

## Lesson Plan 8: PoU Options



90 minutes

### Lesson Description



The focus of this lesson is to explore the need for household water treatment and different other options. Participants will explore different PoU options for household water treatment.

### Learning outcomes

At the end of the session, participants will be able to:



1. Describe different point of use water treatment options
2. Describe operation and maintenance of different PoU options

### Materials



- Brown sheet paper
- Permanent marker
- Masking tape
- Projector
- Computer
- Speaker
- Documentary- PoU by *Maha*

### Preparation



- Write the learning outcomes or lesson description on flip chart paper
- If using the PowerPoint, prepare the files and projector for display
- Prepare the name of 4 different PoU options on different paper (as per the number of participants)
- Prepare poster images or PowerPoint images
- Prepare a paper slip of PoU key point for review

### Introduction

15 minutes



1. Present PoU documentary of "maha-jodi".
2. Present learning outcome of the session linking to the video and earlier sessions.

### PoU

65 minutes



1. Linking to the activity, ask to all participants "Is it safe to drink water without taste and color?"- wait for feedback; as participants may relate to previous session (Water quality) along with documentary in the introduction part and answer this question.
2. Ask participants "What are different techniques to make water drinkable?" - Expected answers - Boiling, Filtration, Chlorination and SODIS
3. Note down the answers on newspaper paper/ white board.
4. Inform participants that they are going for a group activity. For this each participant will be given a paper of PoU options and they will have to be in the respected group.
5. In their group, participants have to include the information on the assigned topic in the following questions.
  - a. What is that method/ introduction to method (SODIS, Chlorination, Filtration, Boiling)
  - b. Process of doing that option
  - c. Points to be considered (for O&M of options)  
(This answers may based upon information from documentary and their general practice)

6. Present the questions and inform participants have 5 to 7 minutes for the group activity. Once participants are clear on the given information, randomly provide the PoU options to all participants and ask to form group accordingly.
7. Provide newsprint and marker to each team, allocate 5 to 7 minutes time and ask them to start at once.
8. Ask participants to present what they have written and request other participants to add if anything is missing. Facilitator should notice the missing points too.
9. After presentation of each option, facilitator has to summarize each PoU options (either by power point or verbal or demonstrate SODIS as per materials available). Also facilitator has to make notes on institution level for each option.
10. Ask participants regarding other technologies and water filters that they have heard - RO, Aro filters, Kent purifiers etc.
11. Disclose the power point slide on different types of filters- Hi-Tech RO 100 LPH Purifier Livpure RO Water Purifier, Euroguard Water Purifier ,Kent Water Purifier etc.

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**Review****10 minutes**

1. Inform participants, they are going to revise what they all had discussed on PoU options. For this, earlier groups will have a group work of other group and they will have to revise the earlier group work and add any missing information based on the presentation and discussion.
2. Also inform they will have 5 minutes time for the activity.
3. Provide the earlier group work (flip chart paper) to the groups. Make sure, group got a new PoU option than earlier one.
4. After 5 minutes, ask groups to stop and volunteer few points from each group.

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**Reflection on Lesson**

### Trainer Reference

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- **Boiling:**
  - Easy method to disinfect water
  - Water should be filtered before boiling as it treats the microbial contamination
  - Half boiled water is even more harmful so water must be boiled at least to its first rolling boil
- **Filtration:**
  - Various types of filter available in market, filters removes the physical particulate matter, pathogens and micro-organisms (CS filter)
  - Easy to handle
  - Easily accessible in market

#### Types of Filter

1. **Candle filter:** Easy to use, easily accessible in market, filter candle should be cleaned in certain time interval, candle should be cleaned with soft brush and soap should not be used while cleaning and candle should not be boiled effective for physical and few microorganisms.
  2. **Colloidal silver (CS) filter:** effective method to treat water (effective for physical and microbial contamination), main component of the filter is the silver coating/ powder used while making candle or plate which kills pathogens present in water, without any chemical process water is disinfected, filter candle/ plate should be cleaned in certain time interval, candle/ plate should be cleaned with soft brush and soap should not be used while cleaning and candle/ plate should not be boiled
  3. **Bio sand filter:** effective for physical, microbial and some chemical components, can be made locally by a trained person, sufficient amount of water is filtered,
- **Chlorination:** Water when treat with chlorine, kills pathogen and react with chemical compounds like iron, manganese, hydrogen sulfide, and form the precipitation and settle down. Ex. Piyush and Piyush plus manufactured by ENPHO, chlorine dosing should not be done in guess; if chlorine dose is not enough for the volume of water it does not disinfectant water effectively and if the dose is high; it might have negative health effect. After the dosing of chlorine one should wait for 30 minutes. Chlorine solution should be stored in out of reach of children and should not be stored in direct sunlight.
  - **SODIS (solar disinfection):**
    - SODIS is a simple, cost effective method to treat water against microbial contamination through the UV rays and heat of the sunlight
    - It is ideal to disinfect small volume of water with low turbidity
    - Contaminated water is filled into transparent plastic bottles and exposed to full sunlight for six hours
    - During the exposure to the sun the pathogens become inactive
    - In case of cloudiness the plastic bottles need to be exposed for 2 consecutive days in order to get safe water for consumption. The treatment efficiency can be improved if the plastic bottles are exposed on sunlight reflecting surfaces such as aluminium- or corrugated iron sheets.
  - **Mass chlorination (1% chlorine solution):** Measure 40 gm (approx. 5 tea spoons) of bleaching powder on few ml of water in mug, take water from 1litre of water. Stir the solution to make the paste, add remaining water on that mug. Stir properly and leave the solution to

settle down (time varies). Pour the clear solution in colorful jerry can which is opaque. Label the jerry can with date, time.

- Amount to be used: 100ml of 1% chlorine solution can treat 1000 liter of water.
- **Points to be noted:** close the cap properly, place at cool, dry and dark place, far from reach of children, contact time of this 1% solution is also 30 minutes.
- **Modern technologies:** Some modern types of filters are available in market with UV rays and reverse osmosis (RO) processes which are effective to kill pathogens and also treat physical and chemical contamination. Example of filters available in market- Euro guard, Aqua guard, Sawyer, Straw filter, Sky juice.

**a) Hi-Tech RO 100 LPH Purifier**

- Hi-Tech RO 100 LPH Purifier is one of the modern water purifier
- Price range from NRs 55,500 to 135,000
- This Water Purifier produces 50 liters of pure water per hour
- Its technology is designed to remove active and inactive bacteria and viruses. The plus side of Hi-Tech RO 100 LPH Water Purifier is the low cost of maintenance and consumables.

**b) Livpure RO Water Purifier**

- Livpure RO Water Purifier uses RO+UV+TDS purification technology to give you clean and pure water.
- Livpure RO Water Purifier has the Storage Capacity of 25 litre(s) and comes with Activated Carbon Adsorber Filter, Carbon Block Filter cum Adsorber filter cartridges, RO Membrane, UV Disinfection Column equipped with 11W UV (Germicidal Lamp), to perform a 5 stage purification process.
- The Livpure RO Water Purifier comes in the price range of NRs 19,900 to 86,490.

**c) Euroguard Water Purifier**

Euroguard Water Purifier is a stunning combination of form, function and style.

- The newer version of the Euroguard Water Purifier, the Aquaguard Neo.
- The Euroguard Water Purifier is equipped with Global UV technology of G.R.O.UV.TH.
- The price range on this water purifier in Nepal is NRs 16,500- 19,900

**d) Kent Water Purifier**

Kent Water Purifier comes in different capacities ranging from 7 -20 Liters Capacity.

- It has been made with Unbreakable Food Grade Plastic and Kent Water Purifier boasts Gravity based UF Membrane.
- With Kent Water Purifier you can be assured of Chemical Free Purification.
- This Water purifier price in Nepal ranges from NRs 5,000- 85,500