

Tanks and Ground Water

PART - I

Tanks (*Cheruvulu*)

For thousands of years our ancestors have tried to use run-off rain-water by building tanks. We have evidence of tanks built and used for agriculture from the times of the Megaliths. You will be reading about the Kakatiya and Vijayanagara kings and nayakas who built a large number of tanks in Telangana and Rayalaseema. This enabled the extension of agriculture into these areas. 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:

The 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 for expenses and labour. All people of the village together maintained the tank by repairing the tank bund (wall) or removing silt from the tank bed. They also took care so that no one dirtied or stopped the water which flowed 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?

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

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

Most important thing is that the tanks helped to prevent the run-off of rain-water and the erosion of top soils. Every year people would collect tank silt and apply to their fields to fertilise the soil.

We should remember that no one person owned the tanks and they belonged to all 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 the tanks have been neglected and have been allowed to break down. Repairs to the tanks, desilting etc. have not been done



Fig 3.1(b) Ramappa Cheruvu - Warangal

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 great expense. But they only benefit a few and in the long run deplete water resources. On the other hand tanks build resources for all.

Project

Find out in detail about the tank in your village or town and prepare a book on the tank.

- ◆ Prepare a sketch map of the tank and its nearby areas.
- ◆ Find out from where the water comes into the tank and where the excess water goes to.
- ◆ Find out the name 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 the tank bund is made of and who maintains it.
- ◆ Find out who built the tank and when it was built.
- ◆ If there are any stories about the tank write them down.
- ◆ Prepare illustration of the tank and various things around it or get photographs of the tank.
- ◆ Find out what crops are grown, who controls the water, and how it is regulated and note down.

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 tubewells.

Rocks which have cracks or pores (minute holes) in them and can contain water are called pervious rocks. In Andhra Pradesh we have few districts like Khammam where such rocks like sandstones are found. Some rocks like granite, Kadapa limestone, 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 our state are of this kind. A small portion of the state 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 rock underneath and if so what kind of rock it is. Also find out who owns the well and when it was dug and also how much it costed. Add up all the information about the wells and prepare a small booklet.

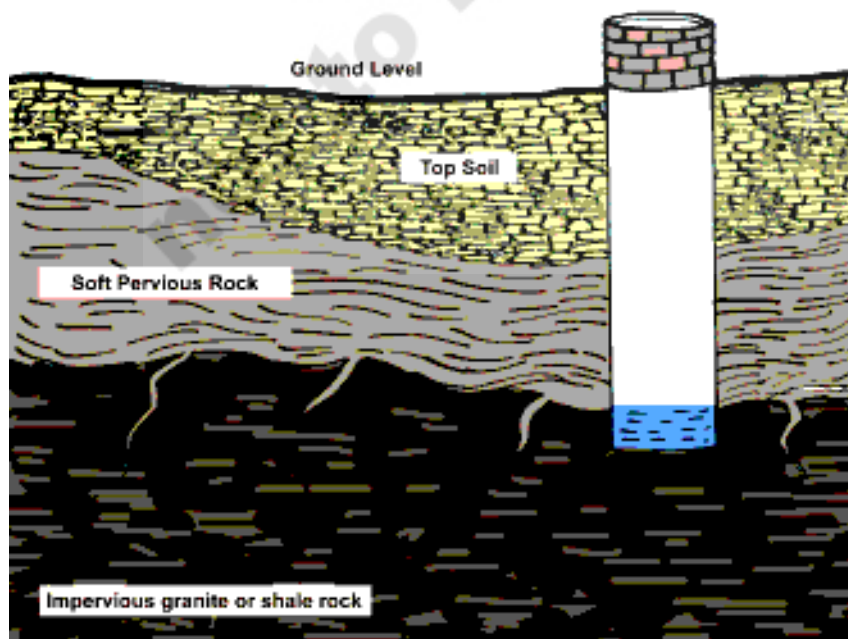


Fig 3.2. Rocks and Water below the ground level

- ♦ 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 will the groundwater accumulate?

Water Table or Groundwater Level

Look at the wells in figure 3.3 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 after the monsoons.

Look at figure 3.3 and answer the following questions:

- The groundwater level is meters below the ground level.
- In summer if water level goes down to 10 meters below the ground level which of the four wells will go dry?
- Which well will have maximum water available?

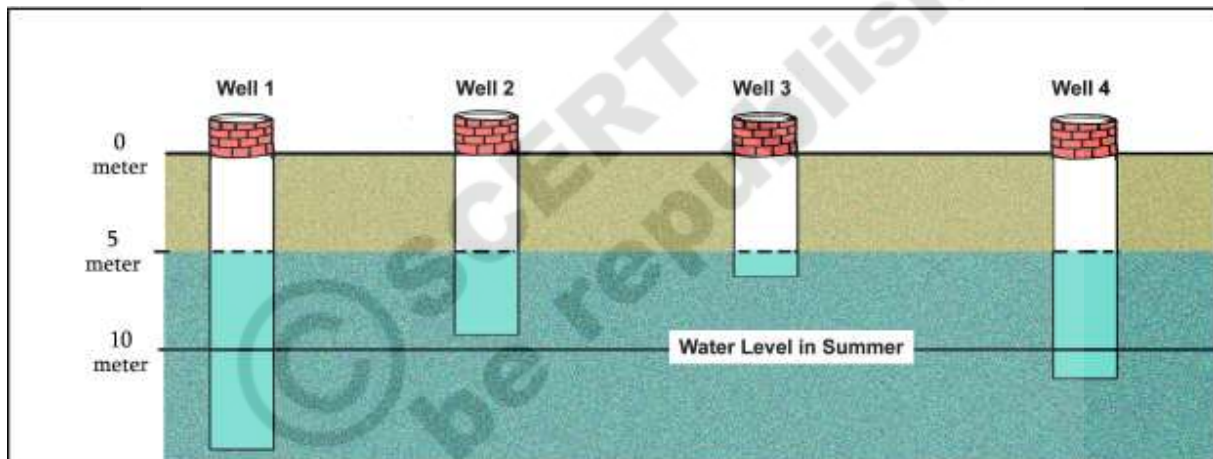


Fig 3.3. Ground water level

Rocks and Groundwater in Andhra Pradesh

Most of the rocks under the soil in Andhra Pradesh 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 or 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. Tubewells which are dug

with the help of drill machines reach the deep cracks and draw water from them.

Look at the figure 3.4 and answer the following questions:

- Can you find 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 your reasons.
- Will there be water in the well even if there is no crack in the rock?

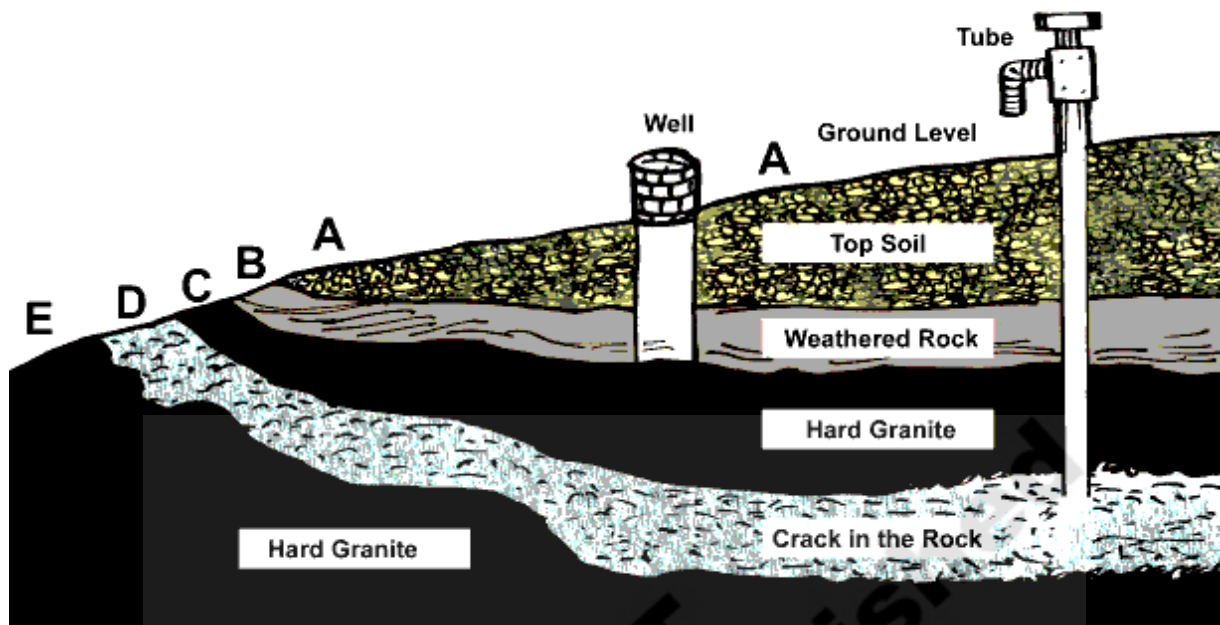


Fig 3.4. Rocks and Water below the ground level

In many mandals the predominant rocks are not granites but rocks of the Kadapa type of limestones, which too are hard but are greatly broken and have a lot of gaps between them allowing water to accumulate in them. In these rocks water is usually available between three to fifteen meters below the ground level. Wells are therefore dug upto 16 meters deep.

The area adjacent to the great rivers like the Krishna and the 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 tubewells in Penamakuru and Salakamcheruvu villages you studied in class VI?

Recharging Groundwater

Water flows swiftly on naked ground, which has no cover of trees or grasses 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 the water percolating into the soil to join the groundwater. Grasses are 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 this helps to increase or recharge groundwater.

However, it is seen in most parts of our state 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. This has been causing the rapid fall in the water table or water level by half to two meters every year.

If we draw more than the water that 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 ground water 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.

Water quickly flows into streams and into rivers. However if the flow of the rainwater were to be checked by vegetation or *bunds*, then there would be a greater possibility of the water percolating into the soil to join the groundwater.

This is why vegetation like trees and grasses and *bunds* are used to enhance groundwater. Over the last few years great efforts have been undertaken to ‘harvest’ rainwater by these means. These measures are usually taken for a stream or 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 and 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 this helps 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 our state, 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 and pesticides or poor drainage. Unless we take preventive steps, soon most of the well or river water will become unsafe for drinking or even 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 neighbouring people. Some of them dig deeper tubewells which cause further decline in water level. As a

result the wells in the neighbourhood are going dry. Unless we use the ground water 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 plans and discuss in the class.

Today's generation has received water from the past as a sacred asset. We should give it 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.

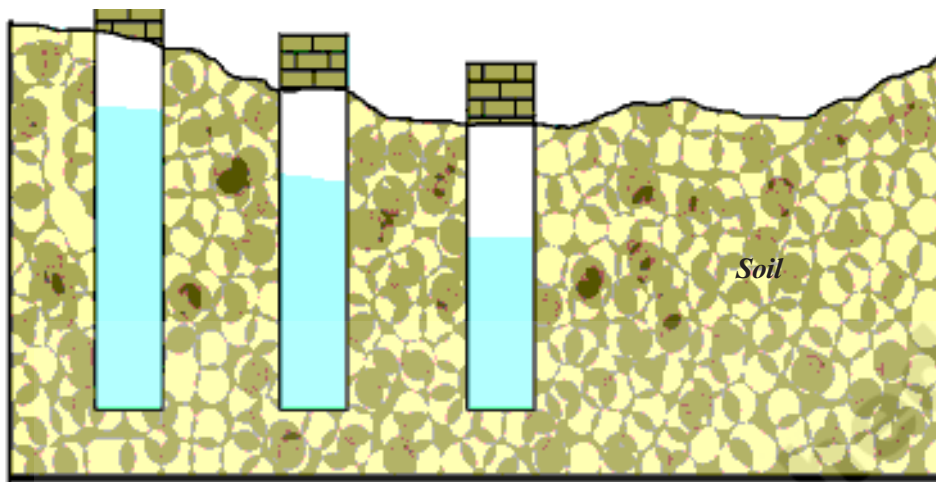
Key words :

1. Pervious rocks
2. Impervious rocks
3. Vegetation
4. Aquifers
5. Megalithicage

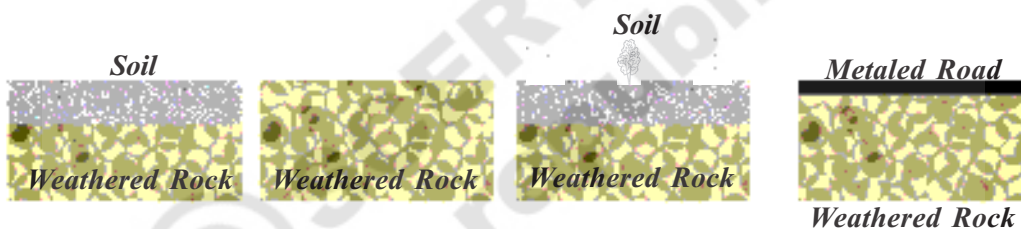
Improve your learning

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 plains.
 - c. Groundwater will never dry.
 - d. It is easy to dig wells in Rajahmundry.

2. The wells shown in this figure are situated on the plains 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 shortage of groundwater, should there be any restrictions on digging tubewells? Why?
6. Think about the ways to restore the groundwater in your area.
7. Observe the picture 3.1(a) and compare with your locality.