Lesson Plan 3: Water Quality **45 minutes**

**Lesson description**

This lesson describes about safe water and clean water. It highlight on drinking water protection from the point of origin to the end.

**Learning Outcomes**

1. Distinguish safe water and clean water
2. Explain steps of Multi Barrier Approach

**Materials**

* 3 glasses
* Spoon
* NDWQS
* MBA flex
* MBA cut cards

**Preparation**

* Prepare the learning outcomes
* Hand washed water in glass, clean water in another glass and safe water in another glass
* Prepare MBA cut cards

**Introduction 5 minutes**

1. Present three glass of water in front of participants.
	1. Glass A: Safe water to drink
	2. Glass B: Filthy water or hand washed water (*Dhamilo pani- haat dhoyeko pani)*
	3. Glass C: Plain and clean tap water
2. Ask participants which glass of water might be safe to drink.
3. Collect the vote of participants for each glass. *Possible answer: glass A and C, as the water is clean.*
4. Inform participants that if the facilitator is to drink a glass of water, one will drink from glass A and not from other glass and also drink a sip from glass A. Ask participants what might be the reason for drinking water from glass A only and not from other glasses?
5. Further clear to the participants that ‘glass A’ water is disinfected and is safe water while glass C is a plain tap water and is not disinfected and it might contain a spoon of filthy water in the glass. Demonstrate the activity while explaining by adding a spoonful of water from glass B to glass C and mixing it, making it unsafe to drink yet it is clean while observing it.
6. Explain further, this might be the similar case in their drinking water; it might be contaminated in the source of water, or in transmission line or in their own household.
7. Present the learning outcome of the session.

**Safe water 15 minutes**

1. Ask participants if clean water is safe water? *Possible answer: No*
2. Ask participants what is safe water. Give a minute to think and ask few participants to volunteer their view.
3. Inform participants that clean water means the water is physically clean, but it might not be same with chemical and microbiological contaminants.
4. Explain further, safe water means the water is physically, chemically and microbiologically safe to use (or no physical, chemical and microbiological contamination).
5. Also inform that Government of Nepal has a guideline for the drinking water, NDWQS with 6-physical parameters, 19- chemical parameters and 2 microbial parameters.
6. Explain further with few common examples of each parameter.
	1. Physical parameter: turbidity, color, taste and odor, total dissolved solids
	2. Chemical parameters: Iron, Manganese, Chloride, Arsenic, Ammonia, Nitrate
	3. Biological parameters: Total coliform or presence of any bacterial contamination

Also inform, Chemical contamination means the presence of chemicals more than it is marked in the NDWQS guideline

1. Ask to participants, among these 3 contaminants, while working in community which contaminant is focused and why.
2. Discuss further and add the following information.

**Answer might include**: Bacterial contaminants as its impact is seen in huge scale and that too in very short span of time comparing to chemical contaminants. About physical contaminants, if water is physically polluted than community does not drink directly and goes for purification/ disinfection process.

**Multi Barrier Approach 15 minutes**

1. Ask participants if safe water is of that importance than how can we ensure the quality, where do we need to start from? Collect the possible answers from the participants.
2. Inform participants that we need to look from source or from the point of origin and should protect it at the beginning. Discuss briefly on source protection.
3. Inform participants that there are 5 steps to ensure the water quality, first step being source protection and introduce other 4 steps to participants discussing briefly on each steps.

Trainer note: MBA steps:

* 1. Source protection,
	2. Sedimentation
	3. Filtration
	4. Disinfection
	5. Safe storage
1. Tell participants that they are going for a group activity. In their groups, participants are to discuss more on each step of MBA.
2. Divide the participants into 5 groups and assign each group a step of MBA and provide 5 minutes time.
3. After time is over, ask a member of each group to tell the discussion to the large group.
4. Summarize all the points and conclude the steps of MBA by showing the flex and also explain greater removal of pathogens as more steps are used.

**Review 10 minutes**

1. Provide a cut piece of MBA steps to each participant.
2. Ask participants to form a group of MBA steps. If participants seem confused, ask what steps of MBA approach are and as per the steps participants are to form a group.
3. Within their thus formed group, ask participants to discuss what safe water is and how many parameters are there in each category.

**Reflection on lesson**

**MBA steps**

**I. Source Protection**

* Use a covered well or pump
* Keep animals penned
* keep the roof clean and collect rainwater
* Plant trees and shrubs at the edge of ponds
* Fencing around the water source so as to protect it from animals and humans,
* Manage drain for runoff water

**II. Sedimentation**

Let water remain in a vessel until the sediment settles to the bottom, can use moringa, prickly pear cactus or alum to help sediment

WHY?

The particles in really turbid water will block the pores of candle filter sooner and the filter would require more frequent cleaning. Thus the flow rate will become very slow.

Sedimentation removes some of the pathogens since the pathogens attach themselves to sediments.

**III. Filtration**

Use clean cotton clothes or locally available candle filter, etc.

WHY?

The disinfection process is most effective when the chemicals or heat can reach the pathogens. If there are dirt particles present then the pathogens may be hiding amongst the dirt, and the chlorine or heat cannot get to them. Filtration removes a lot of those particles as well as many of the pathogens that are stick on them, and exposes the pathogens so the chlorine or heat can reached them more easily.

Bio sand filter and colloidal silver filter have the property to kill pathogens.

**IV. Disinfect**

Add chlorine liquid drops or chlorine tablets, SODIS, boiling, filter- Bio sand filter, colloidal silver filter and other modern technologies

**V. Safe storage**

Safe storage of the treated water prevents recontamination. Cover water vessels, use vessels with lid, use clean vessels with tap.

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| **Description: pumpDescription: Rainwater_House_greyscale** | **Description: BSF_LineDescription: Ceramic Pot** |
| **Description: chlorineDescription: boil** | **Description: settleDescription: settle2** |
| **Description: jerrycan**Description: Safe Storage_Line | Disinfect your water |
| Sediment your water | Store your water safely |
| Protect your source water | Filter your water |