

Unit 4 : Water Quality

Chapter 3 : Water pollution : Causes, Effects and Remedies

Humans have been using natural resources for various purposes. Considering the available natural resources, at present many problems are created in front of human beings.

Think about it

There are two forms of river in the picture. A river flowing through nature and a river flowing through human habitat. What is the difference between the two rivers? Discuss this. What do you think what is the reason for the change in the river?



4.3.1 Observe

Water pollution :

The natural quality of water changes directly and indirectly due to human action or other causes and water becomes unusable for any purpose. This is called water pollution.

Let's Tell

1. Where does your household waste water go?
2. In your village, where waste water is mixed, what substances are seen to have accumulated ?
3. Where do all these substances come from?

Water pollutants :

Water-pollutants are useless solid, liquid, gaseous wastes (harm to living things) that mix with natural water.

Sources of water pollutants :

Water pollution is caused by natural processes or human actions, are called source of water pollutant

1. Household discharge - water coming out of the safety tank, human urine in the urinals, bath water, Animal excrement.
2. Substances from industrial premises- Oil, grease released from washing vehicles mixed with water
3. Agricultural Factors - Pesticides or chemical fertilizers are given to the crops. These chemicals get mixed in the river due to the excess water given to the crops after application.
4. Sewage, minerals and chemical wastes coming out of the factory.
5. Sewage sludge and watershed sludge.
6. Hot water released after processing in a factory boiler.

Think about it

Check out the two scenes below. Make a list of things you need to do to prevent this from happening.



4.3.2 Water pollution

Observe above photograph : What are the possible consequences of this situation? Enter their information in the table below.

| Factors Regarding Polluted Water | Change observed due to pollution |
|----------------------------------|----------------------------------|
| Drinking ability | |
| Colour | |
| Smell | |
| Fishes in the water | |
| Aquatic vegetation | |
| Minerals in the water | |
| Diseases caused due to water | |
| Effect on groundwater | |

Internet my friend :

Get information about polluted rivers in the country from the internet.

Diseases caused by aquatic microorganisms:

| Sr. no. | Pathogenic micro organisms in water | Disease caused |
|---------|---|----------------|
| 1 | Entamoeba histolytica | Dysentery |
| 2 | Salmonella typhi | Typhoid |
| 3 | Vibrio cholerae | Cholera |
| 4 | Hepatitis (A, B, C, D, E) | Jaundice |
| 5 | Plasmodium species Through Anopheles mosquitoes (laying eggs on contaminated water) | Malaria |

Do you know ?

We read news about river pollution everywhere, but there is a river called Umangot, about 95 km from Shillong, the capital of Meghalaya. This river is near a small town Doki in Meghalaya. This city is famous due to Umangot river. This city is near the border of Bangladesh. This river originates from Doki, Darang and shenang village. The water of Umangot river is so clean, that the bottom of the river is visible. The vegetation at the bottom of the water is covered with stones, pebbles, etc. The water looks like glass. The reflection of the boat running on the water seems to be lying at the bottom of the river. The water of this river is rich in fish. The river is always cleaned and no pollution is allowed. A large number of tourists come to see the river. Tourists can take a boat tour of the river. However, keep in mind that if you pollute the river, you have to pay a fine.

Let's Tell

1. In what ways does sea pollution occur?
2. Is the intensity of pollution is higher on beach or in sea ?
3. Describe the accidents related to pollution in the sea.

Marine oil spills and environmental pollution :

There are mineral oil reserves in the sea and they are brought to the surface. In such cases oil spills in the sea due to human error. While oil is being traded from the Gulf to other countries, the ships crashed, and millions of tons of oil spill on seawater. When this oil reaches the coastal areas, it causes a lot of damage to the environment.

Do You Know ?

In August 2010, MSC Chitra and MV Khalija-3 collided in the Arabian Sea near Mumbai. The collision caused a huge oil spill in the sea. About 800 tones of oil spilled into the sea and spilled over a distance of 100 to 120 km off the coast.

Second incident happen in January 2017 near Kamraj port in Chennai. About 60 tons of oil spilled from the collision of the two ships.

Just Think

Oil spills caused by shipwrecks, spill over into coastal areas due to high tides and strong winds. All that time, there is a lot of damage to the aquatic life on the beach. It causes harm to Oysters those sticking to the rocks on the shore harm. Animals like crabs that live in burrows are die. They can't breathe because of the oil sticking to their bodies, so they die.

Oil spill also affects mangroves. The roots of the mangroves are on the ground. Once the oil coats on the roots, the biological breathing process by the roots stops and the mangroves dry up. Due to the oil layer on the leaves, the leaves turn yellow and then fall off. Birds are most affected. Their wings have a natural thin oil layer, so that water does not

stick. But when the bird comes in contact with the spilled oil, the oil quickly penetrates into their wings which affects its function and making it impossible for it to fly. They become heavy and drown in the sea.

Internet my friend :

Find out information about the pollution caused by oil spills in the sea from the internet.

Water Reservoirs and their pollution :

Collect the information

1. Ask your grandparents about the lake in the village.
2. Is the water of the lake in the city or in the village drinkable? Be aware of this.

Lakes :

In the past, lakes existed according to the availability of water in each village. Some towns were famous for lakes. Today there are few lakes left in such villages or towns. Why would this have happened? You can see that the water in the village or in the city is contaminated by mixing with the sewage. In some religious occasions, people leave oil lamps, Idol immersion, Nirmalya immersion in the pool. The oil affects the eggs of the fishes. The eggs are destroyed. Also, some substances are added to fish as food. Their decomposition increases the amount of carbon dioxide in lake water, and affects aquatic life. Living things die because they do not get enough oxygen. The process of decomposition in water produces hydrogen sulfide gas which results in bad odor in the water. Increasing urbanization has led to the addition of waste to the lakes, reducing the size of the lakes. In some villages, the whole lakes themselves have been destroyed. Either buildings or grounds are seen there.

Collect the information

1. Make a chart of the number and names of lakes in different cities/towns of Maharashtra.
2. Find out the number of lakes that existed in the past and the number of lakes that exist now.

Wetlands :

Have you noticed that there are wetlands in various places around you? Observe the plants growing there. Observe the birds that come there. They have become extinct due to encroachment of structures on the wetlands and mixed sewage. A variety of birds are found in the wetlands. Wetlands are home to birds.

Do you know?

A conference was held on the importance of Ramsar, an urban wetland on the Caspian Sea in Iran. February 2 is celebrated as World Wetlands Day to promote the importance of wetlands in human life and protect them from pollution. The first day was celebrated in 1997.

The Central Government has issued laws and guidelines for the prevention and control of pollution. Some laws have been enacted for this purpose. Let us take a look at these laws.

Water (Pollution Prevention and Control) Act 1974 :

The Water Act has laid down some guidelines for determining water pollution and water quality values. It determines punitive action for water pollution or for non-compliance with these principles.

Features of Water Pollution Act :

1. Prevention and control of water pollution.
2. Water conservation or restoration.

3. Establishment of boards for prevention and control of water pollution.

Departments have been set up at the level of Central and State Governments for the implementation of this Act. The Central Pollution Control Board (PCB) and the State Pollution Control Board (SPCB) are responsible for controlling water pollution.

Functions of Maharashtra Pollution Control Board :

1. Planning of comprehensive programs for pollution prevention and control.
2. Inspection of sewage or industrial wastewater recycling reaction, waste disposal facilities.
3. Cooperation and promotion of ecofriendly programs like pollution control, reusing and recycling of waste materials.
4. Educate and guide new entrepreneurs by explaining appropriate technology and methods of pollution control.
5. To create awareness among the people for a clean and healthy environment as well as to address pollution related complaints.

Powers of Maharashtra Pollution Control Board :

1. Enforcement of Environment Act and Pollution Control Act.
2. Determining pollution standards and checking their compliance.
3. Monitoring and controlling all sources of pollution.
4. To fulfill the legal requirements by giving instructions within the prescribed period.
5. Resolving worrying cases violating pollution regulations.
6. To sue in a court of law in a matter of concern.

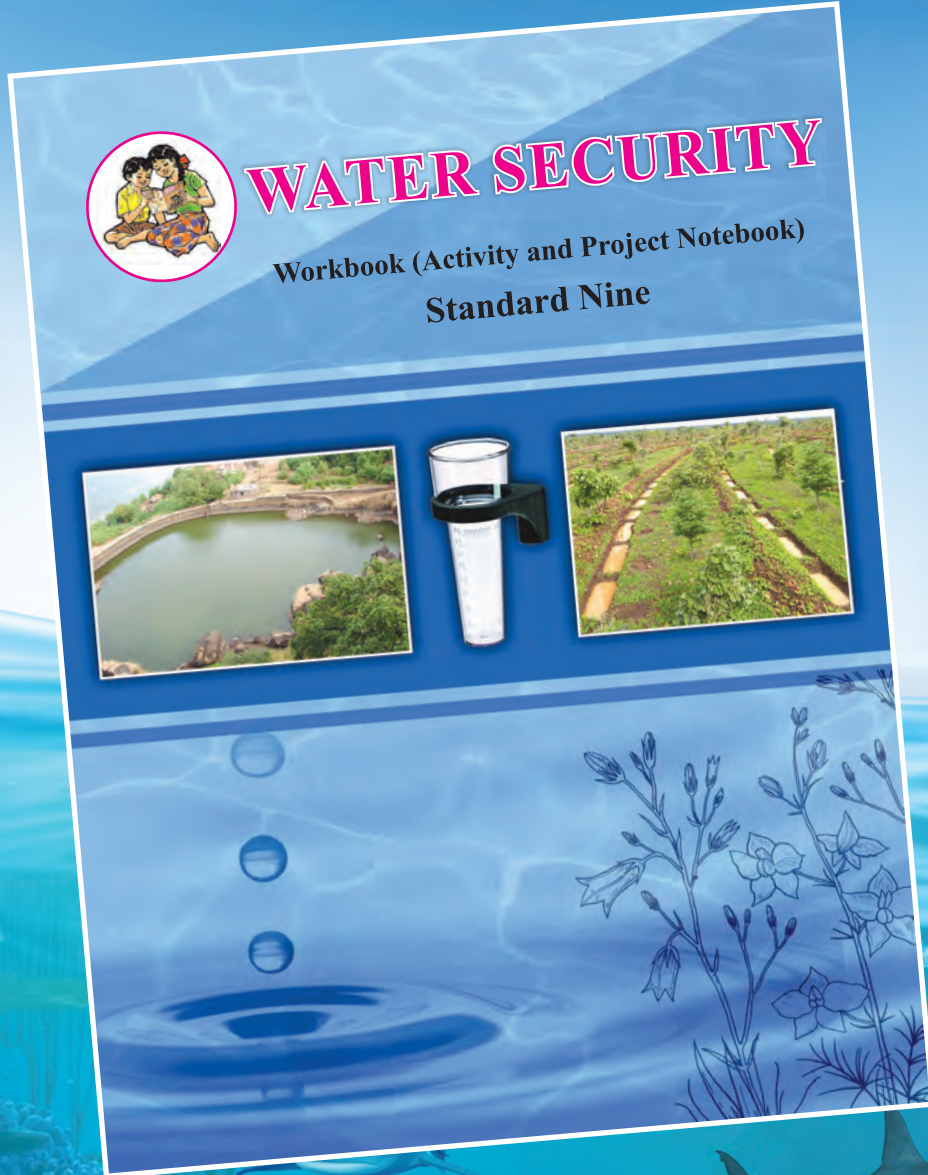
Exercise

1. If there is water pollution in your area, write a report and submit it to the class.
2. Write down the factors that cause water pollution.
3. Explain with the example how the oil spill in the sea harms the environment.
4. Prepare and present to the class what planning needs to be done at the village / city level to prevent water pollution caused by sewage in your village or city.

Notes

A series of horizontal dotted lines for writing notes.

**Workbook as per Curriculum and Evaluation Scheme
of Water Security subject is available.....**



**Maharashtra State Bureau of Textbook Production and Curriculum
Research, Pune.**

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