CHAPTER 3

Tanks and Ground Water

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PART - I

Tanks (*Cheruvulu*)

For thousands of years, our ancestors have tried to utilize run-off rain-water by building tanks. We have evidence of tanks being built and used for agriculture from the times of the Megaliths. You will also read about the Kakatiya kings who built a large number of tanks in Telangana. This enabled the extension of agriculture into dry regions. To this day, most of the villages in these regions have at least one or two major tanks.

How were the tanks built?

The tanks were usually built by building a strong wall of stones and mud across a small stream in such a way that with a wall on just one side, a large lake could be formed. Look at the picture below:

Tanks were sometimes built by a king, sometimes by a military leader or nayaka or often by the people of the village themselves. Usually, every village preserved the memory of those who were responsible for building the tank through stories or temples or festivals. In building the tank, everyone in the village contributed towards the expenses and labour. All the people of the village maintained the tank together by repairing the tank bund (wall) or removing silt from the tank bed. They also ensured that no one stopped the water from flowing into the tank. They also appointed a person to regulate the use of the water from the tank. This particular person is called *'Neerati'* or *'Neeru Katte manisi'*.

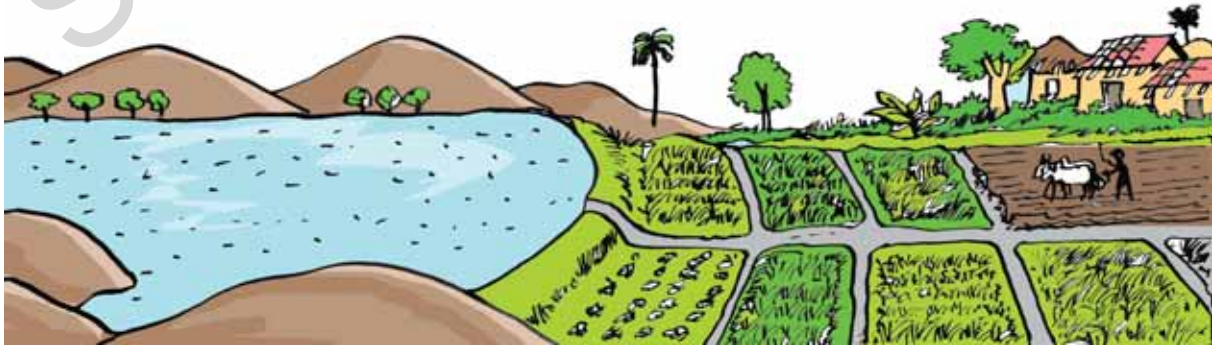

Fig 3.1(a) Tank and fields

How did the Tanks Help?

Tanks helped the people not only by giving them and their animals drinking water, but also in irrigating their fields in such a way that even during drought years, they could raise at least some crops. The tanks also helped to increase the water level in the wells nearby.

After the rain stopped and the tank water decreased, the tank bed could be used for raising some crops.

The most important thing is that tanks helped to prevent run-off of rain-water and the erosion of top soils. Every year, people would collect tank silt and use it in their fields to fertilise the soil.

We should remember that no one person owned the tanks and they belonged to all the people of the village. Thus, they benefitted not one or two people but all the villagers.

Decline of Tanks in Our Times

During the last twenty or thirty years, tanks have been neglected and have been allowed to break down. Repairs to the tanks, desilting etc. have not been done regularly. People also have gradually taken over the tank land for building houses or for agriculture. As a result, in almost every part of the state, we see the sad state of dry tanks lying uncared for. Instead of caring for the tanks, we have been digging deeper and deeper tube wells at a great expense. But they only benefit a few, and in the long run, deplete the water resources. On the other hand, tanks build resources for all.

Fig 3.1(b) Ramappa Cheruvu-Jayashankar District

Project

- Prepare a report with the following details about the tank in your village or town.
- Prepare a sketch map of the tank and its nearby areas.
- Find out from where does the water come into the tank and where does the excess water go.
- Find out the names of the river or stream across which it has been built or the names of the hills near which it has been built.
- Find out what is the tank bund made of and who maintains it.
- Find out who built the tank and when it was built.
- If there are any stories related to the tank, write them down
- Prepare an illustration of the tank with various things around it or get photographs of the tank.
- Find out what crops are grown, who controls the water, and how is it regulated.

Mission Kakatiya (Our Village - Our Tank)

After the formation of the new state, the government of Telangana has started a programme for minor irrigation tanks in the state. This programme, called 'Mission Kakatiya, *mana uru mana cheruvu*", aims at removal of silt from tank beds and repair and construction of tank bunds on about 47000 tanks.

Find out about the implementation of this programme in your area. How many tanks have been improved and whether people have benefitted from this.

Fishing in Tanks

Tanks not only provide drinking water and water for irrigation of fields, but also provide livlihood for fisherfolk. Many of the fisherfolk are from traditional fishing communities like Besta (Gangaputra), Goondla and Mudiraj (Tenugu) Community depend upon these tanks and rivers for leading their lives. Let's find out more about their lives by visiting a village in Suryapet district.

Fig 3.1 (d) : Goddess of Katta Maisamma

Bhethavolu village

This village is 16 kilometers from Kodada near Suryapet.

According to village elders 'Bhethavolu' got its name from Bhethala Reddy, the subordiante of Kakatiyas. He got the tank built in the name of his wife, Veerala Devi. Thus the villagers call the large tank as Veerala Devi tank or Eerla Devi Tank. The tank irrigates about 1900 acres in the village today even though originally it was meant to irrgate about 3000 acres. The ayakat (command area of tank) has been reduced due to illegal encroachements on the tank bed and due to silting.

Fig 3.1 (c) : Veerala Devi Tank

On the tank bund is situated the shrines of Katta Maisamma and Gangamma, who considered the guardian dieties of the tank. Fisherfolk and other villagers worship in these shrines before fishing and also celebrate annual festivals in their honour.

Fig 3.1 (e) : Throwing net

Fig 3.1 (f) : Fishing

There are about 600 families of Besta (Gangaputra) and Mudiraj Community in Bethavolu village. Out of which 60-70 households are leading their lives by fishing. However, they fish in the tank only during the months of March and April. During the rest of the year they work as small farmers or labourers.

Fishes in the tanks

Earlier, different kinds of fishes like Buddaparakalu, Jellalu, Kodipelu, Chandamamalu, Kuntumukkulu, Pulishalu, Isuka dondulu, paperalu, Gandraparakalu, Guriyopillalu, Koraminulu, Valugalu etc., were easily available in the streams, small rivers and canals. When these waters flowed into the tanks the fishes bred in them. But during the recent times these fishes are disappearing due to heavy usage of pesticides and chemical fertilizers in the agricultural fields. So now, the young fish are bred artificially in fish farming centres and are let out as seedlings into the tank. When they grow big they are fished and sold. The important among these are Merige, Ravvu, Bochche (Katla) and Bangaru Theega.These fishes are mainly available in the market nowadays. Each fish has its own special taste. Have you tasted the above mentioned fishes?

- Why do we eat only a few types of fish?
- Why is the cat fish banned?

Net Types

The fishermen use nets of different kinds to catch the fish. There would be 30 'Kannulu' (holes) in small parisha (thinner net) whereas 60 Kannulu in big Parisha (thicker net). These nets are also called as 'Sannapu vala and Doddu vala' in some areas. The nets contain the beads made by either iron or lead. The Sannapu vala weighs less. They catch fish and prawns by Sannapu vala. Doddu vala is used to catch the fish of weight 100 grams to 5 kilos. Doddu vala weighs more. Can you think why….. ?

- Visit the fishermen families of your area and see how they catch fish.
- Find out which types of nets are used in your region and discuss in the class.

Fisherfolk use two methods to catch fish - one in shallow waters and one in deep waters. *Visire* vala is used when there is less water in the tank. Kachchu vala weighs less. Fisher men go farther in to the stable water

and spread the Kachchu vala. These are used mostly in the occasions where the water is deep.

- Discuss why the nets are selected based on the depth of water.

Fishing:

Fishermen start for fishing early in the morning. Some use Visire vala for the fishing on the banks where the water is not deep. Others go into the lake on a ferry made with thermocol and reach a place where water is very deep and spread the Kachchu vala. Fishing is done twice a day. They catch the fish from 4‘0’ clock to 8‘0’ clock in the morning and take them to market. Again they catch fish from 1 to 4‘0’ clock in the afternoon and take them to market. They don’t care for cold, rains and heat and do the fishing. The fish left over after the sale are washed neatly and dried under the sun. When the catch is small they take them to Kodad or Suryapet for selling and when it is large they take it to cities like Hyderabad. Usually it is the men who do the fishing and it is the women who do the selling in the market. See figure 3.1(g)

Cooperative Society of Fishermen

A family needs to have a membership in the Cooperative Society for fishing. The membership is decided on the basis of the ayakat. Usually the Society takes one member per one hectare (two and half acres). There are 339 members in the society today. The Society pays Rs.2,35,000 to the Department of Fisheries for fishing in the tank. The Society has to purchase fish seedlings and put them

Fig 3.1 (g) : Fish Market

into the tanks. They are supposed to pool the produce and share the earnings equally among all members.

- Meet the members of Co-operative society of your village and find about the Functioning of the society.
- Why do you think the fisherfolk have to make payments to the Fisheries Department?

Recently a new practice can be seen in many fishing tanks. The fishermen are too poor and need loans for running their households. They cannot afford to buy the fish seedlings from the fish farms. Hence they are forced to take loans from traders. Traders give advance loans and also take the responsibility of putting seedlings in the tank. In return the fisherfolk have to sell all their produce to the trader at a price fixed by him which is usually about 10 to 20 percent of the actual market price. In this way the trader makes a huge profit. If banks could give loans to the Cooperative societies, the fishermen could become independent of the trader-contractors.

- Why do you think the banks are reluctant to give loans to the fishermen?

PART - II

Groundwater

Rainwater not only flows down the streams or rivers but also slowly goes down into the soil. This water accumulates below the ground in the gaps between rocks, pebbles, sand etc. This is the groundwater which we reach through wells and bore wells.

Rocks which have cracks or pores (minute holes) in them and can contain water are called pervious rocks. In Telangana, there are some areas where such rocks like sandstones are found. Some rocks like granite, Kadapa limestone etc. are very compact and do not have pores in them. Water cannot enter into them. Groundwater usually accumulates above such rocks. Since the water cannot go beneath them, these are called impervious rocks. Most of the rocks underlying the soil in telangana are of this kind. A small portion of land in Telangana, which is next to rivers, has deep layers of sand, soil and pebbles. Water also accumulates in these layers.

The layer of water which accumulates under the ground among rocks is called aquifer. The thickness of the aquifer determines the availability of groundwater in the area.

Visit the wells in your area and try to find out how many feet below the ground is the water level. Find out if there is any rocks underneath and if so, what kind of rock it is. Also find out about who owns the well, when was it dug and how much money was spent. Add up all the information about the wells and prepare a small booklet.

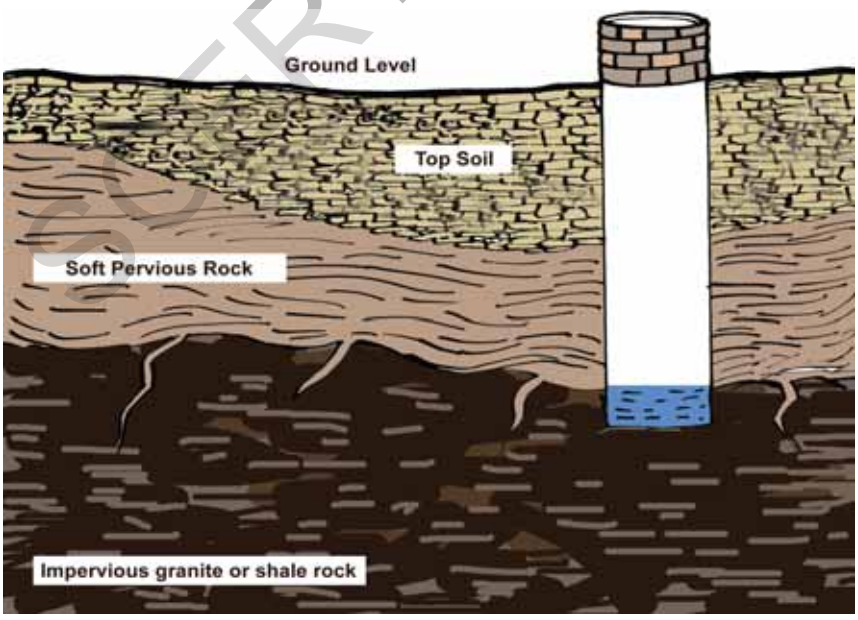

Fig 3.2. Rocks and Water below the ground level

- Do you think groundwater would accumulate if there were no impervious rocks?
- What would happen if the pervious rock is below the impervious rock? Where would the ground water accumulate?

Water Table or Groundwater Level

Look at the wells in figure 3.3 given below carefully, the water level is the same in all these wells. This is the water level in the wells after the rains. You can see that in all these wells, water is available at the depth of 5 meters, this means that if you were to dig a new well in the same region you would strike water at the same depth. This is the level of groundwater, which is also called the water table.

Water level is never stable. It goes deeper in summer months and comes up during the monsoons.

Rocks and Groundwater in Telangana

Most of the rocks under the soil in Telangana consist of granites, which are hard and impervious. However, the top portion of these rocks (about 20 meters) are broken (weathered) and they carry water. Many of these rocks also have deep cracks going down to 50-100 meters depth. These cracks too contain water. Normally, with ordinary wells that we dig, we tap the water present in the top weathered layer. Bore wells, which are dug with the help of drill machines, reach the deep cracks and draw water from them.

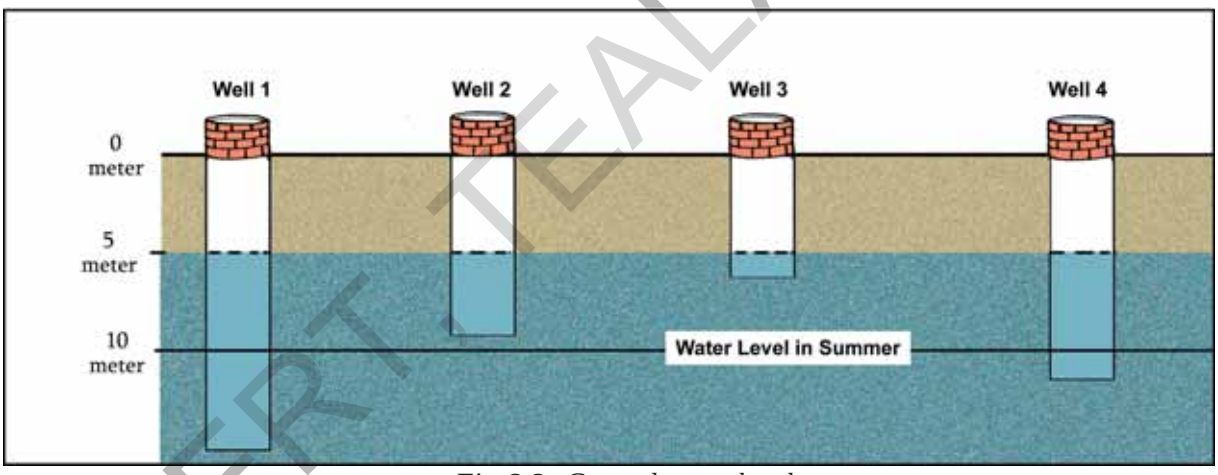

Fig 3.3. Groundwater level

Look at figure 3.3 and answer the following questions:

i. The groundwater level is ..... meters below the ground level.

ii. In summer, if water level goes down to 10 meters below the ground level which of the four wells will go dry?

iii. Which well will have the maximum water available?

Look at the figure 3.4 and answer the following questions:

- Can you find out how water entered the level below the impervious rock and reached the crack in the rock below?
- During summer, which well will go dry first? Give reasons.
- Will there be water in the well even if there is no crack in the rock?

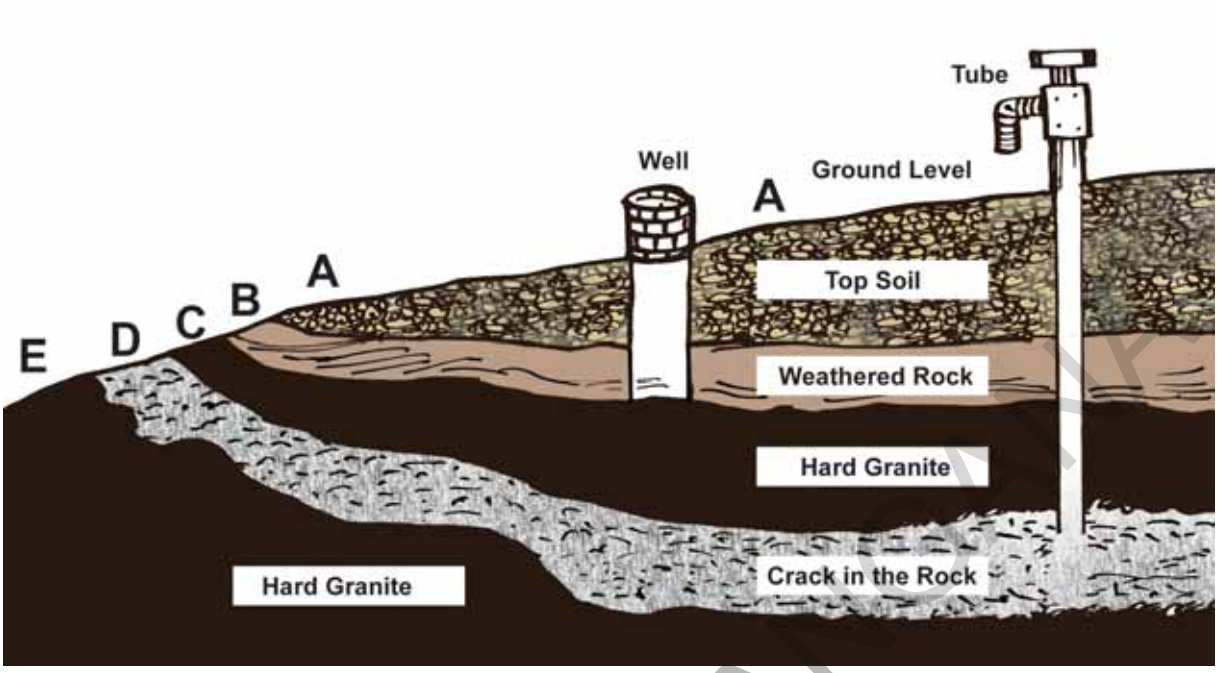

Fig 3.4. Rocks and Water below the ground level

In many mandals of Telangana, the predominant rocks are not granites. Small quantity of ground water goes in these structures. Rocks of the Kadapa type of limestones are avilable in some areas. They are also hard but are greatly broken and have a lot of gaps between them allowing water to accumulate in them. In the cracks of the rocks, ground water is available in some areas.

The areas adjacent to the great rivers like Krishna and Godavari have deep layers of sand and silt. The water level here depends upon the water in the river. Usually, there is plenty of water. It is nearly five to seven meters below the ground in these areas and it is very easy to dig wells in them.

- Can you recall the wells and bore wells in Penamakuru, Dokur and Penugolu villages you had studied in class VI?

Recharging Groundwater

Water flows swiftly on naked ground which has no cover of trees or grass, as there is nothing to stop the flow. However, if the flow of the rain water is checked by vegetation or bunds, then there is a greater possibility of it percolating into the soil to join the groundwater. Grass is planted on the hill slopes from where a stream starts and small check dams are also built across streams to store water for a longer time. All of these help to increase or recharge the groundwater.

However, it is seen in most parts of Telangana that we are extracting more water than the recharging rate. This means that we are over using the groundwater. The amount of water that percolates into the soil has also declined due to the cutting down of forests. Consequently, there is a rapid fall in the water table or water level by half to two meters every year.

If we draw more water than what percolates down, the groundwater will decrease over time. Finally, there may be little groundwater left for us. This has been happening during the last few years.

- Can you think of ways in which groundwater can be used less without wastage?

In our part of the country, it rains only for about three to four months. For the rest of the year we are dependent upon groundwater. Rivers, wells and ponds all get their water from these groundwater sources.

Can we increase the ground water? You may observe that water quickly flows when they are no trees, vegetation stones etc. Then water quickly flows into streams and rivers. However, if the flow of the rainwater were to be checked by vegetation and *bunds*, there would be a greater possibility of the water percolating into the soil to join the groundwater. This is why vegetation like trees, grasses and *bunds* are used to enhance groundwater.

Over the last few years, great efforts have been made to 'harvest' rainwater by these means. These measures are usually taken for a stream or a river. Such efforts are called 'watershed development projects'. Under these projects, trees and grasses are planted on the hill slopes from where a stream starts. Also, small *bunds* are built across streams to stop the flow of water. Small check dams are also built across streams to store water for a longer time. All of these help to increase or 'recharge' groundwater.

- Are there any watershed development projects in your area? Try to visit the site and study how this is done. Try to draw a sketch-map of the project area.

Quality of Groundwater

Groundwater is usually mixed with many minerals. Sometimes, the water is salty and sometimes it is sweet.

- Collect the water from various places like dug well or bore well, lake or pond. Can you explain why the taste of the water taken from some dug wells is sweet, while that of others is salty or brackish?

This difference is because of the minerals which are dissolved in the groundwater. These minerals come from the rocks and soils underneath. Hence, depending upon the minerals which mix with the water, the taste and nature of water changes. In many mandals of Telangana, there is excess quantity of certain minerals like Sodium, Fluoride, Chloride, Iron, Nitrate, etc. Drinking such water is not good for our health and can cause diseases, which affect our bones, teeth etc. (Fig 3.5). In such situations, the drinking water should be properly treated to remove the excess minerals.

Many times, water is polluted due to the excessive use of fertilisers, pesticides or poor drainage. In our country this problem is increasing day by day. Unless we take the preventive steps, most of the wells or river water soon will become unsafe for drinking or even for bathing.

Fig 3.5 Person affected by excessive fluoride in drinking water

Use of Groundwater

Groundwater like the rivers, is the common resource of all people and not just of those who have land over aquifers. However, at present, it is being used only by those who have such lands.

Those who own land over aquifers tend to over use the water, which decreases water table for all the neighbouring people. Some of them dig deeper tube wells, which cause further decline in the water level. As a result, the wells in the neighbourhood are going dry. Unless we use the groundwater as a common resource and in a restrained manner, can we ensure that everyone is able to benefit from them? In fact, after a few years, even those who dig deeper tube wells will not have any water left to pump.

- Can you think of a way in which the groundwater in your village can be used equitably so that all families – including those who do not have any land, get water? Draw up such a plan and discuss them in the class.

Today's generation has received water from the past as a sacred asset. We should pass it on to the future generation just as we received it. We should also develop ways of using and conserving water in a restrained manner. Otherwise, future generations will fight destructive wars over water and we will be responsible for it.

Keywords :

1. Pervious rocks
2. Impervious rocks
3. Vegetation
4. Aquifers
5. Megalithic age

Improve your learning

1. Correct the incorrect sentences.
   a. Water flows from the plains to the plateau.
   b. There is a thick deposit of sand and gravel in the plateau.
   c. Groundwater will never dry.
   d. It is easy to dig wells in Mahabubnagar.

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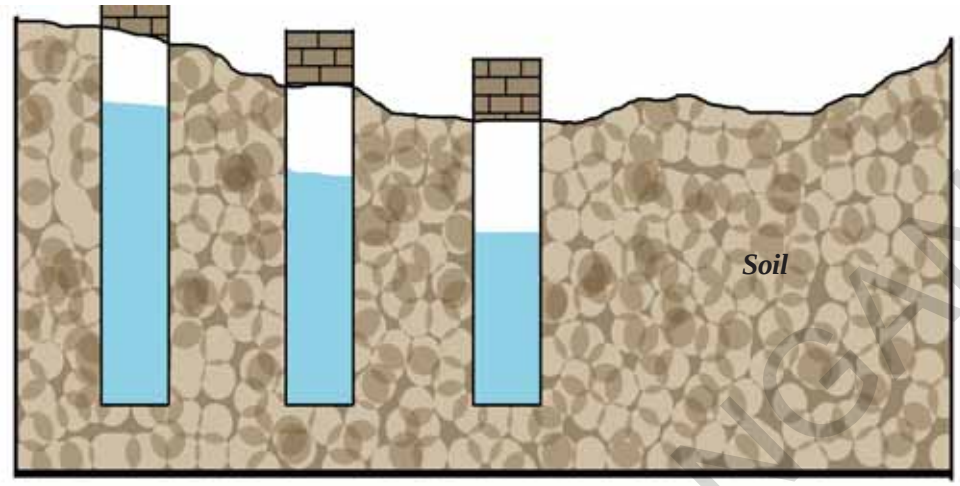
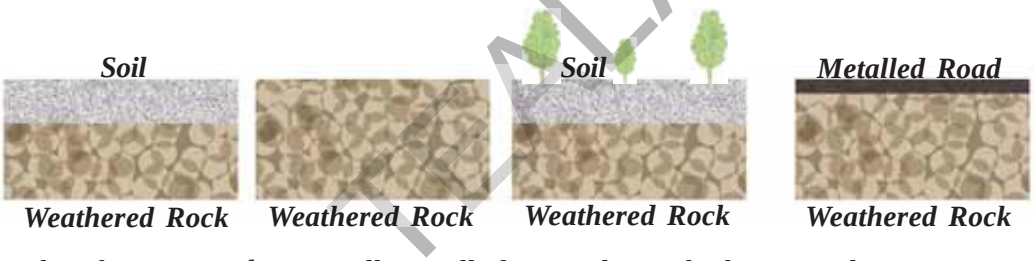
2. The wells shown in this figure are situated on the slopes of the Godavari. But there seems to be a mistake in the figure. Can you correct it?



3. In which of these places do you expect maximum percolation to take place?



4. When the owners of some wells in Pallerla started using high-powered motors to draw water from the wells, the owners of other wells noticed that their wells were drying up. Discuss the possible solution to the problem.
5. In areas where there is a shortage of groundwater, should there be any restrictions on digging bore wells? Why?
6. Think about the ways to restore the groundwater in your area.
7. Observe the figure 3.1(a) and compare it with your locality.
8. Draw the map of your village and locate the water resources of your village in it.
9. Read the third paragraph under "Quality of Ground water" in page no. 30 and comment on it.

Project:

Collect the following information about the tanks/Kuntas.

Sl. No.	Name of the Tank/Kunta	Ayacut (in acres)		Other uses of tanks	Reasons for not repairing	Benefits, it repaired
		Previously	at present			