continuously verify the effectiveness of the WSP.

Five different stages of WSP where necessary control measures should be executed by the users are presented in the opposite slide.

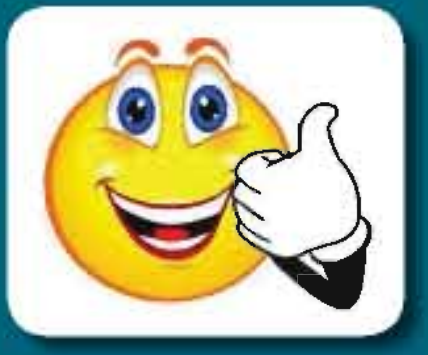
Questions for discussion:

What are the 5 stages of Water Safety Plan?

Next topic of discussion: What are the mechanism for information and complaint on water supply?
What are the social responsibilities to keep water safe?

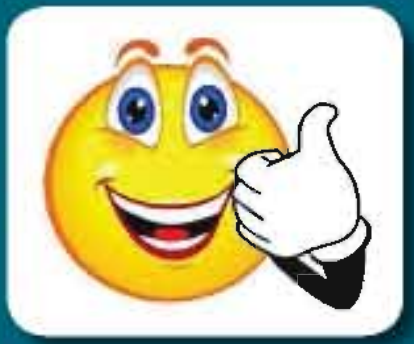
Water Safety Plan

Topic-17: What are the mechanism for information and complaint on water supply?



- Complaints may be made on issues like irregular water supply, reduced water supply, dirty and/or odorous water, leakage in distribution line etc.
- Complaints can be placed to Mayor/Councilors and water supply section by making phone call or through written application.
- There is a responsible person in the water supply section who will provide information on water supply and register complaints and follow-up required responses to the complaints.

Topic-18: What are the social responsibilities to keep water safe?



All of us have some social responsibilities regarding water safety.

Firstly: To follow necessary measures for keeping water safe and abide by health habits and encourage others to do so.

Secondly: Water is a precious asset, so its waste should be avoided. Close the tap after use and replace it if it is found faulty.

Thirdly: Pay the bill regularly in time.

Fourthly: Instantly inform the municipality if any leakage or crack is found in the pipeline or water falls from the broken tap of the stand post.

Fifthly: Avoid illegal connection in order to prevent its wastage and encourage others to do so.

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