Chapter: 1

Reading Maps of Different Kinds

The world we live in is so full of variety – mountains, hills, sea coasts, deserts, forests, snow-covered regions.... Why is there so much variation? How does this affect the lives of people who live in those parts? To study and understand these questions we need to take the help of maps of different kinds. Some maps tell us about how high or low the places are, some tell us about how much it rains there or how hot or cold it gets there, some tell us about crops that grow there or the kinds of forests there. By studying them, we can know many things.

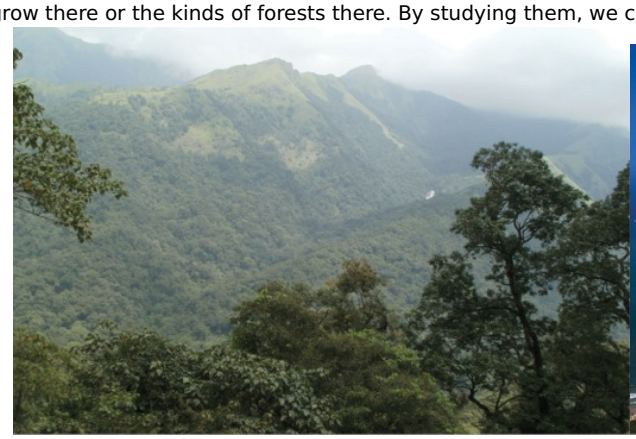


Fig 1.1 Evergreen forest in Western ghats of Karnataka

Fig 1.2 Ramakrishna beach Vishakapatnam

Fig 1.3 An Oasis in the Sahara desert of Libya in Africa

Fig 1.4 Ice covered continent - Antarctica

Bring copies of School Atlas and see how many different kinds of maps are there. Make a list of maps you would like to read and understand. Last year, we learnt to read some simple maps. This year we learn to read maps that show heights. But let us first revise what we learnt last year.

- Hang a political map of India in the class. Look at the map carefully and answer the following questions:
  i. Krishna reddy went to Bhopal from Hyderabad. In which direction did he travel?
  ii. Ashok went to Chennai from Lucknow. In which direction did he travel?
  iii. Regina went to Bhubaneshwar from Mumbai. In which direction did she travel?
  iv. Weprechu went to Jaipur from Kohima. In which direction did he travel?
- Make such questions and ask each other.
- Look at the symbols shown on the map. Now try to find out the boundary of Andhra Pradesh. Trace your finger along the boundary.
- Draw the symbol for the boundary of a state and the symbol for the boundary of India (international boundary) in your notebook.
- Can you make a list of states which lie to the north, south, west of Andhra Pradesh? What lies to the east of the state?
- In class VI, you have learnt to measure distances between places with the help of the 'scale' given in the map. Now try to find out the distance between Hyderabad and various state capitals like Jaipur, Imphal, Gandhinagar and Tiruvananthapuram.

Symbols

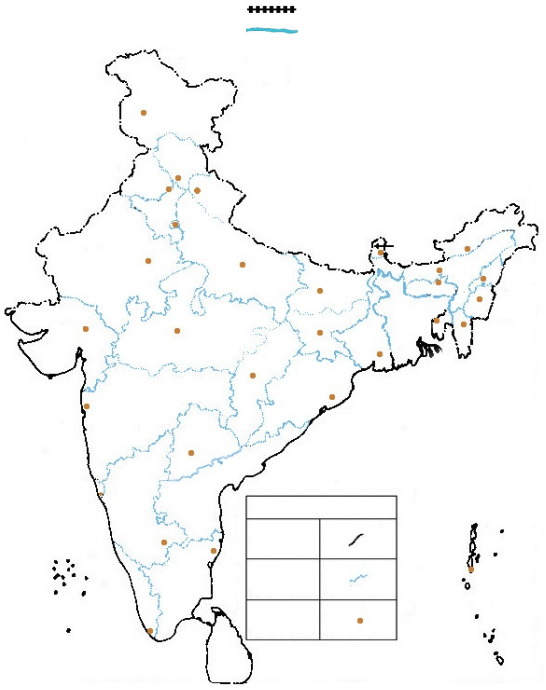
Point, Line, Area: We use symbols to show any physical object on the map. You have seen some of them in class VI.

If we are asked to show Delhi in India map, we will mark a point ( ) and label it as Delhi. To show the river Godavari, we draw a line ( ) along its course.For the Railway line we will draw a track line ( ) to represent it. In Andhra Pradesh map if we want to show the area of Krishna or Guntur district, we demarcate its boundary and mark it with some colour or pattern, which is known as a real symbol. Thus, all physical objects are shown on the map with the help of a point, line or an area symbol.

Look at a few maps in textbooks of 6, 7, 8 classes and fill the following table:

Point Symbol	Line Symbol	Area Symbol
1. Delhi	*1. Godavari*	*1. Post Office*
2.	*2.*	*2.*
3.	*3.*	*3.*

Map-1 : States and Capitals



Lakshadweep

Gandhinagar
Panaji
Thiruvananthapuram
Mumbai
Jaipur
Chandigarh
Bengaluru
Srinagar
Bhopal
Shimla
New Delhi
Chennai
Hyderabad
Dehra Dun
Lucknow
Raipur

The extgernal boundaries of India
Boundaries of stagtes and India
Capital of states

Index

Scale

1 centimeter = 200 kilometers

N

Ranchi
Bhuvaneswar
Patna
Kolkata

Gangtok

Agartala

Shillong

Andaman Nicobar Islands

Dispur

Itanagar

Imphal

Aizwal

Kohima

Temple

Nimpur Village

Physical Maps

You will find some maps in your atlas called ‘Physical Maps’. In these maps, you will usually find different parts of the land coloured in green, yellow or brown. Actually, they show the variety of landforms (plains, mountains, plateaus, etc.) and depict the heights of places.

How can we represent the heights of land on flat paper? Of course, we can make a drawing like the one below:

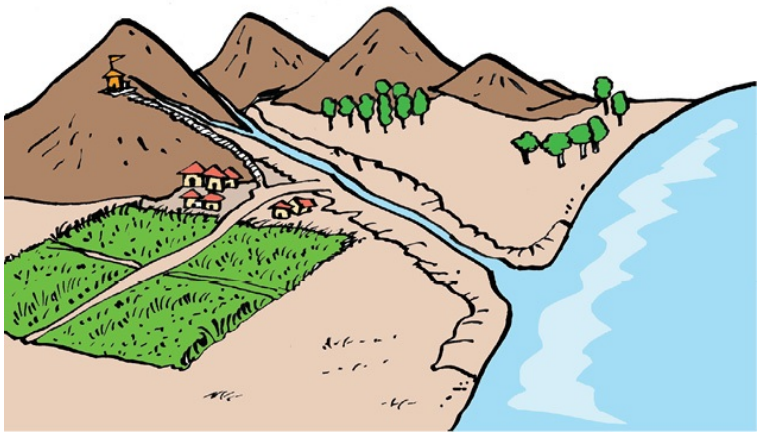
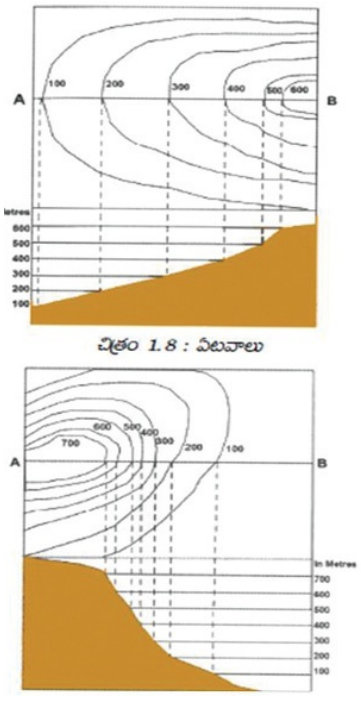


Fig 1.5 Drawing of “Nimpur” Village

As you can see this is a picture and not a map. Here the height of the hills hide what is behind them. A map has to show all places without hiding them. Can you think of a way in which we can draw a map of this place?

One way in which we can show heights on maps is through the use of colour. Let us see how this is done.

Measuring Heights on Land



చిత్రం 1.8 : వీటివాలు

Gentle slope **steep slope**

All heights on the land are calculated from the sea level. Since all seas in the world are connected to each other, the sea level (the top surface) all over the world is taken to be roughly the same. Look at the picture of Nimpur village below to understand this idea.

You can see from the picture that Nimpur village is fifty meters above the sea level.

- How many meters above sea level is the temple?
- How many meters above sea level is the top of the hill?

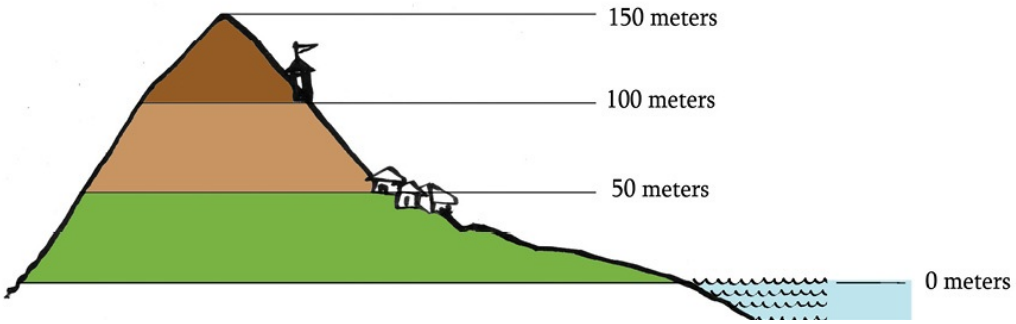


Fig 1.6 Heights in Nimpur Village

Showing Heights on a Map

Look at the map of Nimpur village area given here (Fig 1.7).

Can you see that the map shows three height zones in the map – firstly areas which are between 0 meter height and 50 meter height, areas which are between 51 meters and 100 meters and then finally areas which are between 101 meters and 150 meters. Thus, any place which falls in any of the height zone 51-100 meters will have a height which is above 50 meters but below 100 meters. Heights are shown in different shades of colours.

- Look at the map of Nimpur showing heights. What is the colour given to the area adjacent to the sea?
- What is the colour given to the highest region in this map?

Now look at the Physical Map of Andhra Pradesh in your atlas or wall map. Find out the range of heights and colours for the places given below by reading the index and fill the table below.

Table -1:

Place	Height	Colour Zone
Vijayawada	From.... to .... meters	
Visakhapatnam	From.... to .... meters	
Ananthapuramu	From.... to .... meters	
Chittoor	From.... to .... meters	
Kurnool	From.... to .... meters	
Nellore	From.... to .... meters	

Make such questions and give them to each other.

- Find out the height of few Indian cities.
- Find out the height of few cities around the world by using your atlas.

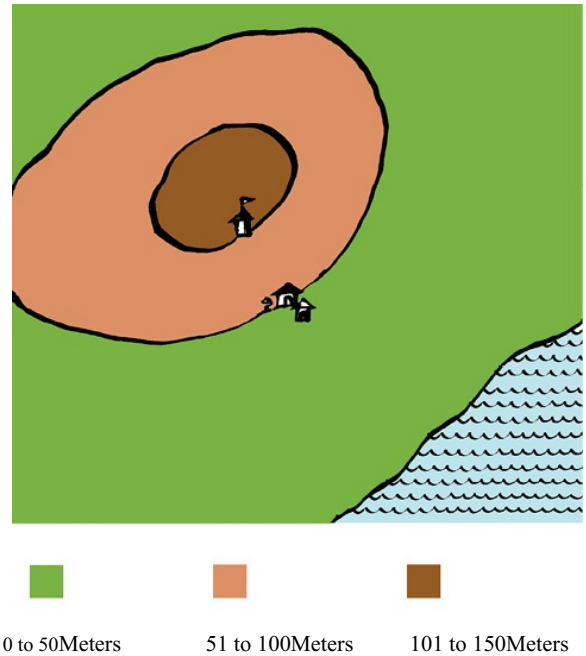


Fig 1.7 Figure of Nimpur Village showing heights

Contour Lines

A contour is a line joining the places with equal heights. On the map of Nimpur you would have seen that there is a line passing through the village, this is the 50 meter contour line. All places on this line will have the same height of 50 meters. Contour lines will be in irregular shape depending upon the land form. These cannot cut with each other. The distance between two contour lines will depend upon the landscape. If the land has a steep climb then the contour lines will be near to each other. If the slope of the land is gentle, then the contour lines will be quite far from each other.

Uses of Maps showing Heights

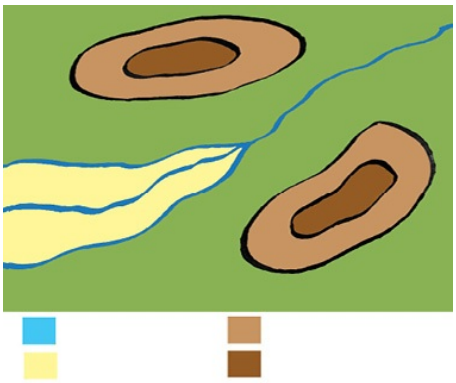
These maps help us to understand the nature of the terrain, where the mountains are, where the valleys are, etc. If you look at the physical map of Andhra Pradesh, you can identify the coastal plains that run along the coast of the Bay of Bengal. If you travel westwards from the coast, you will reach hills which form the "escarpments" to the plateau region. The plateau region itself is cut by many rivers like the Krishna and the Godavari, which form deep and broad valleys in them.

Maps showing heights are very essential when roads or dams have to be constructed. If we have to lay roads in an undulating region between two places such maps help us in deciding the route to be taken by the road. Similarly, when dams are planned it is necessary to know how much land will be submerged by the water of the dam.

Mean Sea Level

There are high tides and low tides on the level of the sea, and they never stand still. As a result of this phenomenon, the level of the sea keeps on either rising or falling. Which of these heights do we take as the sea level or 0 meter height? In order to solve this problem the level of the sea is carefully measured at frequent intervals and the mean level of the sea is calculated. Over a period, scientists observed the high and low levels of the sea and they have come to one calculated average level, which is known as Mean Sea Level (M.S.L.).

If you live near a Railway station, find out the height of that place with the help of display board. The height is mentioned as "_____ M.S.L.". Note it down in your note book.



0 to 20 Meters
21 to 30 Meters
31 to 40 Meters
sa 41 to 50 Meters

- Look at figure 1.6 & 1.7 and tell whether Nimpur would be submerged if sea waters were to flood up to 30 meters?

Look at figure 1.8 and answer the following questions:

- Mark the direction of flow of the river.
- The height of the lowest land is between ____ meters and _____ meters.
- There are two high points in this map. What are their heights?

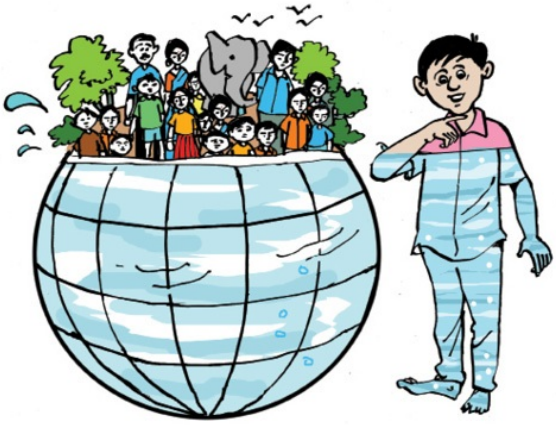
Improve your learning

1. Why are the levels of all the seas equal in the world? AS_1
2. How is the sea level measured? AS_1
3. What are the uses of maps showing heights? AS_1
4. What differences do you find between the life style of people living on high altitudes and low altitudes? AS_1
5. How are maps helpful to people? AS_6
6. Read the para 'Contour Lines' of page 5 and comment on it. AS_2
7. Observe the physical map of Andhra Pradesh and list out the dirstricts which are above 150 M.S.L.? AS_5

Chapter: 2
Rain and Rivers

All life on the earth is very crucially dependent upon water. As you know over 71% of the earth's surface is covered

with water. We depend upon water for growing crops. But we do not get water uniformly over the year. It is also not available uniformly all over the earth. Nor is the quality of water the same everywhere.



Discuss in the class in which months you get rains, in which part of the village or town you have more water or less water, where you get good drinking water and where you get salty or hard water. In the following chapters we will study about the diversity in water availability and its consequences.

PART - I

Sun, Clouds and Rainfall

After the unbearable heat of April, May and June, comes the rainy season, which lasts for a few months. Do you know what causes rains? Where do the rain bearing clouds come from? Discuss whatever you know or think about these things in the class.

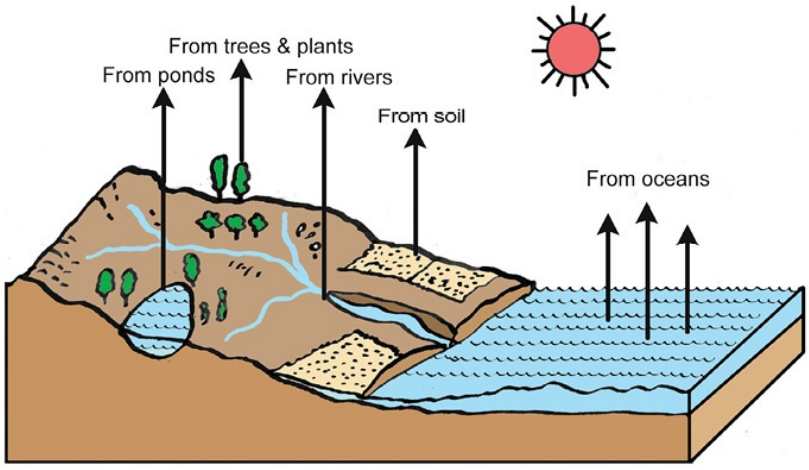
Evaporation

Pranavi woke up early in the morning. She needed to take bath in hot water, so she heated water in a dish over fire. As the water heated up, water vapour touched the lid and with the help of outside cool air, vapour became water drops and stuck to the lid of the dish. When she removed the lid, some of the water drops fell down into the dish. By observing this, she realised that the water evaporates and latter it becomes condensed into water by cooling.

The story of rain begins with water vapour. What is water vapour? When you dry your wet clothes in the open, you see that the water disappears after a while and the clothes dry. Similarly, if you keep some water in a plate, it dries up in a couple of days. Actually, water in the cloth or in the plate becomes water vapour and mixes with the air through a process called '*evaporation'*. So even when water is not boiling there is evaporation.

There are several water bodies on the earth's surface – oceans, rivers, lakes etc. There is constant evaporation of water from these water bodies. In fact, wherever there is moisture, like on wet cloth, there is evaporation. There is evaporation from our bodies, from trees, plants and soil! The process of evaporation speeds up with the increase in temperature.

- In which season would be more evaporation, summer or winter?
- When will the evaporation be more, during the day or night?
- Look at figure 2.1 and make a list of all places from which evaporation takes place.
- Where do you think maximum evaporation would take place – from plants, rivers, oceans or soils?



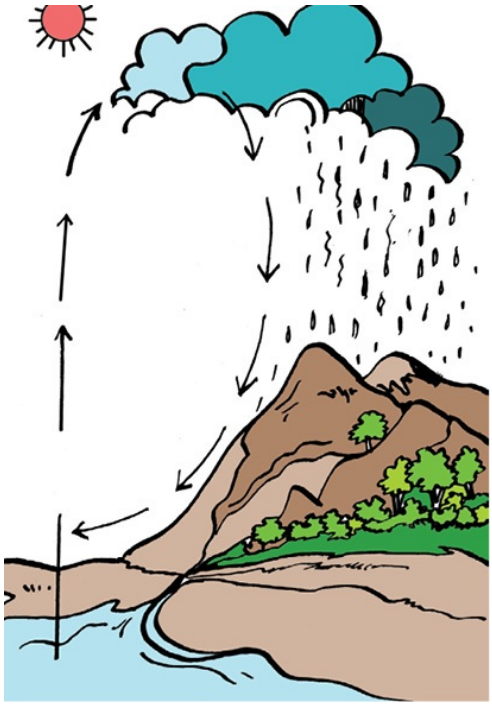
Formation of Clouds and Rain

When water vapour rises with hot air and reaches high up in the sky, it gets cooled. This is because it gets cooler as we rise above the surface of the earth. With the cooling, water vapour is transformed into tiny water droplets. These droplets gather around minute dust or smoke particles in the air and gradually increase in size. These small drops of water gather to form the clouds.

- Make a diagram to explain how vapour is transformed into clouds in the box given above. Label your diagram with these terms – earth, sky, rising vapour, cold, dust particles, water droplets, clouds….

As the clouds continue to rise upwards, it gets cooler and more droplets are formed. The droplets get together to form bigger drops. As they get heavier, it gets more and more difficult for them to remain in the air and so they begin to fall as rain drops.

- Why do you think it is necessary for the clouds to rise in order to cause rain?
- Have you ever observed dew? Where is it formed?
- In which part of the day will you find fog?
- In which season do you have more foggy days?
- Have you ever seen snow fall? How is it different from rain fall?
- Have you ever experienced the hail storm?



Some Important Terms

Evaporation: Change of water into vapour is known as evaporation. The process in which water vapour changes into water is called condensation. Clouds are tiny droplets of water hanging in the air above.

Water Cycle :

The process of water evaporating from the seas, forming clouds in the sky, coming down as rain, flowing down the slopes on land in the form of rivers and finally joining the sea, is called the water cycle.

Precipitation: Different forms of condensation of water vapour is known as precipitation. This may take place in the form of dew, fog, rain, snow, or hail.

Humidity: The amount of invisible water vapour present in the atmosphere is known as humidity. When temperature and humidity are high, we feel uncomfortable. We perspire and the sweat does not evaporate quickly. We feel sticky and such weather is called sultry.

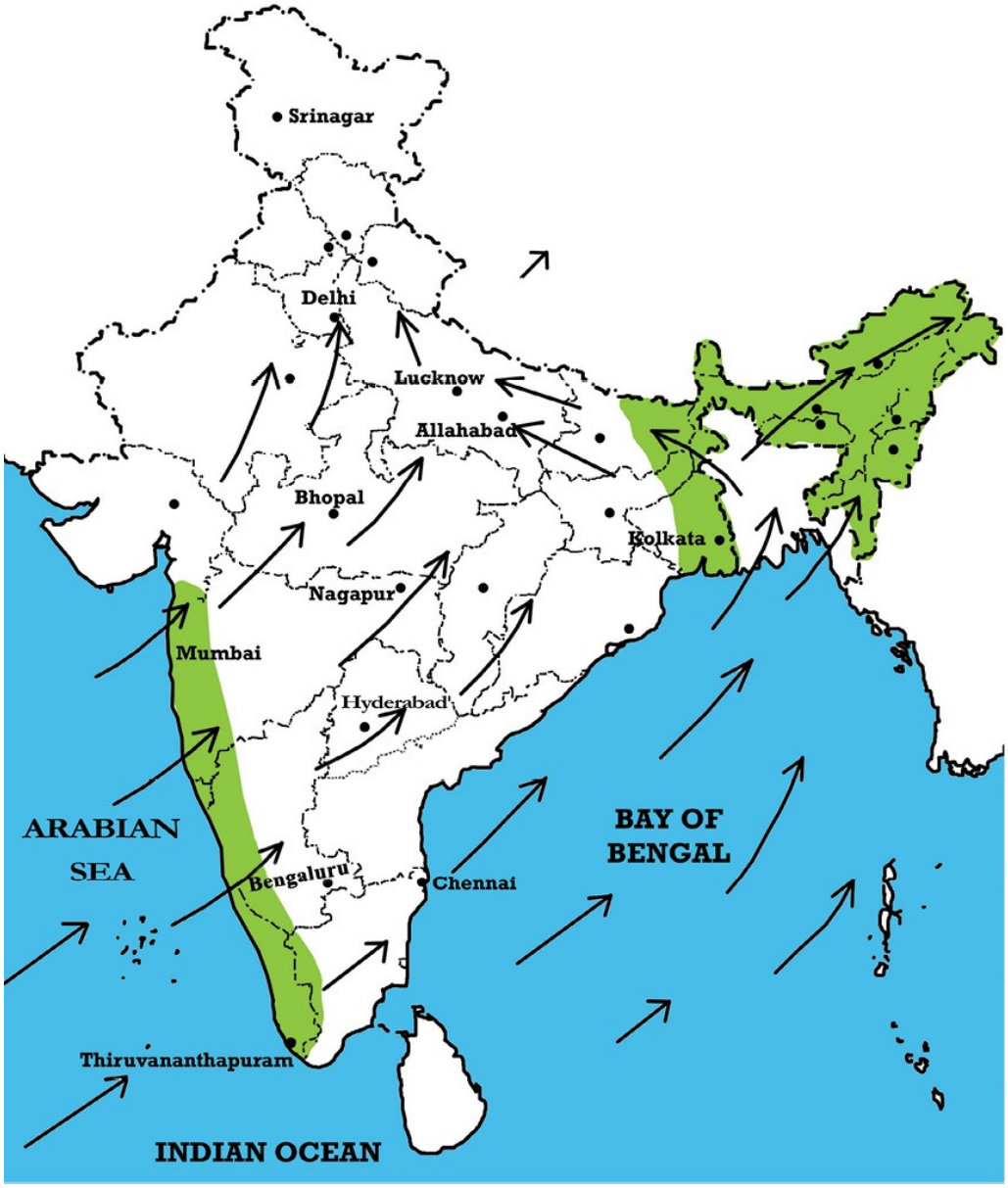
Winds and Clouds

Since evaporation takes place all over the earth's surface, clouds are also being formed all over. However, it is on the surface of the oceans that maximum evaporation and cloud formation takes place. After all, oceans are vast water bodies extending upto thousands of kilometres. As a result, it also rains very heavily on the oceans. Clouds also travel inland for thousands of kilometres to bring rain to us. Do you know what brings them deep inland?

From which direction does the wind blow during the rainy season?

These winds come all the way from the Arabian Sea and the Bay of Bengal and they transport the rain clouds. They are called '*Monsoon winds'*. They are also called '*south- west monsoon* winds' as they blow from that direction. These winds blow only in the summer.

Map 1: Monsoon winds in India



There are two arms of the monsoon winds: one blows from the Arabian Sea and the other from the Bay of Bengal. The arrows in Map 1 show us the direction of winds.

- Towards which parts of the country will the winds take the clouds on the Bay of Bengal?
- Towards which parts of the country will the winds take the clouds on the Arabian Sea?
- From which direction will the winds blow to bring monsoon rains to West Bengal, Lucknow and Delhi?
- From which direction will the winds blow to bring monsoon rains to Mumbai, Hyderabad, and Bengaluru?

Rainfall in Andhra Pradesh

- In which months does it rain most in your place? List three rainiest months.
- Name the three driest months.
- Do you have 'normal' rainfall every year or does it vary every year?
- Have you ever experienced drought?
- Have you ever experienced floods?

When the south west Monsoon sets around the beginning of June, the winds carrying the clouds also reach Andhra Pradesh. As you can see from Map 1, these winds reach Rayalaseema districts of Chittoor and Kurnool first. However they bring very little rain as most of the moisture in the clouds falls down in rain in the Western Ghats and only dry clouds and winds reach Rayalaseema.

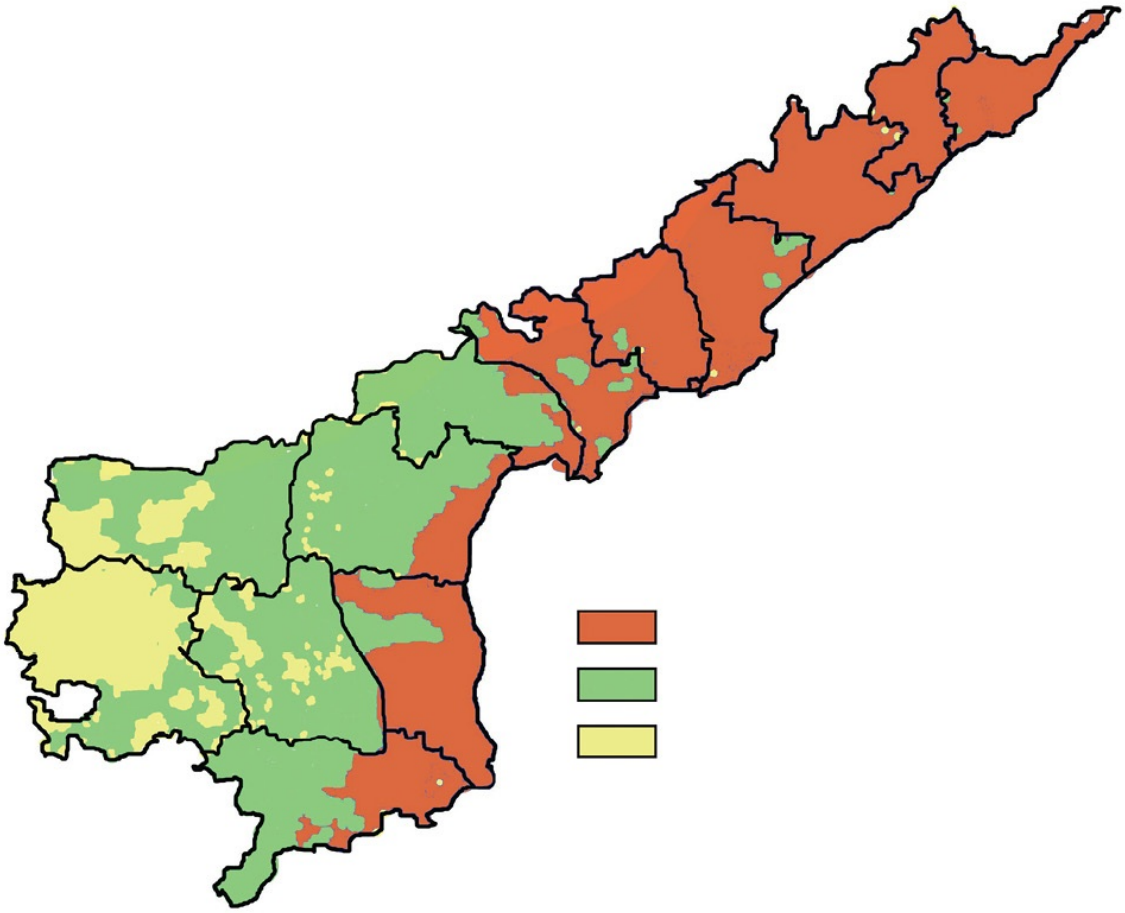
The mountain ranges like the Western Ghats in the path of rain-bearing wind cause them to rise. Rising air cools down and water vapour condenses faster. Further ascent leads to rainfall. This type of rainfall is common in the mountainous regions. However, when the clouds descend on the other side of the mountain range (as it happens when they reach Rayalaseema) they become dry and give very little rain.

The south west monsoon however, brings much rain to the Telangana districts as the winds again rise over the Eastern Ghats.

In the months from May to October cyclones form in the Bay of Bengal causing widespread rains in coastal and inland Andhra Pradesh. Rain caused by whirling storms is called cyclonic rain. These cyclones are formed in the sea due to intense heating up in summer. In a cyclone, winds

blow in from every side towards the centre of it. The whirling air rises up and causes rain. The centre of the cyclonic storm moves fast with the wind and hits the coastal areas causing heavy rains and winds. While these bring rains to the coastal regions, they also cause much destruction. The direction of the winds reverses after October as the winds begin to blow from the Bay of Bengal south Westwards. This causes heavy rains in October-December months in coastal Andhra Pradesh and moderate rains in Rayalaseema and Telangana districts. This is called north east monsoon or the return monsoon.

Map-2 Distribution of annual rainfall in Andhra Pradesh



100 cm and above (moderate rainfall)

between 60 and 99 cm (Low rainfall)

below 60 cm (Very low rainfall)

- Look at the map given above showing rainfall received in different parts of Andhra Pradesh:

i. Does your district receive moderate or low rainfall?

ii. Which town has the least/highest rainfall – Ongole, Anantapuramu, Srikakulam, Machilipatnam, Rajahmundry?

iii. Make some more questions and ask each other.

- Look at the physical map of India in your Atlas and identify Western Ghats and Eastern Ghats. Fill in the blanks in the following sentences.
- Western Ghats are spread across the following states
- Eastern Ghats are spread across the following states _____
- In which region do Western and Eastern Ghats intersect ?
- First, create rough outlines of India in a note book; then draw Western Ghats and Eastern Ghats; After that, roughly mark the areas that are in Rayalaseema and Telangana; Finally, label them with months in which it rains.

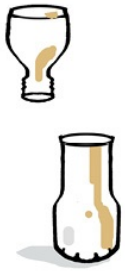
Rain gauge

An instrument by which the rainfall is measured is known as ‘raingauge’. The amount of rainfall for a unit area is measured in centimeters. How do we measure the amount of rainfall? How do we find out if Anantapur has more rain or Guntur?

Make your own Rain gauge

Collect the above items to make a rain (pic 1).

Cut the top of the bottle like this. This ensures the top of the bottle and bottom of the bottle has the same circumference (pic 2).



Turn top of the bottle upside down like this, and fix it to the bottle. (pic 3).

Fill the bottle with sand and water till the spot where you have marked zero. (pic 4).

If the bottom of your bottle is flat you need not fill too much water

Real rain guage

Now ensure that you keep this bottle in an open place. Make sure that there are no walls or trees that can block the rain water from falling into the bottle. You can use a scale to measure the water. If you leave the bottle in the open for a few days, you can know how much it rained in a week, a month.

When it rains the water level in the bottle rises. Measure the height of water with the help of a scale and you will get the rainfall in Centimetres for your area during the period you had kept the in the open.

PART-II

Flow of Rivers

What happens to the water that falls on the earth? Some of it percolates into the soil, some flows on the surface of the land and the rest becomes water vapour and mixes with air. You will read about the water that percolates down into the soil in the next chapter. In this part, we will discuss the water which flows on the surface of the land.

Rivers

Have you seen rain water flowing in small streamlets on sloping land? Water flows in small streams from the mountain slopes during the rainy season. However, these streams dry up after some time. Nevertheless, water cuts channels on the mountains.

When it rains again, water flows down the same channels. In this way river courses and river valleys are formed. This process is shown in figure 2.3.

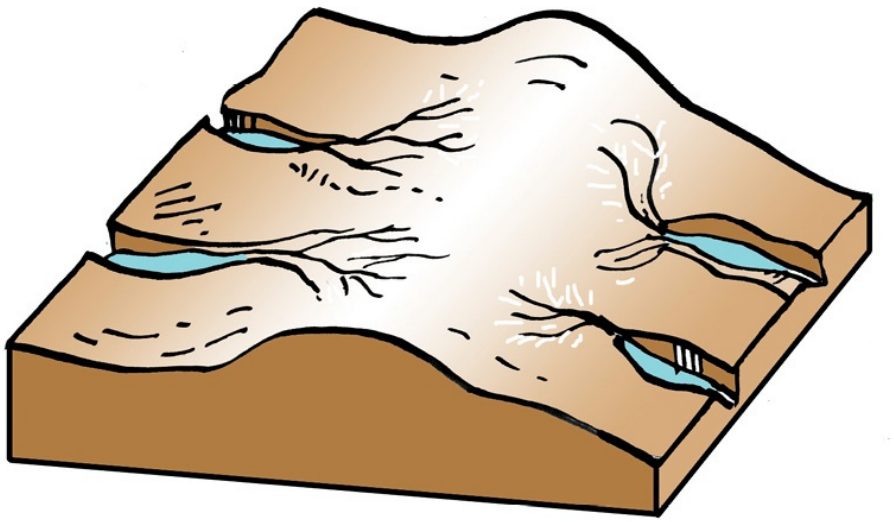


Fig 2.3 Slope and the formation of Rivers

Study the figure below and answer these questions:

- Mark the flow of the river with arrows.
- Mark the slope of the land with arrows.
- Does the river flow in the same direction as that of the slope of the land?

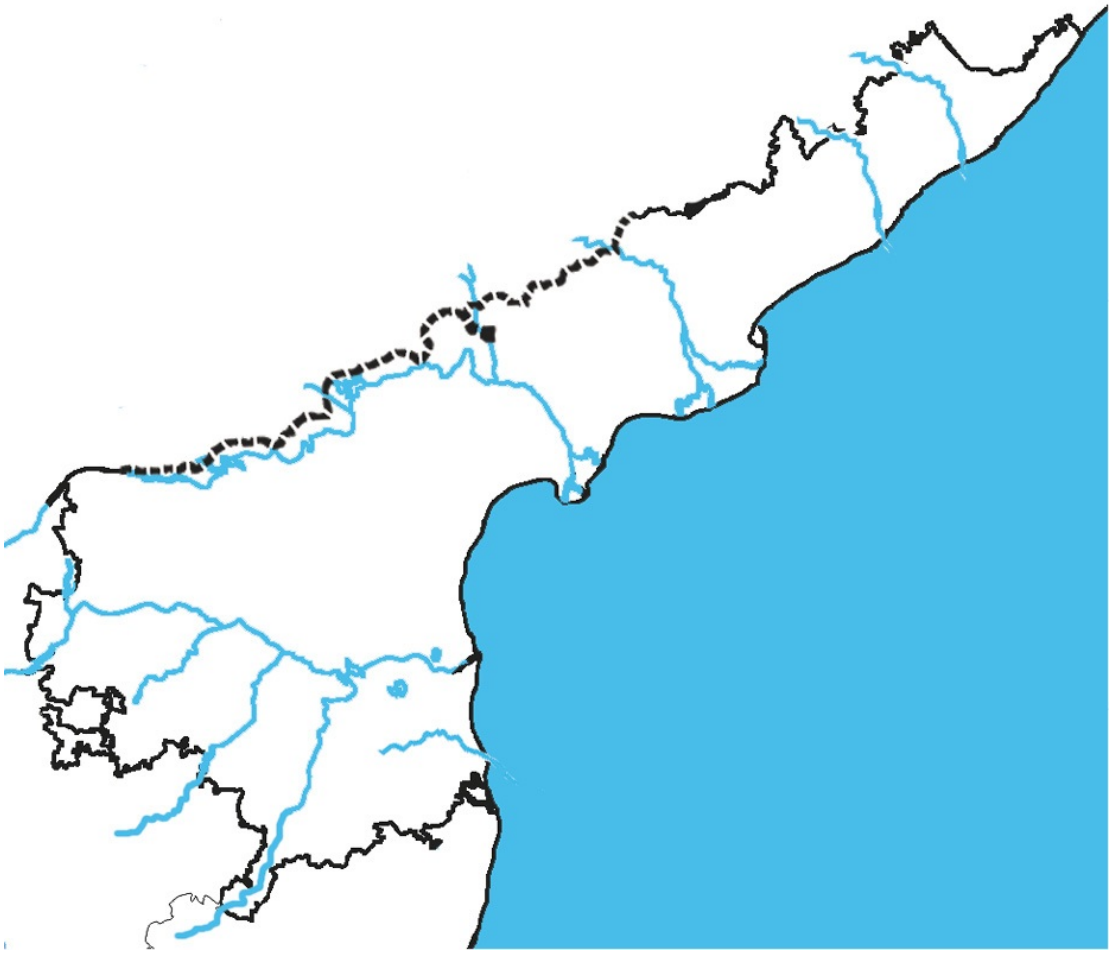
Transformation of a Stream into a Broad River

At its source, a river usually is in the form of a thin stream. As it flows further, it gets bigger and broader. This happens because many small streams join it as the stream flows. Rivers or streams which join a larger river are called '*tributaries'.*

As the river becomes bigger and broader, its flow gets slower. It starts depositing the silt and sand it has carried, on its bed and banks. This causes the formation of plains. Do you remember the village on plains you read about last year?

As it nears the sea, the river gets even slower and is no longer able to carry the silt and sand. It deposits them on its own course, which then gets filled up. When flood waters come again, they have to cut through new channels to reach the sea. Thus towards the end of its journey to the sea a river forms a delta. In our state, we have two main deltas of the Godavari and the Krishna rivers. Look for them in the map.

Map -3 Rivers of Andhra Pradesh



We have two large rivers flowing through our state - the Krishna and the Godavari. However, we also have a large number of rivers that have water only during the rainy season. Why is this so?

Rivers like the Krishna and the Godavari start from the Western Ghats, which receive heavy rains. The rain water slowly percolates into the ground and flows into the river all through the year. On the other hand, many rivers which start from the dry regions of Rayalaseema like the Penna are fed by scanty rains. Others, which start in the Eastern Ghats, receive only moderate rains and the water flows rapidly into the sea. That is why they go dry during the non-rainy season.

- Look at a map 3 and prepare a list of rivers that rise from:

Western Ghats	Rayalaseema	Eastern Ghats

- What do you think is the direction of slope in Andhra Pradesh – from north to south, east to west or west to east?
- List out the streams of your district and write in which river do they join.

Flood-Plains and Floods

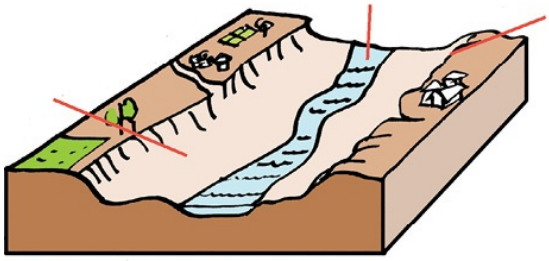
A river does not contain the same amount of water all the year around. While the river is full during the rainy season, it usually shrinks during the dry season. Look at figures 2.4 and 2.5. You can see that the river trough is very wide and it has high banks. This valley is filled with sand and gravel. The river flows as a small stream amidst them. You will notice that there are no trees here. This is because every year when it rains heavily, this valley is filled with water allowing no permanent trees or plants to grow here. This treeless bed is called the *flood-plain* of the river. All major rivers have their flood plains.

You must have heard that during the rainy seasons some parts of the country get flooded due to excess rainfall. You may have read about floods

occurring in rivers like Krishna, Godavari, Brahmaputra or the Ganga.

Figure 2.5 depicts a flood situation. Look at it carefully and answer the following questions:

- Has the river water covered the entire flood-plain or confined to the tiny stream that was flowing in the dry season?
- Is the water confined to the flood- plain or overflown the banks of the river?
- In what way have the floods affected the villages, agricultural fields and trees?
- How are floods beneficial to agricultural fields?



1. Flood Plains Pebbles and Sand deposit
2. Main stream
3. River bank

Fig 2.4 Flood Plains

Floods have become a major problem in our country in recent years. Some part of the country or the other is flooded every year during the rainy season. This causes severe damage to people, crops and livestock. Let us find out if we have contributed to this in any way.

Vegetation cover on the land (trees, plants, grass, etc.) obstructs the run off of rainwater and slows down the speed of its flow. This slowing down helps the rainwater to percolate into the soil. Floods are often caused by sudden increase in the volume of water reaching a river. Vegetation allows the water to flow slowly into the river, thus preventing sudden flooding. It also helps to increase the amount of water which goes into the soil.

Vegetation also helps to prevent floods in another way. It reduces the erosion of soil by rainwater. If there is little or no vegetation, rainwater cuts and carries with it a lot of topsoil. This soil is deposited on the riverbed, which reduces the depth of the river.

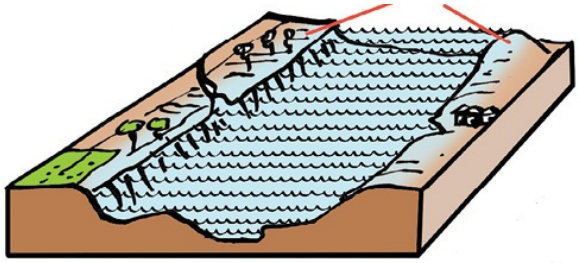


Fig 2.5 Flood

Water level during flood

This results in the reduction of capacity of the river to carry water. Thus, with even a little rain, the rivers are flooded and they overflow their banks, causing damage. If the surface of the land is covered with vegetation, then soil erosion is greatly reduced.

Let us take the case of the Ganga. Earlier there were dense forests on the Himalayas from where the Ganga and its tributaries originate. In the recent years, there has been a large scale felling of trees and hence the forest cover in the Himalayas has been reduced considerably. As a result, whenever there is a heavy rainfall, the rainwater rapidly flows down the slopes of the mountains and fills up the floodplain of the river. The waters also bring a very large quantity of silt and deposit it on the riverbed. This results in frequent floods, which cause heavy damage to life and property along the river.

All this tells us the importance of protecting our forests and increasing the vegetative cover over other lands.

- Can you explain how forests and vegetation help in preventing floods?
- Can forests and vegetation help in reducing droughts?

Facing the challenge in Cyclones and Floods

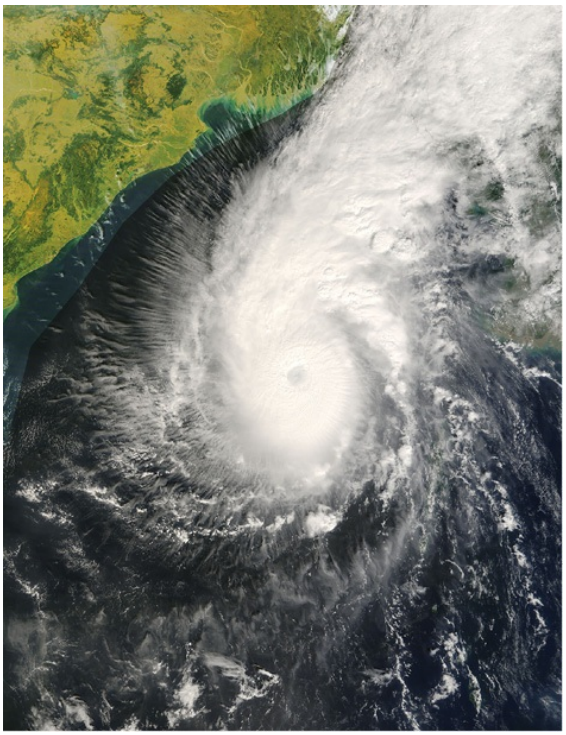


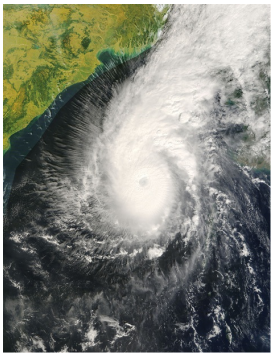
Fig 2.6 Cyclone cloud in Bay of Bengal

Our state has a long coast line and it is frequently faced with very destructive cyclones. When heavy winds blow from the sea, heavy rains lash the lands, and high waves make the sea very unsafe. These usually occur between June and December. The worst cyclone hit the state in November 1977, perhaps, the worst cyclonic storm to hit the Indian shores. Six - metre high tidal waves swept across villages in coastal Andhra Pradesh, killing 9941 people. At least 100 villages were washed away by the cyclonic storms and the ensuing floods. Seen from air, it seemed like a sheet of water drawn over the affected areas floating in the swirling waters. About 100 people who left their homes to seek shelter in a building in Bapatla town died when the building collapsed. Most lives were lost in Diviseema, Krishna District. Recently in 2014 ‘Hud Hud’ cyclone created a huge destruction in Vishakapatnam.

Formation of cyclones may seem natural over which human beings have no control. However, the impact of these disasters are heightened or lessened due to how our society is organised and prepared. For example, if you see who lives in the most vulnerable part of the land which is most affected by cyclones, you will find that it is the poorest people who live there with least resources to defend themselves. The sea coasts are lined with the huts of poor fisher folk and the low lands of the towns and villages, which get flooded, are usually inhabited by the slums of the poor. The people who live in high cement concrete buildings are able to store food, water etc. for many days. Thus, we can see that disasters affect the poorest most.

Usually immediately after the flood waters recede, all sources of water are polluted and become unsafe for drinking. But, especially the poor, are forced to use the polluted water and face the risk of several diseases like cholera, dysentery, jaundice etc. Only those with resources are able to arrange for safe bottled water to drink. Since roads are damaged and it rains heavily, bringing in relief to worst affected areas is not easy. Here people are forced to rely on their own resources to save themselves.

While the immediate damage of the cyclones is also heavy – like loss of lives, crops, houses etc. more importantly they also cause long term damages.



For example, the life savings of most of the poor stored in the houses in the form of food, tools, cattle, small shops, vehicles, boats, nets, etc. are destroyed. To go back to their work they need to buy all these again. Many families may lose their working members. Daily wage workers face loss of work for several weeks till normalcy returns and therefore loss of livelihood. Farmers too not only face loss of crops but also permanent damage to their lands.

How can people meet the challenge of disasters like cyclones and floods?

This can be done through long term planning by governments and close cooperation between the people and government agencies.Today, with the installation of early warning systems by the government, it is possible to predict the possibilities of natural disasters like cyclones and floods.

Governments thus put in place these systems and inform people about the possibility of disasters.

Governments are also responsible for providing for long term security of all people by building strong roads which are not easily destroyed, safe pucca houses for those living in vulnerable areas like sea coast or along the rivers or in low lands. Food, water and medical emergency teams should be kept ready whenever there is a forecast of cyclone.

How can the people prepare for disasters?

1. Cyclones and floods are a seasonal phenomenon. During the cyclone, listen to radio or TV weather reports. In case of a cyclone/flood warning, ensure that everyone is alerted. This is usually done through loudspeakers or by going from door to door.
2. Keep an emergency kit ready at home. These kits should contain important papers, some food, some money and emergency telephone numbers.
3. The nearest available place where refuge could be sought in case of a cyclone should be identified in advance.
4. Wherever necessary, the the walls of the house, roofing, doors and windows should be strengthened.
5. When you get a cyclone warning, store adequate drinking water and food grains in waterproof bags.
6. Do not venture outside, especially into the sea during and after the warning has been sounded.
7. Close doors and windows and stay indoors.
8. Move to a pucca building if you feel your house is not strong enough..
9. If the cyclone strikes while you are in a vehicle, stop but keep away from the sea-shore, trees, electric poles and other objects that may be uprooted during the gale.
10. If the cyclone wind suddenly drops, do not go out, as it could be the eye of the cyclone. Wait till the all clear declaration is made officially.
11. Listen to Radio/TV for updates on the situation.
12. Even after 'all clear' has been sounded, take necessary precautions while moving to or out of your house. There may be partially uprooted trees or poles.
13. Look out for snakes that may have come out of their holes. Do not enter flood waters. They may be too deep.
14. As a student group, you can play a very significant role in spreading awareness about the above precautions.

If you need to Evacuate:

1. Pack clothing, essential medication, valuables, personal papers, etc. in water-proof bags, to be taken to the safe shelter.
2. Put furniture, clothing, appliances on beds or tables (electrical items highest).
3. Turn off power.
4. Whether you leave or stay, put sandbags in the toilet bowl and cover all drain holes to prevent sewage back-flow.
5. Lock your house and take the recommended or known evacuation routes from your area to the safe-shelter.
6. Do not get into water of unknown depth and current.

During Floods:

1. Drink boiled water.
2. Keep your food covered and don't eat too much.
3. Use raw tea, rice water, tender coconut water etc. during diarrhoea.
4. Do not let children remain on empty stomach.
5. Use bleaching powder and lime to disinfect the surroundings.
6. Avoid entering floodwaters. If you have to enter, wear proper protection for your feet and check depth and current with a stick. Stay away from water over knee-deep depth.
7. Do not eat food that got wet in the flood waters.
8. Boil tap water before drinking in rural areas. Use halogen tablets to purify water before drinking (ask Village Health Worker for details).
9. Be careful of snakes. Snakebites are common during floods.

Key words:

1. Rivers and Tributaries 2. Condensation 3. Annual rainfall 4. Flood plain
5. Cyclone 6. Monsoon 7. Hail 8. Famine

Improve your learning

1. Explain how water changes into water vapour and how clouds are formed from it? AS_1
2. Where do evaporation and cloud formation take place on a large scale? AS_1
3. How do the clouds reach deep inland? AS_1
4. Where does it rain maximum? Choose the right option : AS_1

a) sea coasts that are in the direction of the winds

b) mountains that are in the direction of the winds

c) lands far away from the seas.

5. Fill in the blanks choosing the correct options (bank, tributaries, flood-plain, river valley): AS_1

a) A river flows through the …….

b) Streams or rivers joining a larger river are called the …….. of the main river.

c) The entire valley of a river which is filled with water during the floods is called the …….. of the river.

6. The Godavari flows from the west to the east. Why? AS_1
7. Describe the main stages of the water cycle. AS_1
8. There may be streams and rivers flowing near your village or town. Find out about them and fill in the table below: AS_3

No.	Name	Source	Which river does it join?	Which sea does it meet?

9. Do the rivers in your area contain water throughout the year? Find out from your elders if they had more water in earlier times. AS_3

10. How can the people be prepared to face the disasters? AS_4

11. Collect the pictures showing cyclones and floods and prepare an album. AS_3

12. Make a poster on the floods devastation. AS_6

Project Work :

Observe in your village/locality where water is being wasted, furnish the details in a table, discuss the reasons, suggest the ways how water can be saved.

Sl.No.	The place where water is being wasted	Reason	Way to prevent/ save water

Chapter:3

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:

Fig 3.1(a) Tank and fields

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 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 manishi'*

How did the Tanks Help?

The tanks helped the people not only in giving them and their animals drinking water, but also in irrigating their fields in such a way that even in drought years they 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,

Fig 3.1(b) Pakala Cheruvu - Chittoor

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 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

- 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 the water comes into the tank and where the excess water goes.
- 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 an illustration of the tank 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.

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 tube wells.

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 Prakasam 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.

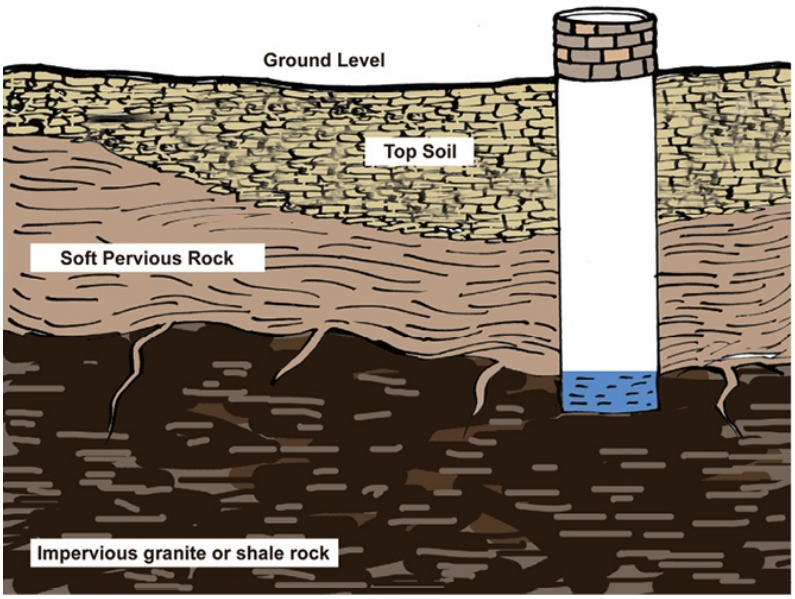


Fig 3.2. Rocks and Water below the ground level

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, when it was dug and how much money was spent. Add up all the information about the wells and prepare a small booklet.

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:

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 maximum water available?

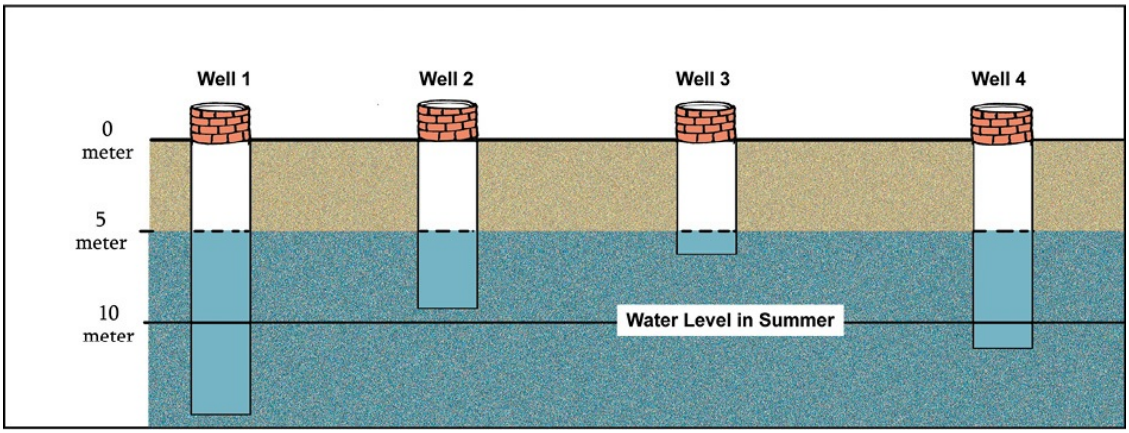


Fig 3.3. Ground water level

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. Tube wells, 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 reasons.
- Will there be water in the well even if there is no crack in the rock?

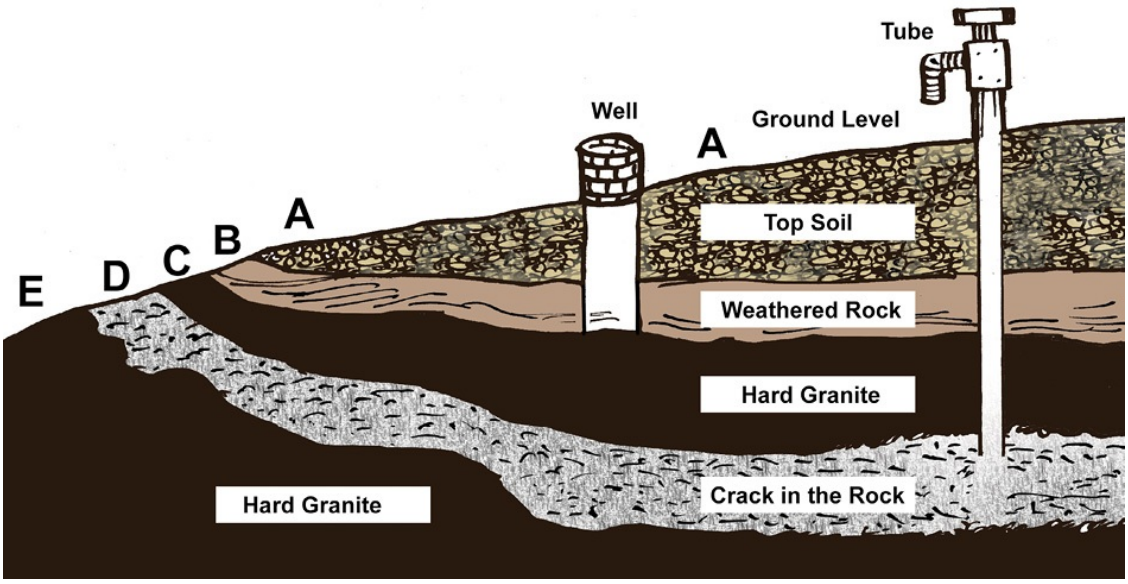


Fig 3.4. Rocks and Water below the ground level

In many mandals, the predominant rocks are not granites but rocks of the Kadapa type of limestones. They are also 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 tube wells 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 it 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. 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 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, 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 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 our state many mandals in Prakasam, Kadapa and Ananthapur 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. Read the additional information about florosis in your biology textbook.

Many times water is polluted due to the excessive use of fertilisers, 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

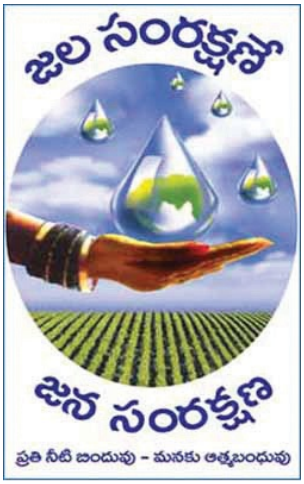
Groundwater like the rivers, is the common resource of all people and not just of those who have land over aquifers. However, at present it is being used only by those who have such lands.

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

tube wells, 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 them 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.



- What does the above logo reveal?

Key words :

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

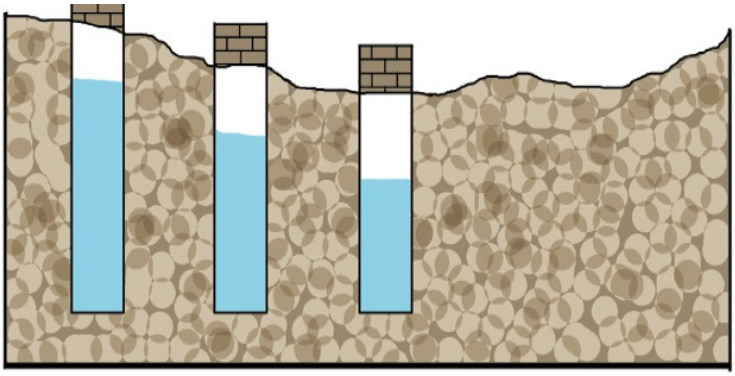
- Do you think groundwater would accumulate if there were no impervious rocks?
- What would happen if the pervious rock is below the impervious rock? Where will the ground water accumulate?

Improve your learning

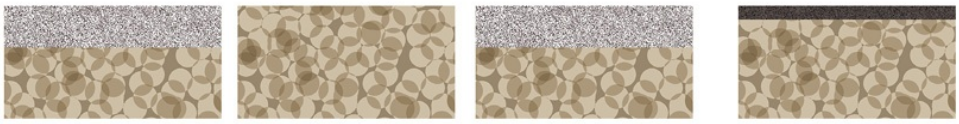
1. Correct the incorrect sentences: AS_1

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? AS_1



3. In which of these places do you expect maximum percolation to take place? AS_1



Weathered Rock *Weathered Rock* *Weathered Rock* *Weathered Rock*

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. AS_4
5. In areas where there is a shortage of groundwater, should there be any restrictions on digging tube wells? Why? AS_4
6. Think about the ways to restore the groundwater in your area. AS_4
7. Observe the picture 3.1(a) and compare with your locality. AS_1
8. Draw the map of your village and locate the water resources of your village in it. AS_5
9. Read the third para of page 57 and write a comment on it. AS_1

Project Work : Collecte the following information about tanks/kuntas.

Sl.No.	Name of tank/ kunta	Ayacut (in acres) previously	Ayacut (in acres) at present	other uses of tanks	reasons for not repairing	benefits if repaired

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Chapter:4

Oceans and Fishing

PART - I

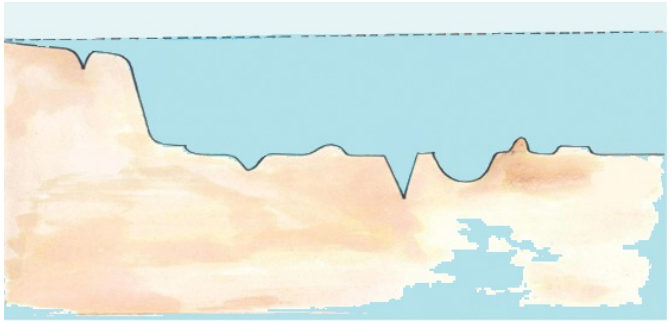
The earth is known as a watery planet as it is the only planet containing water in abundance. It is estimated that about 71% of the earth's surface is occupied by seas and oceans. What is your image of a sea or an ocean? What have you seen or heard about seas and oceans? An extension of saline water on earth is called sea. Large sea areas are called oceans. Oceans are huge bodies of water generally separated by continents.

- Is the water found in your village/town saline or potable? Is it different in different parts of the village/town?
- How do you call different water bodies? Do large or small waterbodies have different names?
- In a map of the world or on the globe, find the names of five seas and five oceans. Run your hand over the areas they cover.

It will be interesting to learn what lies under the water. The surface of water does not tell us about what lies under it. You may have had the opportunity to notice or feel what the bed of a river or stream or pond is like.

- Please share what you have seen or felt about what lies under the surface of waterbodies.
- How many meters deep are the water bodies you have seen?

Ocean Relief



Continental Shelf Continental Slope Trench Sea level Deep sea plain

Fig 4.1 Relief features of an Ocean

The floor of the ocean is just like the surface of the earth. The bottom of the sea is not a flat surface. It consists of hills, mountains, plateaus, plains, trenches etc. Many trenches on the ocean floor are so deep that even if the Mount Everest is placed in them, it will drown completely. A major part of ocean floor is about 3-6 kms below the sea level.

Figure 4.1 is a sketch of the kind of land forms that can be found under the surface of an ocean. And in fig 4.2 are the relief features of what lies below the surface of the oceans around our country.

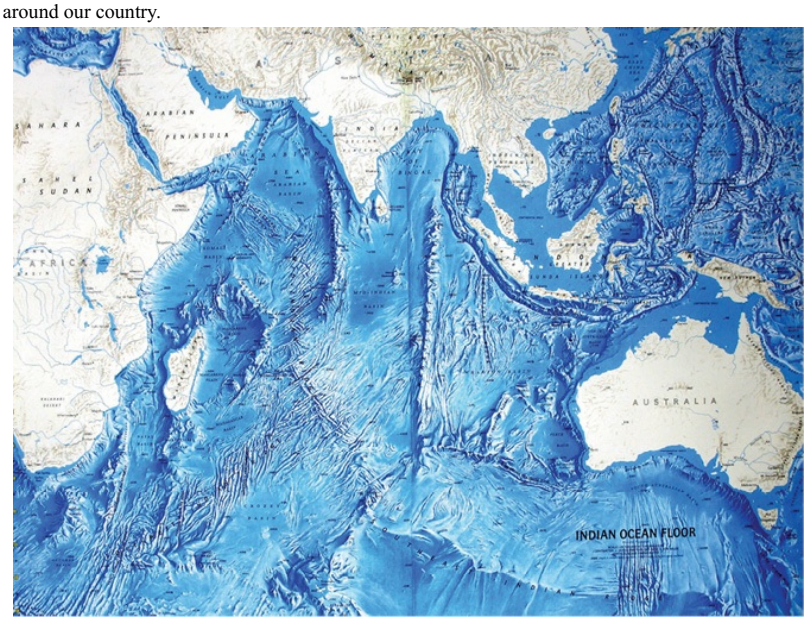


Fig 4.2 Relief features of Indian Ocean

In the figure 4.2 do notice the land mass of India and then go over to the floor of the Bay of Bengal, the Arabian Sea and the Indian Ocean. Try to point out what may look like hills, plains and trenches on the ocean floor.

The waters of the oceans are never still. There are different kinds of movements in them.

- Have you experienced the different movements of water in a river? You may be aware of waves, currents and the coming and receding of floods. Discuss these experiences in the class.

Ocean waters have three kinds of movements. They are:

1) Waves: When the water on the surface of the ocean rises and falls, they are called waves. They are formed when gentle winds scrape across the ocean surface. The faster the wind, the bigger will be the waves.

2) Currents: In the oceans, water is found to move from one part to another in big streams. These streams which flow constantly in a definite direction on the surface of the ocean are called ocean currents. The ocean currents are of two types - the warm currents and the cold currents. The warm currents flow from the equatorial region towards the poles. The cold currents flow from the poles to the equatorial regions. These are mainly caused by the prevailing winds, differences in temperature and salinity of the ocean water.

3) Tides: Tides are the rhythmic rise and fall in the level of the water in the oceans every day. All places on the coast experience some hours of low tide and some hours of high tide. Tides do not rise to the same height every day. When the tide is high, water comes up to the coast for some distance. Then as low tide begins, the water moves back from the land. The tides are of great help to fishing. Tides at some places take away the mud brought down by rivers and prevent silting.

PART-II

Fishing Village on the Coastal Plains

Ocean water is always saline. It contains several mineral salts dissolved in it. The oceans are the main source for rainfall. Oceans are the storehouses of fish and other seafoods. They are the main source of salts. Oceans provide natural highways for international trade. Let us visit Bhavanapadu, a fishing village near the coast of Andhra Pradesh and study the life of people living near the ocean.

- Find the districts that lie on the coastline of Andhra Pradesh.
- Find the district in which Bhavanapadu village is located.
- Look at the image of Bhavanapadu village (Fig 4.4) and find the following:

i) Identify the water bodies in the image.

ii) Identify the land that is used for activities other than agriculture in this village. If so, for what purpose?

Fishing

It is four in the morning. Appalakonda's wife Dhanamma, wakes him up and gives him some rice gruel to eat by 5.00 am after which Appalakonda is ready to go out to the sea. His friends wait for him on the beach. All of them are poor fishermen. They don't own any boats or nets. They work on Tata Rao's mechanical boat. They are altogether 20 members on a boat. Tata Rao too joins them and works along with them. The boat has already been made ready the day before, with all the necessary things properly loaded.

Fig 4.3 Bhavanapadu village settlement

Fig 4.4 Aerial view of Bhavanapadu village settlement

Before launching into the sea they check the engine, the rope puller, the additional stock of diesel and also put their food packages down. They pray to the goddess in whom they have a strong faith.

Tata Rao owns this boat, which he purchased from Markonda in Odisha. It cost him around Rupees 6 lakhs. He borrowed the money from private money lenders at a high rate of interest. He couldn't get a bank loan, as he had no fixed assets. Even for daily fishing expenses, he has to get advances from middlemen. He has to invest a minimum of Rupees. 5,000/- per trip for diesel, wages and other things. Because he has borrowed money from the middle man, Tata Rao has to sell the day's catch of fish to the middleman at the rate he fixes. By this time, the boat is ready for sail and all the twenty members are on the boat. They go up to 15-20 kilometers in the sea.

Dhanamma, wife of Appalakonda attends to domestic work after he leaves for work and finishes by 9 am. Then, she goes to work in the salt pans. Sometimes she also attends to agricultural work. As they don't possess any agricultural land or salt pans, their family depends on the daily wages they get. While labouring in the salt pans, Dhanamma eagerly waits for her husband's phone call. She remains anxious about her husband's safety and also about the catch. If there is a good catch, they will get more money for the household.

The fishermen return any time between 1 pm and 8 pm or sometimes even late in the night. On the day we were there, they came back at 3 pm with a good catch of a variety of fish known as "*para*".

Fig 4.5 Anchored Boat with neatly packed net heap,

Fig 4.6 Engine of the boat, lunch carriers, diesel cans and picture of the goddess

Some middlemen temporarily store the fish, segregate them and carry them in cold container tanks to faraway places like Kolkata, Bangalore, Chennai, Hyderabad, Kerala and so on. These people get four times more money than the catcher does. Observe the following pictures of the Potaiah *adda (4.9)*, the local middleman.

- What enables the middlemen in the fish business to earn much more money than the fishermen?
- For what purpose are the thermocol boxes shown in the photo lined up in the middleman's *adda*?

Fig 4.7 Unloaded fish being carried to Auction hall.

Fig 4.8 Fish spread in the Auction hall, Middlemen are already there.

Besides the big fishing business discussed till now, small business in fishing also takes place in the village. *Karrateppa* is a country made boat which goes up to
5 Km into the sea and brings small catches of fish. It can be carried by the wives of the fishermen known as *Berakatthelu*. They sell this fish in nearby towns like Naupada, Tekkali, Pundi and Palasa.

Compared to the *Karrateppa*, there is far more risk of life in *Marapadava* (mechanised boat) because it goes far into sea and it is difficult to swim over to shore in times of trouble. What is worse, there is no first aid in the big boats, nor any life jacket. Fishing is a risky and brave occupation.

Fig 4.9 Middleman's adda storage tanks.

Fig 4.10 Loading at the middle man's adda to sell at the big cities.

Nets

After reaching home in the afternoon Appalakonda took his lunch, came to the cyclone shelter with the broken nets, and started repairing them. It is an activity seen at every common place of Bhavanapadu.

The fishermen have a special tool kit for repairing the nets which consists of *Nulukarralu* (net repairing fork) (Fig 4.12), *Nulukanda* (Thread) and a flattened stick that determines the net ring size.

Fig 4.11 'Berakatthelu***', waiting for their turn to load fish in their*** Thattalu ***to sell at nearby towns.***

Nets are of different types based on different sizes of the *Kannulu* (Rings) and the layers of the net. Recently a net known as Ring Net which helps in getting a better catch is being increasingly used by the fishermen. This has helped to reduce migration from the village. Earlier there were nets made of cotton thread. Now cotton nets have almost been replaced by plastic, nylon and other synthetic materials.

Fig 4.12 (A) Repairing nets, (B) Fisherman stitches (C) Nulukarralu. (D) Floating beads-Lead, (E) Floating beads-Plastic.

A net lasts for 4-5 years. Nets are purchased by weight and the type of rings they contain. Nets cost around Rupees 250-300 per Kg. Ring nets weight around 500 kgs. The fishermen of this area usually buy nets from Barhampur (Odisha).

Agriculture and Animal Husbandry

Fishing is not the only occupation of the people in Bhavanapadu village. They cultivate the land to grow crops and also rear animals and birds.

The village soil is mainly loamy and rice is the principal crop grown on it. Only a few acres of land are irrigated. Bhavanapadu lies at the tail end of Vamshadhara canal. Water comes to Bhavanapadu only after the fulfilment of the needs of the nearby village, Marripadu. Hence, most of the agriculture in Bhavanapadu depends on the rain.

There are no landlords in the village. A large number of cultivators of Bhavanapadu are small farmers. They don't grow any commercial crops. Some of them rear cows and buffaloes. There are two poultries in this village running on profit. Rice production is not sufficient for their needs, so they get rice from the ration shops through their 'white cards' and sometimes buy it from the market.

Salinity and Drinking Water

The water in the village is saline. If one digs upto 8 or 10 feet near the beach, one can get potable water. But in summer, these wells dry up. And it takes a long time for the water to fill up again. If you wait for an hour, you may get another pot of water. So women have to wait long to fetch water or they walk upto 2 km to collect fresh water.

Fig 4.13, 4.14 Salt pan leveling work known as 'Adugetha', which makes the pan impervious

The government has sanctioned a protective water project that pumps water from the nearest village known as Suryamanipuram. It gave relief for some time. But cleaning of overhead water tank and frequent repair of pumping motor is a hurdle. For some time a youth organisation helped in keeping the water project active. But this has stopped functioning now.

Social Life

A large number of people of Bhavanapadu worship Gangamma, Gowri, and Shiva. They perform puja to their boats and nets. The most important festival is Gowri Purnima. They spend common good fund of the village on these festivals. Observe the Fig. 4.16. Most of the men like Appalakonda wear tattoos like this.

Fig 4.15 An old woman fetching water from a faraway place

There is an open stage, where the dramas, *burrakathas, harikathas* and record dances are performed. All these activities are led by the caste headmen called *Pillas*. They determine customs and traditions of the people. They even resolve disputes and impose fines. The money collected goes to common good fund.

Fig 4.16 Why do you think people wear tattoos? What is the symbol on Appalakonda's hand? What does it signify?

- Would there be any health problems by wearing tatoos. Discuss in your classroom.

Key words :

1. Tool kit 2. *Kannulu* 3. *Burra Katha*
4. Mechanical Boat 5. Salinity

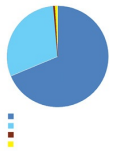
Improve your learning

1. Does Bhavanapadu look like the place you live in? What differences and similarities can you think of? Compare them on the following aspects? AS_1
   a. Sources of livelihood b. Types of employment
   c. Water sources d. Agriculture practices
2. How many types of ocean movements are there? Which of them is useful to the fishermen? AS_1
3. What is the difference between fishing with mechanical boats and that of *Karrateppa*? AS_1
4. Write the process of getting a mechanical boat ready for fishing. AS_1
5. What does the tool kit of fishermen contain? AS_1
6. What are the similarities that you find between the surface of the earth and the bottom of the sea? AS_1
7. Collect information about the aquifers of your village / town and fill in the table.Analyse the benefits. AS_3

S.No.	Name of the aquifer	Uses	Limitations

8. Make an album that reflects the life of fishermen. AS_3
9. Locate the coastal districts of Andhra Pradesh and write them down. AS_5
10. What solutions do you show to the fishermen for not depending on the middlemen for money? AS_4
11. Across the last 4 chapters, we studied many different aspects of water. Here is more information about the availability of water on our Earth. Look at them carefully and explain the availability of water resources on the Earth. AS_3

Distribution of fresh water

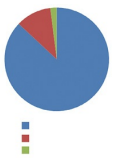


Ice caps and Glaciers 68.7%
Groundwater 30.1%
Surface water 0.3%
Other 0.9%

Distribution of water on earth

Saline water (Oceans) 97%
Fresh water 3%

Distribution of fresh surface water



Lakes 87%
Swamps 11%
Rivers 2%

12. How do you support the statement 'The life of fishermen is tied up with seas'. AS_6
13. Read the the first para of page 32 and comment on it. AS_2

Batuke O Kadali Merise ee Chepalu
Kadale Naa Batuku Dorike Nee poota
Tooge ee Alalu Chindula gangamma
Saage Naa Kalalu || Batuke|| Vandana mayamma
Kopam enadoo choopaku mapaina

||Batuke||

Read some writings which reference the life style of fisherman. Eg: Samajam-Musalodu, Aatu-Potu (Janjhavathi Kathalu)