



Agriculture in India

CHAPTER 6

Types of Farming

Agriculture is an age-old economic activity in our country. Over the years, cultivation methods have changed significantly depending upon the characteristics of physical environment, technological know-how and socio-cultural practices. At present the following farming systems are practised in different parts of India.

Subsistence Farming - This type of farming is alone in two forms. They are : Simple Subsistence Farming and Intensive Subsistence Farming.

1. Simple Subsistence Farming: Agriculture is practised on small patches of land with the help of primitive tools like hoe, dao and digging sticks through family/community labour.



Fig. 6.1: Preparation of land for agriculture.

- Name some of the states of India where “slash and burn” farming is practised?

This type of farming depends upon monsoon, natural fertility of the soil and suitability of other environmental conditions to the crops grown. It is a ‘slash and burn’ method of agriculture (Shifting agriculture). You have read about it in the previous classes.

2. Intensive Subsistence Farming: It is practised in areas with high population density on land. It is labour intensive farming, where high doses of biochemical inputs and irrigation are used for obtaining higher production.

Commercial Farming: The main characteristic of this type of farming is the use of higher doses of modern inputs, for example High Yielding Variety (HYV) seeds, chemical fertilisers, insecticides and pesticides in order to obtain higher productivity. The degree of commercialisation of agriculture varies from

one region to another. For example, rice is a commercial crop in Haryana and Punjab, but in Odisha, it is a subsistence crop. Plantation is also a type of commercial farming. In this type of farming, a single crop is grown on a large area. In India, tea, coffee, rubber, sugarcane, banana, etc. are important plantation crops.

- Give some more examples of crops which may be commercial in one region and may provide subsistence in another region?

Cropping Seasons

Agricultural crops depend on seasons and natural resources such as soil, water and sunshine for cultivation. Temperature and humidity conditions are important. Some crops can be cultivated only in specific seasons regardless of the availability of water and other inputs. Therefore, in any region, different crops are grown in different seasons.

India has three cropping seasons – **rabi**, **kharif** and **zaid**.

Rabi crops are sown in winter from October to December and harvested in summer from April to June.

Some of the important rabi crops are wheat, barley, peas, gram and mustard. Availability of precipitation during winter months due to the western temperate cyclones helps in the success of these crops. However, the success of the green revolution in Punjab, Haryana, western Uttar Pradesh and parts of Rajasthan has also been an important factor in the growth of the above mentioned rabi crops.

Kharif crops are grown with the onset of monsoon in different parts of the country and these are harvested in September-October. Important crops grown during this season are paddy, maize, jowar, bajra, red gram, green gram, black gram, urad, cotton, jute, groundnut and soyabean.

In between the rabi and the kharif seasons, there is a short season during the summer months known as the Zaid season. Some of the crops produced during 'zaid' are watermelon, muskmelon, cucumber, vegetables and fodder crops.

Major Crops

A variety of food and non food crops are grown in different parts of the country depending upon the variations in soil, climate and cultivation practices. Major crops grown in India are paddy, wheat, millets, pulses, tea, coffee, sugarcane, oil seeds, cotton and jute, etc.



Paddy : It is the staple food crop of a majority of the people in India. Our country is the second largest producer of paddy in the world after China. It is a kharif crop which requires high temperature, (above 25°C) and high humidity with annual rainfall above 100 cm. In areas of less rainfall, it grows with the help of irrigation. Paddy is grown in the plains of north and north-eastern India, coastal areas and the deltaic regions. Development of dense networks of canal irrigation and tubewells has made it possible to grow rice even in areas with less rainfall such as Punjab, Haryana and western Uttar Pradesh and parts of Rajasthan.

Wheat: This is the second most important cereal crop. It is the main food crop in north and north-western part of the country. This rabi crop requires a cool growing season and a bright sunshine at the time of ripening. It requires 50 to 75 cm of annual rainfall evenly distributed over the growing season. There are two important wheat-growing zones in the country – the Ganga-Satluj plains in the northwest and black soil region of the Deccan. The major wheat-producing states are Punjab, Haryana, Uttar Pradesh, Bihar, Rajasthan and parts of Madhya Pradesh.

High Yielding Varieties

High Yielding Varieties of seeds and fertilizers are the key elements of new agriculture technologies. The HYVs seeds grow well when fertilizers and water are used; they have larger amounts of grain and shorter stalks and a short period maturity in most cases. The short period maturity also enables double cropping - farmers can use their lands more than once in a year.

This policy was initially implemented in Punjab, Haryana, Western Uttar Pradesh and in some districts of Andhra Pradesh and Tamil Nadu. The HYV seeds require a lot of water and these areas are already irrigated. The new variety of wheat is grown in Punjab, Haryana and Western Uttar Pradesh, while rice is grown in Telangana, Andhra Pradesh and Tamil Nadu.

Maize: It is a crop which is used both as food and fodder. It is a kharif crop which requires temperature between 21°C to 27°C and grows well in old alluvial soil. In some states like Bihar maize is grown in rabi season also. Use of modern inputs such as HYV seeds, fertilisers and irrigation have contributed to the increasing production of maize. Major maize-producing states are Karnataka, Uttar Pradesh, Bihar, Telangana, Andhra Pradesh and Madhya Pradesh.

Millets: Jowar, bajra and ragi are the important millets grown in India. Though these are known as coarse grains, they have very high nutritional value. For example, ragi is very rich in iron, calcium, other micro nutrients and roughage. Jowar is the third most important food crop with respect to area and production. It is a rain-fed crop mostly grown in the moist areas which hardly needs irrigation. Maharashtra is the largest producer of jowar followed by Karnataka, Telangana, Andhra Pradesh and Madhya Pradesh. Bajra grows well on sandy soils and shallow black soil. Rajasthan is the largest producer of bajra followed by Uttar Pradesh, Maharashtra, Gujarat and Haryana. Ragi is a crop of dry regions and grows well on red, black, sandy, loamy and shallow black soils. Karnataka is the largest producer of ragi followed by Tamil Nadu.

Pulses: India is the largest producer as well as the consumer of pulses in the world. These are the main source of protein in a vegetarian diet. Major pulses that

are grown in India are red gram, black gram, green gram, masur, peas and bengal gram. Pulses need less moisture and survive even in dry conditions. Being leguminous crops, all these crops except **arhar** help in restoring soil fertility by fixing nitrogen from the air. Therefore, these are mostly grown in rotation with other crops. Major pulse producing states in India are Madhya Pradesh, Uttar Pradesh, Rajasthan, Maharashtra and Karnataka.

- Which of these pulses are grown in the kharif season and which are grown in the rabi season?

Food Crops other than Grains

Sugarcane: It is a tropical as well as a subtropical crop. It grows well in hot and humid climate with a temperature of 21°C to 27°C and an annual rainfall between 75cm. and 100cm. Irrigation is required in regions with low rainfall. It can be grown on a variety of soils and needs manual labour from sowing to harvesting. India is the second largest producer of sugarcane after Brazil. It is the main source of sugar, gur (jaggery), khandsari and molasses. The major sugarcane-producing states are Uttar Pradesh, Maharashtra, Karnataka, Tamil Nadu, Telangana, Andhra Pradesh, Bihar, Punjab and Haryana.

Oil Seeds: India is the largest producer of oilseeds in the world. Different oil seeds are grown covering approximately 12 per cent of the total cropped area of the country. Most of these are edible and used as cooking mediums. However, some of these are also used as raw material in the production of soap, cosmetics and ointments.

Groundnut is a kharif crop and accounts for about half of the major oilseeds produced in the country. Telangana and Andhra Pradesh are the largest producers of groundnut followed by Tamil Nadu, Karnataka, Gujarat and Maharashtra. Linseed and mustard are rabi crops. Sesamum is a kharif crop in north and rabi crop in south India. Castor seed is grown both as rabi and kharif crop.

Tea: Tea cultivation is an example of plantation agriculture. It is also an important beverage crop introduced in India initially by the British. Today, most of the tea plantations are owned by Indians. The tea plant grows well in tropical and sub-tropical climates endowed with deep and fertile well-drained soil, rich in humus and organic matter. Tea bushes require warm and moist frost-free climate all through the year. Frequent showers evenly distributed over the year ensure continuous growth of tender leaves. Tea is a labour intensive industry. It requires abundant and skilled labour. Tea is processed within the tea garden to



Fig 6.2 Tea plantation

restore its freshness. Major tea producing states are in the hill regions of Assam, West Bengal, Tamil Nadu and Kerala. India is one of the leading producer as well as exporter of tea in the world.

Coffee: India produces about four per cent of the world's coffee production.



Fig 6.3 Coffee plant

Indian coffee is known in the world for its good quality. The Arabica variety initially brought from Yemen is produced in the country. This variety is in great demand all over the world. Initially, its cultivation was introduced on the Baba Budan Hills and even today, its cultivation is confined to the Nilgiri in Karnataka, Kerala and Tamil Nadu.

Horticulture Crops: India is one of the leading producers of fruits and vegetables in the world. Tropical and temperate fruits like mangoes of

Maharashtra, Telangana, Andhra Pradesh, Uttar Pradesh and West Bengal; oranges of Nagpur and Cherrapunjee (Meghalaya); bananas of Kerala, Mizoram, Maharashtra and Tamil Nadu; lichi and guava of Uttar Pradesh and Bihar; pineapples of Meghalaya; grapes of Telangana & Andhra Pradesh and Maharashtra; apples, pears, apricots and walnuts of Jammu and Kashmir and Himachal Pradesh are in great demand the world over.

India produces about 1/6 of the world's vegetables. It is an important producer of pea, cauliflower, onion, cabbage, tomato, brinjal and potato.

Non-Food Crops

Rubber: It is an equatorial crop, but under special conditions, it is also grown in tropical and sub-tropical areas. It requires moist and humid climate with rainfall of more than 200 cm. and temperature above 25°C. Rubber is an important industrial raw material. It is mainly grown in Kerala, Tamil Nadu, Karnataka and Andaman and Nicobar islands and Garo hills of Meghalaya. India is among the world's leading natural rubber producers.

Fibre Crops: Cotton, jute, and natural silk are the three major fibre crops grown in India. The first two are derived from the crops grown in the soil, the latter is obtained from cocoons of the silkworms fed on green leaves specially mulberry. Rearing of silk worms for the production of silk fibre is known as sericulture.

Cotton: India is believed to be the original home of cotton plant. Cotton is one of the main raw materials for cotton textile industry. India is the third-largest producer of cotton in the world. Cotton grows well in drier parts with black cotton soil in the Deccan plateau. It requires high temperature, light rainfall or irrigation, 210 frost-free days and bright sunshine for its growth. It is a kharif crop and

requires 6 to 8 months to mature. Major cotton-producing states are – Maharashtra, Gujarat, Madhya Pradesh, Karnataka, Telangana, Andhra Pradesh, Tamil Nadu, Punjab, Haryana and Uttar Pradesh.

Jute: It is known as the golden fibre. Jute grows well on well-drained fertile soils in the flood plains where soils are renewed every year. High temperature is required during the growth period. West Bengal, Bihar, Assam, Odisha and Meghalaya are the major jute producing states. It is used in making gunny bags, mats, ropes, yarn, carpets and other artefacts. Due to its high cost, it is losing market to synthetic fibres and packing materials, particularly nylon. However, in the recent times, the market or ecofriendly jute has been growing.

- The following table shows some of the details of different crops and the important states which produce them. Not all the information is given. Refer an atlas and discuss with your teacher to complete the information in the table.
- Mark each crop using a particular (•, ○, ◆, ■) symbol in a (political) map of India and discuss the reasons for which only those states account for major share in the production of specific crops.

Sl. No.	Crop	Top states in 2014-15 and how much they contributed to total grains production	Reasons, both natural and other factors, that account for major share of production
1	Paddy	West Bengal, Uttar Pradesh, Andhra Pradesh, Punjab, Odisha.	
2	Wheat	Uttar Pradesh, Punjab, Madhya Pradesh, Rajasthan, Haryana.	
3	Cereals	Rajasthan, Karnataka, Telangana & Andhra Pradesh, Maharashtra, Uttar Pradesh.	
4	Maize	Telangana & Andhra Pradesh, Karnataka, Maharashtra, Bihar, Tamilnadu.	
5	Pulses	Madhya Pradesh, Uttar Pradesh, Maharashtra, Rajasthan, Andhra Pradesh.	
6	Sugarcane	Uttar Pradesh, Maharashtra, Karnataka, Tamil Nadu, Bihar	
7	Oil seeds	Gujarat, Rajasthan, Madhya Pradesh, Maharashtra, Telangana & Andhra Pradesh	
8	Cotton	Gujarat, Maharashtra, Telangana & Andhra Pradesh, Haryana, Karnataka	

Importance of Agriculture

In this section, we shall look at agriculture from an overall view for the entire country. We would read about the changes that have taken place since the time of Independence to the present day and the challenges that we face today.

The food security of a nation depends on agriculture. A variety of raw materials required for industries are cultivated on farms. Wheat, paddy and other food crops are cultivated by farmers. Agriculture is a major source of livelihood for millions - giving employment to a large section of people.

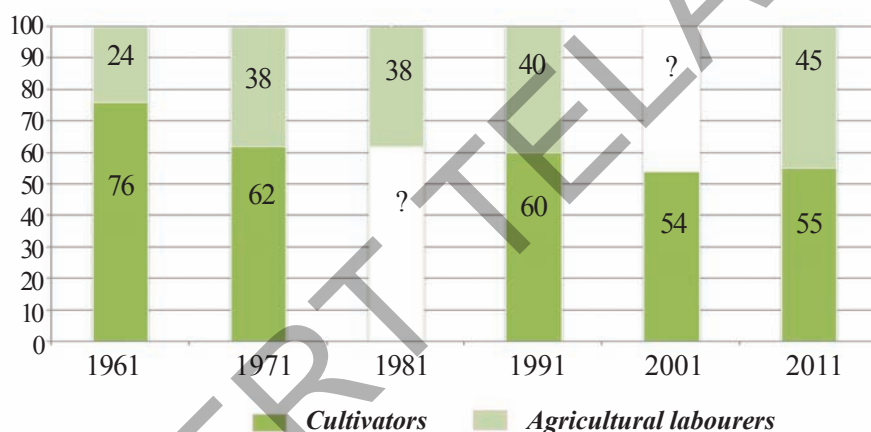
More than half of the population of workers in India is working in the agriculture sector and its related activities. Between men and women, it is the women who get more employment opportunities in agriculture. Nearly 70 per cent of the working women are engaged in agriculture.

Two kinds of people are engaged in farming – agricultural labourers and cultivators. Cultivators are those farmers who have some land of their own and also use land belonging to others for cultivation. Agriculture labourers are those

who are landless labourers who work on other's lands.

Since population also increases with time, we look at the absolute numbers, the number of people working in agriculture increased from 97 million in 1951 to 234 million in 2001. Hence, the number of agricultural labourers who are seeking a livelihood in rural areas has increased, given the fact that they have very little or no land to cultivate. What are the other alternative job opportunities available to them? This is a serious challenge.

*Cultivators and Agricultural Labourers
in 1961-2011 (%)*



- Complete the bar diagram above and find out the percentage of cultivators and agricultural labourers in 1981 and 2001 respectively.
- Discuss the difference between self employment and looking for work using examples from your region.
- Do you think that some families who were earlier cultivators are becoming agricultural labourers now? Discuss.

Indian farmers are mostly small landholders

One distinct feature of Indian agriculture is the small land holdings. Most farmers work with only a small plot of land. Look at the following table.

Table 1: Number of farmers and land they possess in India (2010-2011)

Type and amount of land operated by farmers		Number of Farmers		How much land they operate with?		Average amount of land operated by farmers (acres)
		Number (lakhs)	%	Land in lakhs acres	%	
Marginal	up to 2.5 acrs	924	?	875	?	?
Small	2.6 to 5 acrs	247	?	868	?	?
Semi-medium	5.1 to 10 acrs	138	10.0	927	?	6.7
Medium	10.1 to 25 acrs	59	4.3	833	?	14.1
Large	More than 25acrs	10	?	429	?	?
Total		1378	100.00	3932	?	?

- Complete the data in the table and the explanation in the following passage below.

Majority of farmers operate only small plots of lands. A typical Indian marginal farmer has only about acres to cultivate. There are 924 lakh farmers so that% of all farmers are marginal. If we add up the number of small and marginal farmers, they form ...% of all farmers. However, even though in percentage terms medium and large farmers is small, the number in absolute terms is large.lakh farmers can be together considered to be in this group. They have a powerful voice in rural areas. This group of large and medium farmers together operate% of the land. Each large farmer, for example, on an average operatesacres of land. Compare this with each marginal farmer who operates on an averageacres of land. This inequality in distribution of land explains the inequalities in opportunities that they experience, the poverty or growth opportunity that they face.

- In your opinion, what would be the minimum amount of land required to do viable farming which would give a farmer a decent earning. How many farmers in the above table are doing viable farming?
- Why do only a small section of farmers have a powerful voice?

Agricultural production depends on natural factors

Agricultural crops depend on seasons and natural resources such as soil and water and sunshine for cultivation. Temperature and rainfall conditions are important. Some crops can be cultivated only in specific seasons regardless of the availability of water and other inputs. Therefore, in any region, different crops are grown in different seasons. When you visit the '*Santha*', a fruit or vegetable market, in different seasons you would notice these differences.

There are also variations in the natural conditions between different regions in the country.

Besides land reforms such as abolition of Zamindari, Land ceiling Act, the Indian government has also initiated other important policy changes. These can be seen in three phases – 1950-1965, 1966-1990 and Post 1991. Each phase signifies different facets of Indian agriculture.

The First Phase (1950-1965) - Increasing Irrigation and Building Dams

Between 1950 and 1965, the Indian Government invested heavily on irrigation and power projects. It was hoped that this would raise crop production and solve the problem of food shortage. Big dams for irrigation and electricity generation like Bhakra-Nangal (Himachal Pradesh) Damodar Valley (West Bengal), Hirakund (Odisha), Nagarjuna Sagar (Telangana & Andhra Pradesh), Gandhi Sagar (Madhya Pradesh) were constructed.

The area under cultivation and the irrigated area both went up and crop production increased. During this phase, government promoted the formation of farmer cooperatives and also appointed agricultural extension officers to provide technical support to farmers. A variety of initiatives, especially for small farmers, were taken at the mandal or block level through community development programmes.

Despite these developments, food shortages continued. During 1962-65, India faced two wars and the government spent a lot of money on the war. There was very little rain in and these years 1965 and 1966 were declared as drought years. This led to decline in the production of food grains and forced the government to import food grains.

- In an atlas, find the locations of the above mentioned dams and mark them on a map of India. Label the names of the major rivers on which these dams were built.

This situation of depending on other countries for food requirements worried the Indian leaders. The Indian Government began to change the policy towards agriculture and this phase was called as Green Revolution.

Second Phase (1966-1990) – Green Revolution and its spread

The government introduced new kind of seeds to the Indian soil which were invented in various agricultural research institutions in India as well as other countries. This marked the second phase of agricultural development. These new seeds are known as High Yielding Varieties. It was also accompanied by the use of chemical fertilizers, machinery such as tractors and others besides irrigation facilities. A variety of cooperative banks were set up in rural areas to provide credit to farmers so that they could buy raw materials such as seeds, fertilizer and pesticides and machinery required for modern farming.

Dryland Agriculture

A little over 40% of the total cultivable land in India is irrigated. This percentage can only go up to a maximum of 55%. The remaining 45% cannot be easily irrigated - it would be very difficult and expensive. Thus, these areas must depend solely on rainfall. These are the drylands in our country.

Some of the main crops grown in these areas are jowar, bajra, groundnut, ragi, cotton, soyabean, red gram and bengal gram.

Dryland areas are most suitable for certain crops. For example, 84% of the pulses grown in the entire country are from these areas. However, the production of pulses is not increasing and they are becoming more and more expensive.

What should then be done to increase production in such dryland areas? Unlike the cultivation of HYVs in irrigated lands, dryland farming poses different challenges. Conserving rainfall that the area receives is the first step. There are several ways in which people can stop rain water from quickly running off, so that it can soak into the ground and recharge the ground water. This is done through watershed development programmes which include afforestation, bunding, building check-dams and tanks. Also, fertility of the soil needs to be raised by adding organic material (compost and manure).

Farmers who grow crops like bengal gram, red gram, bajra, jowar, ragi, soyabean, groundnut, and cotton also need support. They may need new varieties of seeds suitable for different regions, knowledge about the best ways of growing a mix of crops on the same land, loans to purchase inputs, support prices for these crops etc. Farming of HYVs has now been adopted in dryland regions too.

- In which areas were the new methods of agriculture first tried? Why was the whole country not covered?
- Why are different methods necessary for dryland areas?

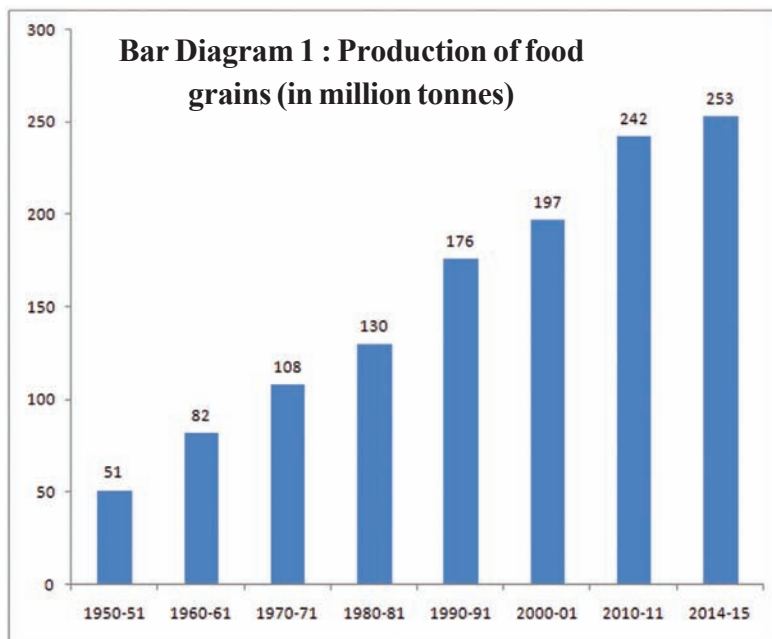
The Effects of the Green Revolution

Increase in Production

The spread of HYVs to large parts of the country and to newer crops has led to a significant increase in crop production in the country. India has become self-sufficient in food grains.

Due to the rise in food grains production, it was no longer necessary to import food grains from other countries. Today, food materials constitute only about three per cent of India's imports (Bar Diagram). The production of food grains has increased five times over the last five decades - from 1950-51 to 2014-15 is 253 million tonnes.

A large stock of food grains has also built up with the government through Food Corporation of India (FCI) that can be used in case of shortage and can avoid drought or famine-like situations in the country. The procurement of food grains is also used to supply food grains to inaccessible areas. In the year 1967, the total food grain stock with the government was only 19 lakh tonnes. By the year



2010-11, it increased to 220 lakh tonnes, about one tenth of total food grains produced in India.

Green revolution helped the farmers to produce higher quantities of foodgrains and non-foodgrains on the same plot of land. There was no major increase in the land used for cultivation. In 1960s, a farmer was able to produce an average of only 287 kilograms of foodgrains, be it paddy or wheat, on one acre of cultivable land.

Today, the same farmer is able to produce nearly 800 kilograms of foodgrains per acre of cultivable land.

- How increase in buffer stock would help to avoid situations of drought and famines?
- How farmers were able to raise higher amount of food grains on the same plot of land over the years?
- In which decades the food grains yields grow fast? What could be probable reasons for this?

Environmental Effects

The Green Revolution has also brought several environmental imbalances. As mentioned earlier, it was first introduced in the northern states of Punjab, Haryana and parts of Uttar Pradesh. We shall study some of the environmental problems faced by these areas.

Water problems

In these states, most farmers have shifted to cultivation of HYVs of rice and wheat which require plenty of water. The main source of irrigation in these states is tubewells that draw groundwater. As the number of tubewells increased over the years, the groundwater level fell rapidly. Groundwater level can be maintained as long as the use of groundwater is less than the groundwater recharge. Groundwater recharge is a natural process and happens each year through rainfall or flows from canals, streams and rivers. Water from these sources slowly flows through the various soil layers and collects as groundwater. The problem starts when the groundwater use through tubewells etc. is more than the groundwater recharge. A fall in groundwater level would mean that less groundwater is available for future use. Then there is the need to protect the ground water.

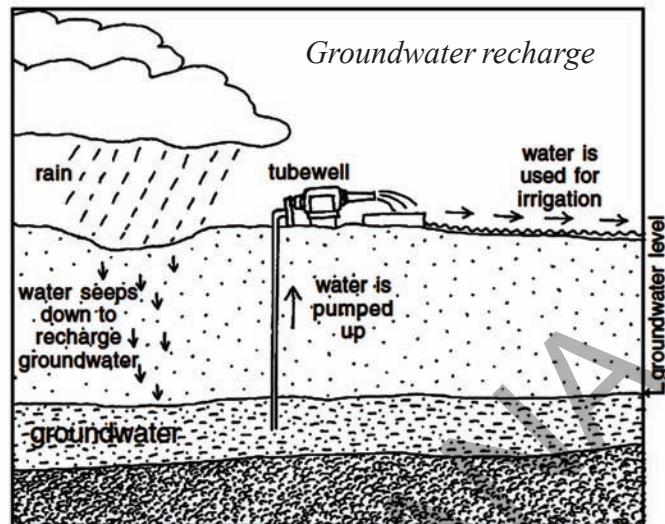
This problem of falling ground water level is faced by 10 out of 12 districts of Punjab and 9 out of 12 districts of Haryana. Experts fear that agriculture in Punjab could be in danger due to environmental damage over the past three decades.

Fertilizer Problems

Manure and compost contain humus and living organisms that slowly release minerals as they decompose. Chemical fertilizers provide minerals

(usually nitrogen, phosphorus and potassium) which dissolve in water and are immediately available to plants, but may not be retained in the soil for long. They may be leached from the soil and pollute groundwater, rivers, and lakes. Chemical fertilizers (as well as pesticides) can also kill bacteria and other organisms in the soil. This means that after some time of repeated use, the soil will be less fertile than ever before. Without micro-organisms, the soil will be dependent on frequent addition of more and more chemical fertilizers. The variety of nutrients which are normally produced by micro-organisms may also be reduced. Thus, in many areas, the Green Revolution has actually resulted in a loss of soil fertility and ever-increasing costs to farmers.

Environmental resources like soil fertility and groundwater are built up over many-many years. Once destroyed it is very difficult to restore them. Similar environmental imbalances are being faced by other regions with large-scale use of HYVs. Given that agriculture is heavily dependent on natural resources, how do we take care of the environment to ensure future development of agriculture? This is a complex question which is currently being debated.



What is fertile soil?

To be fertile, soil has to provide the right amounts of water, minerals, and air to the roots of plants. To do this, it must have the correct texture and the correct composition. Soil is composed of mineral particles (which come from the breakdown of rocks) as well as organic components (which are or have come from living organisms). To be available to roots, the minerals must be dissolved in the water.

Third Phase (1990s to the present) – Post Reform Agriculture

From 1967 to 1991, Indian farmers sold their produce to markets within the country and to the government through the FCI. People were also dependent on markets within the country for their food purchases. Foreign trade in farm products was not allowed. Export of most farm products, especially foodgrains, was banned. Imports were also not allowed. It was only the government that had the right to import from products in case of scarcity.

We have also seen that the government supported farmers through the supply

- Why did not the Indian government allow farmers to export foodgrains during the Green Revolution?
- Why should government ban exports / import? How does this policy help Indian farmers?

of cheap farm inputs and by offering to buy farm products at minimum support prices. Thus, the Indian farmers produced only for markets within the country and required government's support to earn a reasonable income from farming.

Foreign Trade in Farm Products

As pointed out earlier, government took many protective measures in agriculture prior to 1991. However, there has been a significant change in the agriculture policy in India. Farm products are exported from and imported into India more than in the past.

Changes in farm trade policy are not taking place in India alone. Many developing countries in Asia, Africa and South America have made similar changes in the policies. This is because the developed countries are putting pressure on them to allow foreign trade. These developed countries want to sell their surplus farm products in the developing countries that have a large number of buyers.

With the foreign trade policy changes, many crops can now be traded. For instance, farmers can now export vegetables and fruits, sugar and jaggery. Similarly, import of cotton, rubber, pulses, oilseeds are freely allowed. However, farmers cannot export food grains. Since food grains are the most important food item, the Indian government has been cautious to allow trade in food grains. Only the government can do so, if it wishes.

Organic Farming – The experience of a farmer in Odisha

In order to overcome the ill effects of Green Revolution, farmers in India have begun to adopt different farming practices. Let us look at an example. Aged 80, Natwarbhai is a resident of Narishu village, near Niali in Cuttack district, Odisha. A retired school teacher, he has been practising organic farming for the last decade or so, and swears by its potential to feed India's population. He says some of the varieties he grows yield over 20 quintals per acre, higher than the so-called 'high-yielding' varieties that farmers around him get after using chemical fertilizers and pesticides. Infact he spends much less on his crops since his main inputs are gobar, natural pesticides when occasionally needed and family labour.

Natwarbhai was earlier a 'modern' farmer. One day, while watching a labourer spray Carbofuran (a highly toxic pesticide), he was horrified to see him stagger and collapse. The worker was rushed for treatment. He survived but not Natwarbhai's faith in the new agriculture was lost. Especially after the labourer told him: "I could not breathe, my head was reeling"; and especially after, having buried the remaining stock of Carbofuran in a pit in his fields, Natwarbhai "saw dead snails, snakes, and frogs floating in the water that had accumulated there. "I immediately wondered what would be happening to the earthworms and micro-organisms that I knew kept the soil alive."

Natwarbhai switched to organic inputs, but with the high yielding varieties that the agricultural department provided. On the advise of the son, Rajendra, started cultivating traditional varieties. But such traditional varieties are rarely cultivated Now a days. It posed a big problem.

In 1999, he started his journey to search for traditional varieties of paddy seeds. He travelled all over Odisha, and a little outside, about 5,000 kms. He collected dozens of

traditional varieties of seeds from the areas termed as backward. He tried cultivating them all, noting down their names, characteristics and productivity.

Source: Adapted from Ashish Kothari, A New Rice Every day? The Hindu, December 9, 2012.

- Can organic farming produce enough food for all?
- How is organic farming especially suited for small and marginal farmers? Discuss.

The developed countries are however constantly putting pressure on India to allow greater imports of crops produced in their countries.

Foreign trade could cause farmers income to fluctuate. In certain years and for certain crops the farmers might gain from exports. In other years, farmers could lose because of cheap imports and fall in prices of farm products. Small farmers without much savings will not be able to bear this loss. They will get caught in debt trap and become poorer. The government has to be very careful in allowing trade in farm products.

Why does Government buy and store some grain?

A lot of grain comes into the market at the time of harvest. One problem that farmers face is lower price of grain during this time. This means farmers are not able to sell grain at a high enough price to be able to repay their loans and continue using the new farming methods. They need to be protected from traders who might try to purchase the grains at low prices.

Therefore, the government has decided to set a Minimum Support Price (MSP). A Minimum Support Price is a price at which the farmers can sell their grain if they want to the government. The government sets the MSP so as to cover the cost of cultivation and allow a little bit of profit to the farmer. Because of the MSP, farmers are not forced to sell their grains at cheaper prices to the traders.

The Food Corporation of India (FCI) was formed by the government to purchase food grains from the farmers and store them. It keeps stockpiles and supplies grain to ration shops and other government schemes (e.g. for midday meals in schools).

Keywords

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|------------------------|-----------------------------|-------------------------|
| 1. Chemical fertiliser | 2. Green revolution | 3. Organic material |
| 4. Dryland agriculture | 5. Modern farming practices | 6. Foreign trade policy |

Improve your learning

1. Name one important beverage crop and specify the geographical conditions required for its growth.
2. The land under cultivation has been reducing day by day. Can you imagine its consequences?
3. On an outline map of India, show the millet producing areas.
4. What is Minimum Support Price (MSP)? How is it being implemented in your area?



5. Explain all the ways in which the Indian government supported the Green Revolution.
6. Do you think it is important for India to be self-sufficient in food grains production? Discuss.
7. How is dry land agriculture different from irrigated agriculture?
8. Can you recall incidents such as pesticides being found in soft drinks? How is this related to the use of pesticides? Discuss.
9. Why are chemical fertilizers used in new farming methods? How could use of fertilizers make soil less fertile? What are the alternative ways of enriching soil?
10. How has the Green Revolution in some areas resulted in short-term gains but long-term losses to farmers?
11. What could be the effects of foreign trade on farmers' income?
12. In earlier classes, we had studied about land distribution. How does the following image reflect this idea? Write a paragraph about this in the context of Indian agriculture.
13. Read the paragraph under the title 'Fertilizer Problems' on page 70 and comment on it.
14. Observe the map given in the page 74 and locate the States where paddy is grown in the outline map of India.



Discussion:

Do you feel that the farmers who cultivate are happy? If not, What are the reasons? What are the factors that affect agriculture?

Debate: In agriculture, whether it is to be followed organic or chemical fertilizers and pesticides? Conduct a debate in classroom keeping the population increase in mind.

Project

Which crops are grown in your area? Which of these are grown from HYV seeds and which ones are grown from traditional seeds? Compare the HYV seeds and the traditional seeds with regard to each of the following points:

- | | | |
|----------------------|-------------------------------|----------------|
| (a) duration of crop | (b) number of times irrigated | (c) production |
| (d) fertilisers | (e) diseases | (f) pesticides |

Map - 1 Find the Paddy producing states in India

