

Teacher's Guide

Water

Part 3

Based on the Karnataka State Board Curriculum for
Standard VI



JANAAGRAHA CENTRE FOR CITIZENSHIP & DEMOCRACY

Janaagraha's initiative to improve citizen engagement in India's democracy through their civic learning program

Developed in collaboration with Young Leaders for Active Citizenship (YLAC)

Water | Teacher's Guide (3/3)

Part 3

Class VI

Board – Karnataka State Board

Subject – Science

Textbook – Science Textbook for Class VI (Karnataka State Board)

Chapter 14 – Water

Number of parts – 03

Length – 75-90 minutes (estimated, for a class of 40-45 students)

Note: Teachers may divide the lesson plan into as many periods as they see fit

Section I – What are we going to learn and why is it important?

Learning objectives

Students will:

- Learn the different ways in which individuals, organisations, communities and the government can conserve water.
- Understand how rainwater harvesting system works.

Learning outcomes

Students will:

- Become active citizens by practicing water conservation initiatives at home, school, and neighbourhood.

Key Terms

Dumping	Concrete	Rainwater harvesting	Rooftop rainwater harvesting	
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Materials needed

- Print outs of activity sheets for activity- initiatives to conserve water. (printable versions given in the appendix section)

Section II – How are we going to learn?

- In our lesson so far, we have understood that water is a scarce resource and needs to be conserved.
- We have also understood the process of water cycle and how it can have imbalances leading to floods and droughts.
- Before we talk about the most important part of this chapter, let's once understand three important factors that impact water consumption by humans.

1. Recap Discussion: Understanding different aspects of water consumption.

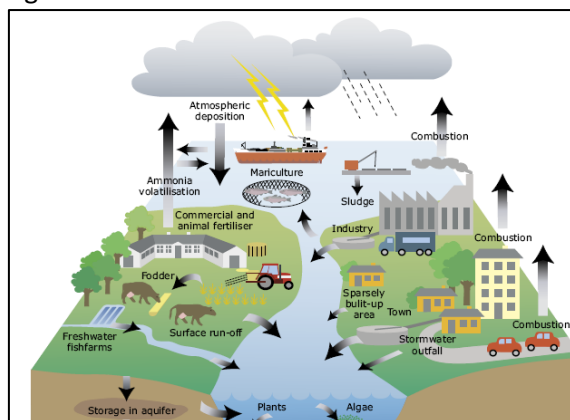
Time: 10 mins

Note to the teacher:

- Split the class into 3 groups, and hand them the following graphics or alternately project these graphics in the class one by one and discuss what each of these means. Original infographics can be accessed on links for projection.
- In case a projector isn't available, draw the following table on the board and explain the points accordingly:

Increasing demand for water	Increasing construction leading to low ground water recharge	Increasing population and pollution	High dependence on natural resources
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Figure 1:



Explanation for Figure 1: The figure shows the increase in the number of activities that are using water. Increasing industries, agriculture, and population- all this has led to a sharp increase in the use of water while rain and other natural processes cannot replenish it at the same rate.

Source: [EEA](#)

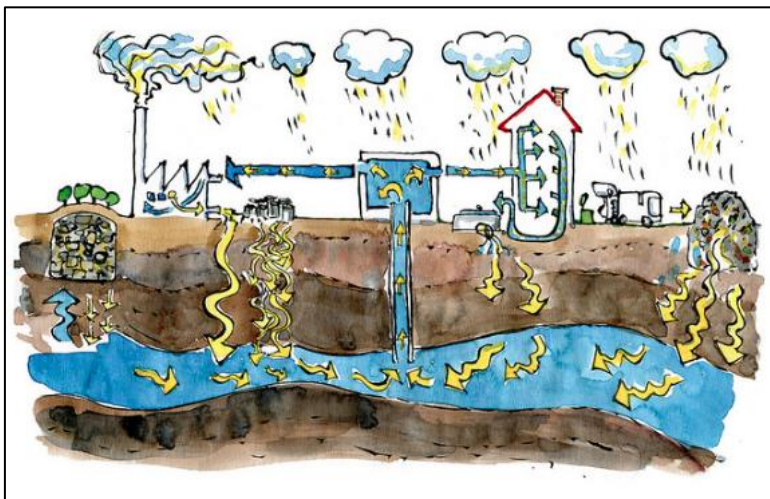
Figure 2:



Explanation of Figure 2: The image shows the construction of a new road. Due to a rise in construction of roads, buildings, complexes etc., the amount of lands that is covered with **concrete** has increased tremendously. As a result, rain water does not seep into the soil to recharge ground water.

Source: [CMW Infra](#)

Figure 3:



Explanation for Figure 3: The figure shows more and more ground water is being extracted from the underground. It is also being polluted due to the **dumping** of wastes by factories, farms etc. making it unfit for consumption.

Source: [Flickr](#)

Facilitation notes:

- Let's quickly go back and recap everything we know about water consumption and scarcity so far.
- Why do you think, we are witnessing the situation of water scarcity around the world?
- The water level does not get affected as long as we draw as much water as is replenished by the water cycle.
- However, underground water table may go down if the water is not sufficiently replenished. This happens due to the following reasons:
 - **Increasing demand for water.**
 - **Increasing construction.**
 - **Increasing population and pollution.**
 - **Increased dependence on natural sources of water.**

2. Discussion: Initiatives to conserve water (individual/society/government)

Time: 15 minutes

Materials needed: 3 sets of sheets with prompts each. (In case the sheets cannot be printed, the teacher to write the questions on the board)

Facilitation notes:

- In an environment where water is becoming increasingly scarce and precious, every little effort we take will have a positive impact. At the same time, we need to make sure that more and more people understand this problem and actively work towards solving it.
- We, as a society and a community need to come together to tackle this problem.
- (Divide the class into three groups: Individual, society and government. Each student gets one worksheet, depending on which group s/he is a part of. Worksheets are available in appendix of this lesson plan.)
- You all will be getting worksheets with questions on them. Each of you first fill your own worksheet and then discuss in small groups. After 10 minutes, we will continue this discussion with the entire class. (The teacher to give students to fill their worksheets, then discuss them in small groups and large groups).
- The questions for each group: **(Refer to the appendix for printable worksheet designs and solutions)**

<u>Individual People</u>	<u>Society and Industry</u>	<u>Government</u>
<ul style="list-style-type: none"> • What can I as an individual do to spread awareness about the water crisis? • How can I ensure that I save water by myself and in my family? 	<ul style="list-style-type: none"> • What should societies do to save water? • What should businesses and industries do to save water? 	<ul style="list-style-type: none"> • What policies can the government adopt to encourage water conservation among citizens? • What policies can the government

- | | | |
|--|--|--|
| <ul style="list-style-type: none"> How can I encourage my friends/ neighbors/ school to save water? | | adopt to facilitate water conservation among businesses? |
|--|--|--|
- You all made brilliant points. Let's now talk about rainwater harvesting- a practice extensively being followed all over Karnataka and many other parts of the country to save rain water.

3. How every house can contribute: **Rainwater Harvesting**

Time: 15 minutes

Facilitation Notes:

- When it rains, water goes into lakes, rivers, wells, underground. In this manner saline water from the oceans is converted into useable water all over the world. So, by extension, we can say that it is this rain that ultimately makes sure we have fresh water for our use.
- Now, if I were to ask you to find ways to save this rain water, how do you think we can do that? Take 2 minutes and discuss ways in which we can save rain water. (Take a few responses)
- The process by which rain water is saved and stored for future use is called rainwater harvesting. Here, rain water is collected, stored and used to recharge ground water so that it can later be drawn out through wells or used by plants.
- So, the process of rain water harvesting is as follows:



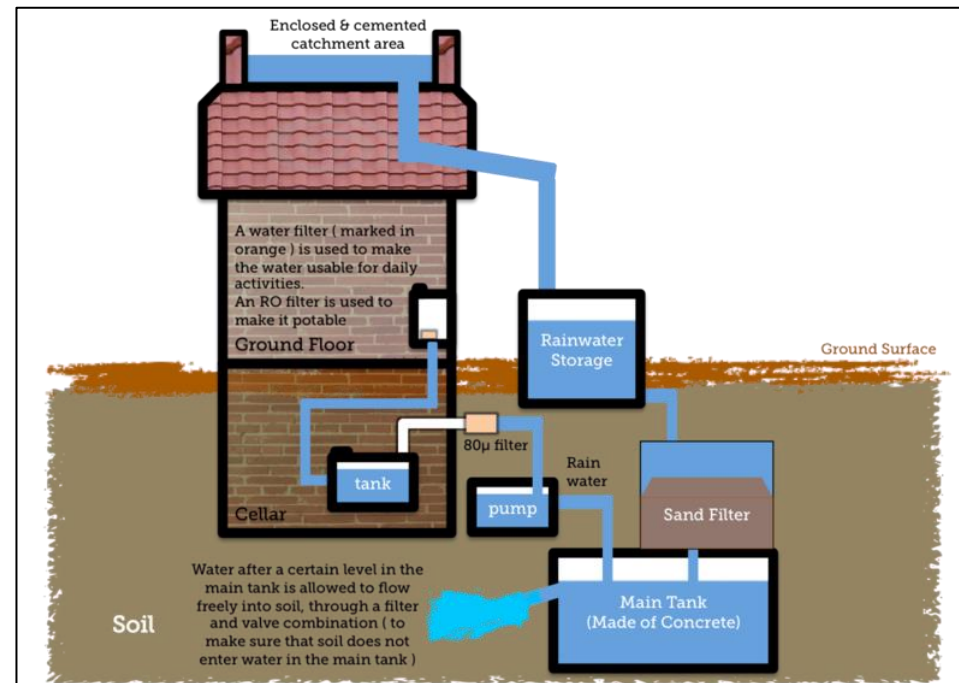
- I would now want everyone to study this process with their partners.
- Now imagine, that you are all architects and I want you to design a rain water harvesting system in my house. I am drawing a rough sketch of my house on the board. After everyone understands the process of rainwater harvesting, I want everyone to now imagine a rain water harvesting system for this house and draw it for me.



Diagram of a house to be drawn on the board

Source: [Etsy](#)

- You all made some really interesting drawings! Here is a diagrammatic presentation of rainwater harvesting (notice how water is collected, travels through pipes, and is stored in over ground and underground containers or is used to recharge ground water).



Diagrammatic representation of rainwater harvesting

Source: [Wikimedia](#)

- The diagram mentioned above shows **rooftop rainwater harvesting**. This basically means that water is collected on the roofs of buildings and then stored in tanks or seeps underground. (Explain how water is stored to a certain level after which it automatically flows out of tanks)
- There is also an option of simply letting rain seep directly into the ground and travel all the way down to recharge ground water. Can anyone tell me why that isn't a feasible idea, especially in cities? (Because direct seepage of rain into the ground is very difficult with concrete and cement covering so much of land area around cities)
- Think about how can you collect and use rainwater in your homes.
- In conclusion to this chapter, we need to understand that water is one of the most precious resources in the world, we need to respect it and use it very carefully. Each of us can make a difference and spread this awareness among our friends and family.
- There are many ways in which we all can contribute to this cause.

- At the same time, as a society, we need to start adopting habits that are more mindful of our environment.
- Let's conclude with this incredible video on how every action matters.
- (Optional video)

Video: Start a little good

The video shows how the amount of water wasted by one person in urban India during his bath can satisfy so many water needs in rural India.

Link: [YouTube](#)



Section III: Assessment

Pop Quiz

Time: 5 minutes

Ask the following questions to the students:

- What is rainwater harvesting? How does it lead to ground water recharge?
- Rain water does not seep directly into the ground and recharge ground water in cities. Why?
- What can you, as individuals, do to help conserve water?
- How can you spread these ideas in your school? Neighbourhood? Give me 5 points.

Homework: Find out the following about your neighbourhood: (ask at least 5 people from 5 different homes)

1. How many of them adopt any water conservation techniques? If yes, which ones?
2. What can be done to make their family members more aware about water conservation?
3. How many households have rainwater harvesting systems? How much does it cost to get one installed in your home?

4. Split the class into groups of 3. Each group has to make a poster on how to conserve water in easy ways.

Section IV: Closure

Time: 5 minutes

Summary by students

Note to the teacher: Select a student at random to summarize the key points and learnings of the session.

Recap by the teacher

Time: 3 minutes

- Given the alarming rate at which we are using our water sources, there is an urgent need to conserve water.
- Simply asking the government to save water is not enough. We need to tackle this issue at an individual and societal level.
- Rainwater harvesting is a great way to collect fresh water from the rain and store it for later use.
- More amounts of concrete and cement have made it very hard for rainwater to directly seep into the ground.
- (And as a separate point) Here is the number of the Bangalore Water Supply and Sewerage Board- 080 - 22238888 | 1916. It is the main agency responsible for the water supply and sewage disposal in Bangalore. (ask students to note it down.)

Section V: Field Visit(s) to a rain water harvesting plant

Take students out for an experiential activity to a rain water harvesting or a sewerage treatment plant. Suggested visits are given below.

Field Visit I

Note: To plan a field visit in your city, look for any water conservation site, step wells or a building/ campus which has installed rain water harvesting system.

Ideal visit time: 1-2 hours

Field visit to rainwater harvesting system/park

Location for Bangalore: Visvesvaraya Rain Water Harvesting Theme Park

- Understand the process of rainwater harvesting and how that results in water conservation.
- Carefully study all the different rain water harvesting techniques, as displayed in the park.
- What role can you play in conserving water at home, school and wherever you go?

Field Visit II

Note: To plan a field visit in your city, look for any site that has set up a sewerage treatment plant.

Ideal visit time: 1-2 hours

Location for Bangalore: STP Plant-Cubbon Park/The Koramangala Challaghatta Valley STP**Field visit to water to sewerage treatment plant (STP)**

- Understand the process of how sewerage water gets treated, where does the water come from, what is the treated water used for etc.
- Interact with the people in-charge and understand how the STP is helping clean up the nearby water bodies? What are the potential ways in which the sludge can be managed/ used?

Section VI: Additional Resources**Resources for students:****1. Video: Rainwater Harvesting**

The video shows how a young student built a rainwater harvesting structure in his home using minimal resources.

Link: [YouTube](#)

2. Video: Three thoughtful ways we can conserve water

The video very beautifully explains how we can save water in our own small ways- ways that will make big differences.

Link: [YouTube](#)

Resources for teachers:

1. Article: This scientist hasn't paid a water bill in 23 years

The article recounts the brilliant story of a Bangalore based scientist who set up a rainwater harvesting system in his own house.

Link: [The Better India](#)

2. Video: Save that drop

The talk highlights, from a student's perspective, the urgency to save water and how we can do our bit.

Link: [YouTube](#)

Appendix

The following are printable worksheets for activity on water conservation along with solutions

Individual acts of responsibility



What can I do to spread awareness about the water crisis?

What can my family and I do to save water in our day-to-day activities?

How can I encourage my friends/ neighbors/ school to save water?



- Close taps while brushing, washing hands.
- Make sure the plants are not over watered.
- Encourage elders to reuse kitchen water.
- Reuse water used to clean fruits and vegetables.
- Completely fill the washing machine/ dish washer before using it

Solutions Sheet:

What can I do to spread awareness about the water crisis?

- Educate people at home.
- Educate younger siblings about the importance of water conservation.
- Do discussions in class and school assemblies about the water crisis.
- Make a play on water crisis and perform it in school, neighbourhood.
- Do special sessions in Parents Teacher Meetings.

What can my family and I do to save water in our day to day activities?

- Close the tap while brushing, washing hands.
- Make sure plants are not over-watered.
- Encourage elders to reuse kitchen water.
- Use a bucket instead of the shower to bathe.
- Fix all leaks at home.

How can I encourage my friends/ neighbors/ school to save water?

- Educate friends about conserving water
 - Ask the school principal to fix any leaks in taps/pipes in school.
 - Ensure that water is not left running in toilets/ gardens etc.
 - Make posters on water conservation and spread awareness.
 - Ensure any community gardens/ parks use water judiciously.
 - Encourage people to keep roads clean to avoid water logging.
 - Keep any nearby ponds/ lakes clean to make the water useable.
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Bringing Society and Industry Together



What should societies do to save water?	What should businesses do to save water?

Bringing Society and Industry Together



What should societies do to save water?	What should businesses do to save water?
<ul style="list-style-type: none"> • Do not litter/ do not dirty the water bodies. • Use fewer plastic items. • Put pressure on the government to take action against factories who pollute the water bodies. • Ensure you adopt water conservation practices at home. • Spread awareness about conservation of environment among friends and families. • Organise citizen led clean ups of local water bodies, parks and public spaces. 	<ul style="list-style-type: none"> • Do not release waste in water bodies. • Treat waste before it is released in water (if at all). • Invest in technology that is environmentally friendly. • Pay money for cleaning up water bodies that have been polluted by their actions. • Install water saving equipment in offices. • Spend money on campaigns to spread awareness about water conservation.

Policies for water conservation



What policies can the government adopt to encourage water conservation among citizens?	What policies can the government adopt to facilitate water conservation among businesses

Policies for water conservation



What policies can the government adopt to encourage water conservation among citizens?	What policies can the government adopt to facilitate water conservation among businesses
<ul style="list-style-type: none"> • Build rainwater harvesting systems. • Create awareness about the shortage of water. • Give tax incentives to use lesser water at home. • Fine citizens who litter water bodies. • Introduce new equipment for homes and agricultural fields that save water. 	<ul style="list-style-type: none"> • Fine factories and people who pollute the environment. For example, Chadha Sugar Mill was fined Rs. 5 cr for spill of untreated waste into the river Beas that killed hundreds of fish and contaminated water for several kilometres. (Link: https://goo.gl/R2z3zR) • Clean dirty water so that it can be used again. • Launch initiatives to clean up the rivers and lakes. For example, the government of India has launched National Mission for Clean Ganga to rejuvenate the river. • Give tax incentives to use lesser water.

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