

Eternal Snow Peaks

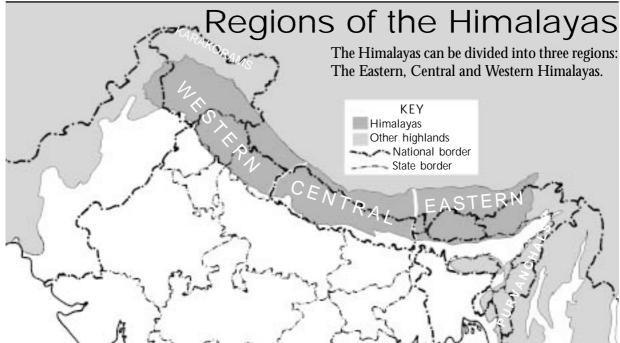
Very high mountains divide the Indian subcontinent from the rest of Eurasia. In addition to the Himalayas, there is the Karakoram Range in the northwest and the lower Purvanchal Hills in the Northeast.

The snow-clad peaks of the Himalayas seem to be touching the sky. They are the highest mountains in the world. The highest peaks rise to elevations of 6,000 to 8,850 metres - almost 9 km above sea level.

Find the following peaks in your Atlas.

	Peak	Height
1.	Karakoram2	8611 metre
2.	Nangaparbat	8126 metres
3.	Nanda Devi	7817 metres
4.	Badrinath	7138 metres
<i>5</i> .	Kanchenjunga	8598 metes
6.	Everest (Sagarmatha)	8848 metres

Do you live in the Himalayas, or have you ever been there? Do you know anyone who has been there? If so, discuss where and what the places are like.



	Western Himalayas	Central Himalayas	Eastern Himalayas
States of India (or parts of states)			
Other Countries for parts of countries)			

Summer and Winter

On the right is the temperature graph of Leh, in Ladakh (the north-eastern part of the State of Jammu and Kashmir). It shows the average maximum and minimum temperatures for each month of the year.

Find Leh on a map. Is Leh north or west of Delhi? What is the direction from Shimla to Leh? What is the direction from Srinagar to Leh? What major river flows close to Leh?

What are the warmest and coldest months in Leh, and how warmor cold are they?

Does it usually go above O' Celsius in January in Leh?

How cold does it usually get at the hottest time of year in Leh?

From the next graph you can get some idea of how cold it gets in different parts of the mountains, as compared to Delhi, which is in the plains. The average minimum temperatures of Leh, Darjeeling, and Delhi are all shown in one graph.

How cold does it usually get in January in Darjeeling?

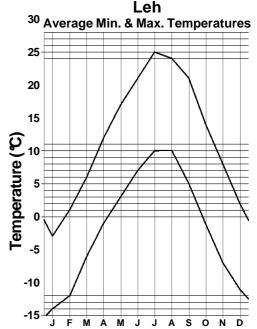
Which is colder: Delhi in December or Leh in June?

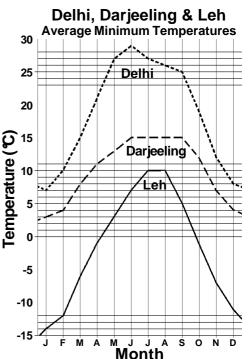
Which of these three places has the coldest climate?

Based on the temperature graphs, guess how high above sea level each of these places are: match each place to its elevation.

Darjeeling237metresDelhi3505metresLeh2134metres

Why do the highest peaks of the Himalayas remain snow covered throughout the year? Why doesn't all the snow melt away in the summers?





Snow, Ice and Rivers

Himalaya means the abode or home (Aalaya) of snow (ihm). There is snow in the Himalayas throughout the year at heights above about 4,500 metres. In winter, snow falls at elevations down to about 2000 metres. The roads to many villages and towns that are high in the mountains are blocked by snow in winters, cutting these areas off from the rest of India.

Look in your Atlas and make a list of the major rivers that rise from the Himalayas.

The rivers that rise from the Himalayas are perennial – meaning, they flow throughout the year. Why don't they ever dry up and stop flowing like some rivers in other regions?

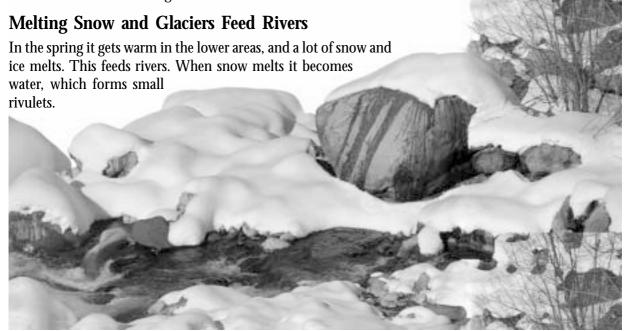
Snow and Ice

Do you know the difference between snow and ice? Ice is hard and cold, and sometimes transparent.

Snow falls from the sky as snowflakes (about 1 millimetre in size), or small clumps of

snowflakes (as big as 1 cm). Here are three magnified pictures of single snowflakes. They are actually crystals of ice. When they fall, the ground gets covered with a soft, white layer of snow. Snow get compressed, partially melted

can get compressed, partially melted, refrozen, and changed into ice.



The rivulets join together as they rush down the slopes, becoming streams. The streams (or 'headstreams') join together to become rivers, which get wider as more streams join them. These rivers cut through the high mountains, swiftly flowing through deep gorges and valleys.

High valleys in between the snow peaks are often covered with glaciers – slowly moving 'rivers' of ice. Glaciers are formed when a lot of snow

accumulates, gets compressed into ice, and slowly flows down the valleys (usually at speeds of only about a few centimetres per day). The glaciers melt when they reach lower, warmer altitudes, thus giving rise to rivers.

For example, the Gangotri Glacier gives rise to the Bhagirathi River. The Bhagirathi flows down to meet the Alaknanda River at a place called Dev Prayag. From here they flow as one river called the Ganga.

Run your finger up the course of the Ganga on a wall map of India. Can you find Gangotri?

Also look in the Himalayas for the sources of the Satluj, Yamuna, Beas, Brahmaputra, Indus, Ghaghara, Gandak and Kosi.

Try and locate the following glaciers on a map: Yamunotri, Pindari, Baltoro, Siachen.

Besides getting fed by melting snow, the rivers also get fed by rains during the monsoon. Let's find out how much rain the mountains get.

Rain on the Himalayas

The Himalayas stand like a wall at the north of the Indian subcontinent. In June and July the monsoon winds carry moisture (which has evaporated from the sea) to the Himalayas.

wind

sea

The mountains force these winds to rise up. As they rise, the air and water vapour get cooler. Cooler air cannot hold as much water as warmer air can. So, as the water vapour gets cooler, it condenses into drops of water that fall as rain. The mountains are very high and extensive, so by the time the air gets to the top it has lost most of its moisture. The air warms up as it descends down the far side of the mountain. Therefore, not much rain falls on the far side. That is why this region is called the 'rain shadow' region.

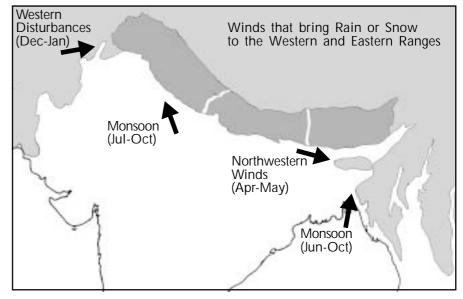
Thus, the parts of the Himalayas that face the plains of India have heavy rainfall during the monsoons.

The Purvanchal Hills and the southern face of the Eastern Himalayas get heavy rainfall each year. This is mainly because the monsoon winds release the moisture they carry from the nearby Bay of

Bengal. The monsoon comes early to this region (around 1 June), and remains until the middle of October. Winds blowing from the northwest bring additional rain in April and May.

In the Western Himalayas, the winter winds blow from the west ('Western Disturbances'). They carry moisture from the Mediterranean, Caspian Sea and Persian Gulf. As the winds rise

over the Western Himalayas, this moisture falls as snow. But little of it reaches northern Kashmir and Ladakh, as you can see on the graph and maps in your Atlas. (The Western Disturbances also cause a cold wave in north India, preceded by a few days of winter rain that is very important for the rabi crop.)



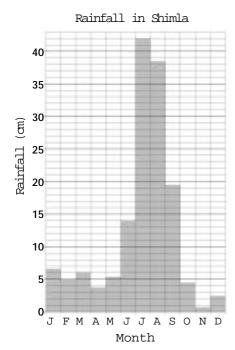
Below is a bar graph that shows how much rain falls each month in Shimla. The precipitation that falls as snow is also included in these 'rain' graphs as well as in the maps in your Atlas.

Howmanycentimetres of rain does Shimla usually get in July and December?

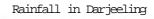
Whichmonthsare the monsoon months in Shimla?

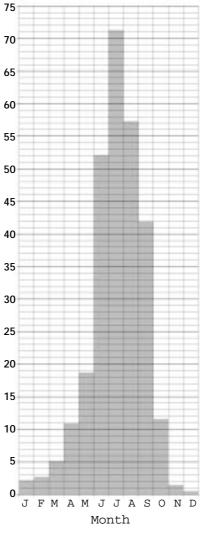
How much rain does Shimla usually get from June through September?

Some years there is less rain and some years there is more. These graphs show the average rainfall for each month for the last 20 years.



Here are some more rainfall graphs. Examine them and look in your Atlas at the map showing annual rainfall in order to answer the questions on the right.





Inwhichmonthdoes Darjeeling usually get the most rain? How much does it get in that month?

InwhichmonthdoesLehusually get the most rain? How much does it get in that month?

Which place gets the most rain in a year: Leh, Darjeeling or Shimla? Which of these three places gets the least amount of rain in a year?

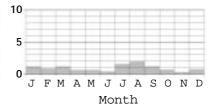
Why does Leh get less rain than Darjeeling?

Look at the annual rainfall map of India and find out about how many centimetres of rain fall each year in Gangtok, Itanagar, Jammu and Gangotri.

Which Himalayan region has heavierrainfall, the eastern or the western?

Do you think the part of the Eastern Himalayas that lies further north in China gets the same amount of rainfall as the part in India? Explain.

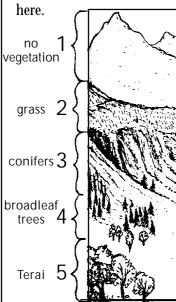
Rainfall in Leh

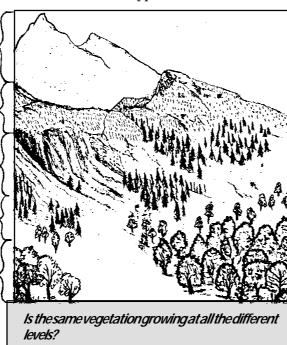


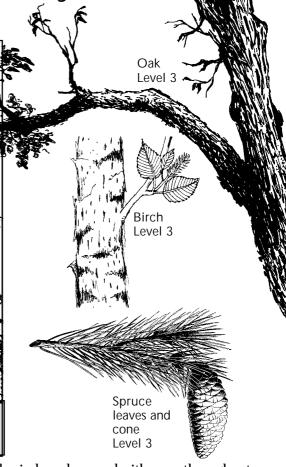
Have you ever wondered why vegetation changes from place to place? Let's investigate how and why different places have different vegetation.

Natural Vegetation of the Himalayas

This diagram shows some typical vegetation in the Himalayas. The mountain has been divided into five levels of elevation. Some of the main types of trees are shown







The highest peaks of the Himalayas are cold, windy and covered with snow throughout the year. Some parts are covered with rock. The highest peaks get less precipitation (rain and snow) than the lower peaks that face the plains of India.

> Snow covers the areas below this during the winter. It remains quite cool even in the short summer season, when the snow melts. In summer grass grows on these slopes.

The lower slopes are warmer, and they get more precipitation. Coniferous trees grow here.

At the bottom of the Himalayan slopes there is the terai region. It is quite hot here and the rainfall is heavy. Some wild animals like chital (spotted deer), leopards and tigers roam here in thick forests of tropical broadleaf trees, such as sal, shisham, khair and sandalwood. These trees cannot withstand frost.

We see that different plants grow at different heights above sea level because different elevations have different climates.

Foreach of the five elevation levels inthediagram, givereasons for the type of vegetation.



Chil (pin

Let us now look into the lives of the people living in the Himalayan region.

Life in the Western Himalayas

Forests are Being Destroyed

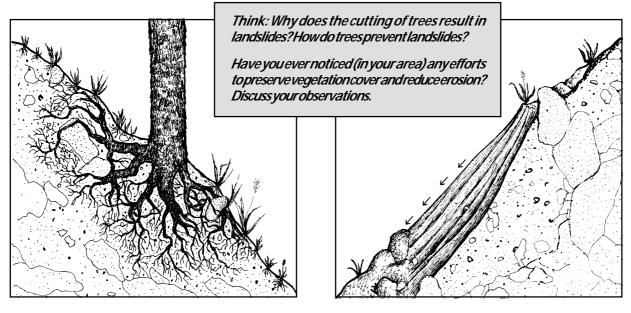
In 1950, 38% of the land in Himachal Pradesh was covered by forests. Today less than 18% is forested. Why are the forests disappearing so rapidly? Wood is in great demand, since it is used in construction, for making furniture and paper, and as a cooking fuel. The fewer trees there are, the more expensive wood becomes. Thus, selling wood becomes more lucrative.

The government owns most of the forested land and gets a good income from the trees. The forest department cuts down specified numbers of trees and auctions them to contractors. If only small areas are cleared, leaving some trees uncut here and there, the forests will regrow. New trees can also be planted. However, trees grow slowly and if too many trees are cut too frequently the forests disappear. This disappearance of forests is called **deforestation**.

Deforestation is having harmful effects on the environment in the Himalayas. When all the trees on a slope are cut, the **topsoil** gets easily eroded and washed away in the rains. The topsoil contains humus and is the fertile part of the soil.

After erosion, a hard, rocky soil is left. These mountain slopes do not have very hard rocks. Once trees are cut, the rocks and soil on the steep slopes crumble and slide down the mountains. Such landslides occur particularly when it rains. This has become a serious problem. Sometimes, entire villages are buried under landslides, killing people and destroying their homes. Sometimes roads are blocked by landslides. Landslides can also dam rivers and create lakes. But these are only temporary lakes. When the pressure of the collected water becomes too much, it breaks through the debris and floods the lower parts of the valleys. Such sudden 'flash floods' are devastating.

The people of Kumaon and Garhwal regions of Uttaranchal launched a movement, known as the 'Chipko' movement, to halt the destruction of the hills and protect the environment. Whenever contractors came to cut trees the people from nearby villages would hug the trees and not allow the workers to cut them. Due to growing awareness and pressure from the people, trees are once again being planted on the naked mountain slopes where forests have been cut.



Sheep and Goat Herding

The grass growing in the higher parts of the Himalayas during the summer months is good for grazing sheep, goats and other animals. Thus, in the western Himalayas a lot of sheep are reared for meat and wool. When summer ends, and the winter snows begin to cover the slopes, the shepherds bring their animals to the lower, warmer regions of the Himalayas. This is where they have their pucca houses and fields.

In winter, people work in their homes, spinning wool, knitting, weaving blankets etc. When summer comes, the grass grows again and the shepherds take their animals back uphill to graze.

During winter, in which part of Himalayas is fodder available and why?

Flat Fields on Steep Slopes

There is very little land fit for cultivation in the Himalayas. In the wide valleys and on the less steep hills some crops can be grown. But many places are too cold. Some slopes are too rocky. The northern faces of hills get less sun.

Do you know how fields can be made on steep slopes? The hillsides can be made into terraces.

People have settled wherever they can do some farming. But because cultivable land is scarce and scattered, the villages are small and far apart. Even the houses belonging to one village are usually widely scattered over a hillside. The number of people living in the mountains is less than the number living in valleys and plains.

The farmers of Himachal Pradesh grow vegetables, fruit, rice, and corn in their terraced fields.

The yield of grain is not very high, but certain fruits and vegetables grow well, and are sent to markets in many other parts of India.

Himachal is famous for its potatoes (phD) Add and capsicum (iSanla inca).

Fruit trees produce apples, plums, peaches, pears, and cherries.

Where else have you read about or seen terraced fields? What are its advantages?

Why it is possible for a larger number of people to live close together in the villages of the plains, unlike those of the mountains?

Roads and Agriculture

It used to be that walking many kilometres over narrow winding paths up and down the hill slopes was the only way to get from one place to another. But since 1947, many remote areas have been connected by roads. With the growth of transport, farmers began growing more and more vegetables. The number of orchards also increased. Their fruits and vegetables began to be sold in markets in many parts of India.

The hill people did not have enough money to develop large orchards themselves. So many well-off farmers from Punjab and Uttar Pradesh took the opportunity to buy land in the forests of the Himalayas. They cleared the forests and planted large orchards, especially apple orchards. Even today, many of the orchards in Himachal Pradesh are owned by them. Local people work in the orchards as labourers. Many people are employed to pack the fruit in cartons and to transport these goods to cities.

You can see how important transportation has been in changing the geography, the economy and the society of a region!

Has the growth of railways and roads in your region led to as important changes as it has in Himachal Pradesh? Discuss.

Discuss in small groups: If you were a farmer growing apples in Himachal Pradesh, what would you prefer to do with the apples: (1) Sell them yourself in a local small town market; (2) Sell them to a trader who sells them to tourists in Shimla; (3) Sell them to a trader who transports them to cities in the plains; (4) Sell them to a foreign company which uses them to make jam for export to other countries. Givereasons for your choice. Why might you get more or less profit in each case, and would you have any other considerations besides profit?

Electricity and Industry

Look back through what you have read in this chapter so far and make a list of all the natural resources and agricultural products of the Western Himalayan region. Tell what kinds of industries could be based on each of these resources and agricultural products. For example:

Wool could be used for making ______.

Trees could be used for making ______.

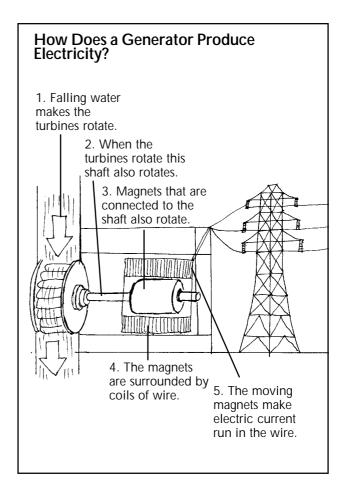
(Make this list as long as possible.)

Are the swiftly running rivers a natural resource? What can they be used for? One thing they can be used for is to generate electricity. **Hydroelectric power plants** use water power to generate electricity.

There are a number of hydroelectric generating plants in the western Himalayas, and more are under construction. Every village in the state of Himachal Pradesh is electrified.

Although, this electricity could be used to run big factories and industries, there are very few big industries in the Himalayas. This is because there is a scarcity of mineral resources such as iron and coal.

However, one important mineral **is** found in the Himalayas. This is limestone, which is used in making cement. People are employed in limestone quarries and cement factories.



What can people construct with cement?

Unfortunately, there are several problems in connection with the cement industry. Landslides sometimes occur in limestone quarries and around construction sites where the forests have been cleared away. The dust and debris from the quarries also accumulates on roads and fields and in rivers, which causes health problems in people and affects the growth of trees and crops as well.

Which characteristics of the Western Himalayas support industrial growth?

Which characteristics of the Western Himalayas hinder industrial growth?

Handicrafts and Tourism

Traditional industries in the Western Himalayas include handicrafts such as handloom cloth and shawls, knitted items, embroidery (kSaldakarl) and woodcarving. Beautiful objects of lacquer and papier mâché are also produced, particularly in Kashmir. All of these are home-based industries, done either by artisans independently or working on contract for traders.

Another very important industry that has been growing in the hill regions is tourism. With the increase in roads, well-to-do people from the cities and foreign countries visit Kashmir, Himachal Pradesh, Uttaranchal and other places to enjoy the natural beauty and cool climate of the Himalayas. Many people also come to important pilgrimage centres like Vaishnodevi, Badrinath, Kedarnath, Gangotri and Dharamshala.

Hotels and restaurants have been built for the tourists. Taxi drivers take them around to see the different tourist sights. People sell things to the tourists. Many local people are finding employment in these businesses. Some people find

that they can make more money by renting rooms in their houses to tourists and opening small restaurants than they could make in agricultural work. Thus, in some places the amount of farming has recently decreased.

Unemployment and migration from the hills

Some people from the hills work as labourers in the large cities of the northern plain. There is a shortage of agricultural land on the hills, so farming is limited. There are only a few industries in the Himalayas. Also, there are no big cities. That is why there are not many different ways of earning a livelihood. On the other hand, there is a lot of industry, business and commerce in many large cities on the plains. Hence, the possibility of getting employment is greater there. That is why people from the hills go to cities like Kanpur and Delhi. Some of them return to their villages in summer to farm their land, or work in tourism. Some go to the large cities just to sell their shawls, carpets and other handicrafts. Others decide to settle down in the cities on the plains.

Now let's find out something about how people live in the rainy North East.

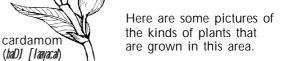
Life in the Eastern Himalayas and Purvanchal Hills

The states of Sikkim and Arunachal Pradesh in the Eastern Himalayas are mainly inhabited by tribal communities (adivasis). In Sikkim there are the Nepali, Bhutia, Lepcha and Sherpa communities. In Arunachal Pradesh the main communities are the Adi, Nishi, Apatani, Mishmi and Monpa.

Agriculture

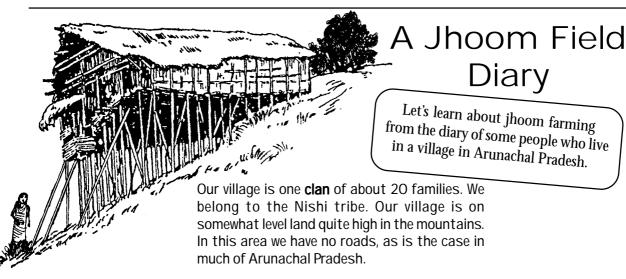
We have already seen (from the temperature and rainfall graphs) that the Eastern Himalayas and Purvanchal Hills have somewhat different climates than the Western Himalayas. Therefore the vegetation and agriculture is also different.

The leaves of this tree are tejpata, and the inner bark is cinnamon (dalacalna)



bamboo

Farming is difficult because of the steep slopes and high rainfall. In the flat lands in valleys, rice is grown in the same fields year after year. The paddy fields are ploughed, and modern inputs such as fertilizers and pesticides are being used increasingly. However, if the soil on hill slopes is ploughed, it flows down the hillsides in the torrential downpours. Even making terraced fields does not completely stop this erosion. Therefore there is another type of farming in this region called *jhoom* farming.



Our houses are propped up on bamboo stilts on the hillside. This is the best way to build a house here because the ground is usually very wet, with so many scorpions, leeches, snakes and insects running around. Around our houses we have small gardens with fruit trees, vegetables, tea and coffee.

12 December - Searching for Fields

At this time of year it's dry and quite cold here – although we don't get snow. We get so much rain most of the year, but it all flows downhill, and from December to February we have trouble even getting drinking water. We have to go down the steep path to the river in the valley to fetch water.

This is the time of year that we prepare our fields for cultivation. Each year we make fields on a different part of our land. Because the thin topsoil gets quickly washed away by the heavy rains, after two or three years of farming the fields loose their fertility. The fields we used last year will be left fallow for at least 7 or 8 years so that the forest will grow and the soil will become fertile again.

I use this bamboo container to carry water



The land on which our village is located plus two other forested hills all belong to our clan. No one family owns any part of it – we all own it together. But other clans cannot farm on it.

Today we went around looking for a part of our forest to clear for the new fields. After a lot of debate, we decided on the southern slope of our nearest hill.

13 December - The Forest is Cleared

Today we began cutting down the trees for our new fields. This is a lot of hard work. All the men of our clan work together felling trees and preparing each family's field in turn. There are no labourers to hire around here – anyway we don't need them since we all help each other out.

We leave the stumps of the trees standing. The stumps and roots prevent the soil from being washed away by the rain. We leave the logs lying in the fields to dry out.

We have also left a few trees standing because they produce certain fruits. Each year all the women climb up and down the hillsides to gather the ripe wild fruits. They also collect a few different kinds of tubers from the forests.





2 February – Hunting

Today a group of men went hunting in the forest. They brought back a deer. We eat meat as often as we can get it, but these days the number of animals is decreasing and the government has put many restrictions on hunting.

11 March - The Trees are Burnt

Today we have started burning the dry logs in the fields. After the fires die out, all that will remain is ash and some half-burnt tree stumps.

24 March - The Rains Resume

The rains have started again. After just two showers, the ash that was lying in the fields has mixed with the soil, making it more fertile.

4 April - Sowing

The *jhoom* field is ready for sowing. These days there are light drizzles. Heavy downpours will begin from May. So we have to finish the sowing before May. Everyone who can work - women, men, and some children - go to the *jhoom* field, carrying seeds, baskets and hoes. We don't use the hoes to plough the fields, though. We use them to dig small holes in the soil. Then we place seeds in the holes, and cover them with soil, working from the bottom to the top of each field.

All the crops each family uses are sown together in the family's *jhoom* field. So one field contains at the same time rice, corn, *jowar*, sesame (til), beans, onions, tobacco, cotton, sweet potatoes, chilly, pumpkin etc.

We are also building *machaans* and huts in the fields so that someone can stay and look after the fields, protecting the crops from the wild animals.

26 June - Weeding

Now the really heavy rains are coming every day. The crops are growing very quickly. But weeds are also growing rapidly. We have to weed the fields about 4 or 5 times.

3 August - Harvesting

The first of our crops are ripe. We will now start harvesting each crop as it gets ripe, one by one. By December the harvest will be complete, and another year will begin.

Inthe Historychapter on adivasis in British times, your ead about a tribe in Orissa that practiced a similar kind of agriculture. How was this different from the present day jhoom farming in the Eastern Himalayas?

How does the soil get fertile in jhoom farming?

Is jhoom more suitable than terrace farming in the Eastern Himalayas? Give advantages and disadvantages of each method of farming.

Does jhoom farming destroy forest in the long run?

Development and Problems in the Northeast

These days jhoom farmers are facing great difficulties. On the one hand, forests are rapidly being cut away for industries. On the other hand the population of the region is increasing. As a result, land available for farming is shrinking.

Whereas earlier jhoom farmers would leave a field fallow for twenty years, they can scarcely leave it for four or five years these days. This is not long enough for proper regrowth of the forest. Therefore the soil does not get very fertile and the crop yield is low. Efforts are being made by the government to help people give up jhoom farming and take to terrace cultivation to a greater degree.

In other chapters you will learn about adivasis in other states of India and the many hardships they have faced. You will learn about how zamindars, traders and moneylenders have grabbed their land. You will see how the adivasis in many places got no particular benefit from the industries set up in their areas.

The situation of the adivasis in the eastern Himalayan states of India is quite different. A law has been passed that no outsiders can go there without the permission of the government, let alone buy land etc. Hence, no outsider has been able to grab agricultural or forest land here. The tribes have been able to develop freely and, today, senior officials, teachers, traders and shopkeepers are all tribal people. The spread of modern education has contributed greatly to this

development. Tribal youth have acquired education and reached high positions in their states.

People are also engaged in handicrafts such as weaving and making bamboo products. But in the absence of big industries or commercial agriculture new avenues for earning one's livelihood are limited. There are few opportunities for employment. Farmers sell only a small percentage of their crops, so they do not have much money to buy many other things they need. However, compared to the people of the Western Himalayas, fewer people from the Eastern Himalayas go out in search of employment.

Tea Gardens

There is one crop grown in the Eastern Himalayas that reaches all corners of the country, and that is tea. Some of it is also exported to other countries.

Most of the tea used in India comes from the northeast. In the lower hills and the valley of Assam and northern part

of West Bengal there are vast tea gardens. New leaves of the tea plants are plucked, shredded in machines and dried before being sold as tea.



Exercises

- 1. The Himalayas do **not** extend into which of the following places: Madhya Pradesh, China, Uttar Pradesh, Sikkim, Haryana, Punjab, Pakistan?
- 2. Why do the rivers that flow from the Himalayas have water all year round? Where do they get water from?
- 3. Why do sheep herders climb to the higher parts of the Himalayan mountains in summer and why do they leave these areas in winter?
- 4. Why are houses scattered farther apart in mountains than in the plains?
- 5. Make one list of the crops grown on the Western Himalays, and another list of crops grown on the Eastern Himalayas.
- 6. How does the construction of roads in hills encourage the development of agriculture? How does the construction of roads in hills discourage the development of agriculture?
- 7. Why do landslides occur in the Himalayas?
- 8. Make a list of the similarities and differences between the vegetation and climate of the Eastern and Western Himalayas.
- 9. Considering the expense of transporting agricultural produce, dhy to Himachal farmers still find it profitable to sell fruits and vegetables in the plains?
- 10. From the felling of trees to the harvest of crops, what are the various steps in jhoom cultivation? Describe them in your own words.
- 11. What are the difficulties that have recently arisen in practising jhoom farming?
- 12. In the Eastern Himalayas, is there more soil erosion in terrace farming or jhoom farming? How is erosion minimized in each method?
- 13. Why is jhoom farming not practiced widely in the Western Himalayas?
- 14. Write three questions about the Himalayas for which you cannot find the answers in this chapter. (You need not write answers to these questions. Maybe in future you can think of a way to find the answers.)