

Agricultural Development in India (Part II)

The Effects of the Green Revolution

Increase in Production

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

Due to the rise in production, it was no longer necessary to import food grains from other countries. A large stock of food grains has build up with the government that could be used in case of shortage. In the year 1967, the total food grain stocks with the government was only 19 lakh tonnes. By the year 2000 it increased to 220 lakh tonnes.

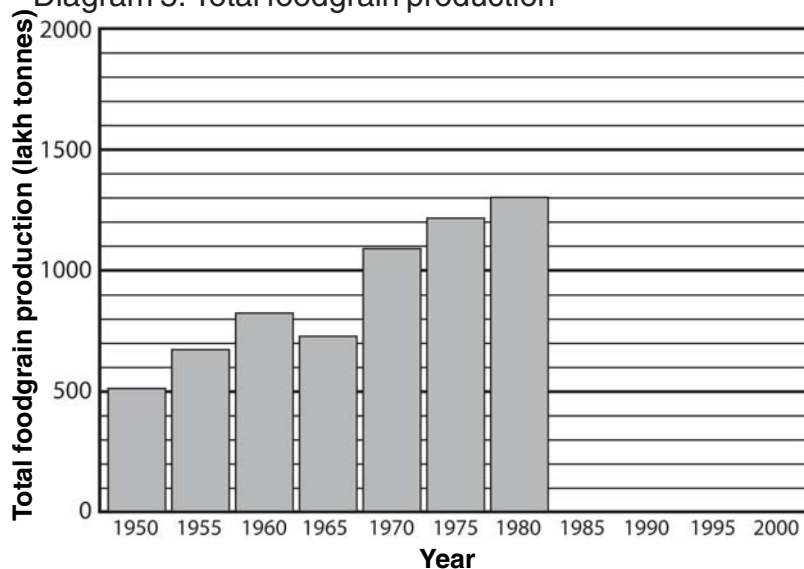
The STOCKPILE Problem

It isn't enough to have a stock of food. How do we ensure that people are not hungry and that all families have enough food throughout the year? Isn't it a shameful situation that more than half the children in this country do not get enough food for their normal growth. We shall discuss this in the chapter on Poverty.

PICTURE: RAT

The total grain production for certain years is shown in the Table below. Use this data to complete the graph.

Diagram 5: Total foodgrain production



Year	Foodgrain production (lakh tonnes)
1950	508
1955	669
1960	820
1965	724
1970	1084
1975	1210
1980	1296
1985	1500
1990	1760
1995	1800
2000	1970

Effects on Farmers' Incomes

You have read about small and large farmers earlier. Which kind of farmers would be more able to utilise the opportunities of the new agricultural methods?

As the production of foodgrains increased and farmers began to get better prices for grains because of the government MSP, farm incomes rose. Farmers with large landholdings were able to make huge profits and they used these profits for different purposes. Many of the large and medium farmers made use of bank loans to buy machines like tractors and harvesters to do the farm work. Some farmers used the money to set up businesses, buy more land or construct big houses.

The gains to the small farmers were much less, compared to the large farmers. For those with very small landholdings the income from farming their own land was not enough. The cost of water, electricity, seeds, fertilizer and pesticides was high in comparison to what they earned. Most small farmers were in debt. For survival they also had to work as labourers in others' fields.

For the landless labourers, the new farming methods could increase the number of days of work available during the year. More than one crop could be grown on a piece of land each year. Where irrigation was well-developed, the demand for labourers grew more and many more people could get work. However, this was not the case everywhere. In many areas, employment did not increase much and people continued to remain in poverty.

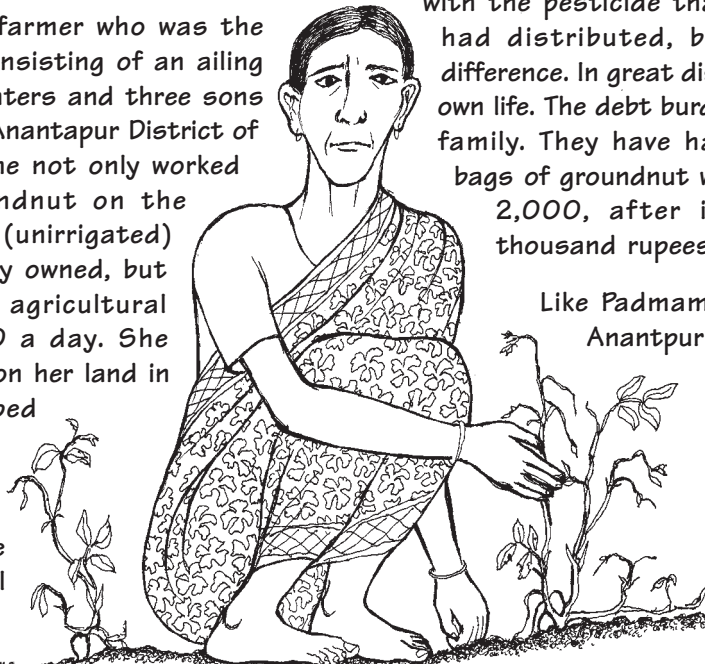
Also, as we already mentioned, many of the large and medium farmers bought machines to do the farm work. Work such as ploughing, sowing, harvesting, and threshing could now be done with machines. As a result the demand for farm workers didn't grow as much.

Today in most villages of India, small farmers and agricultural labourer households face the problem of not finding enough work during the year.

Compare the effect of new farming methods on small and large farmers.

Caught in Debt

Padmamma was a farmer who was the head of a family consisting of an ailing husband, two daughters and three sons in a small village in Anantapur District of Andhra Pradesh. She not only worked hard raising groundnut on the three acres of dry (unirrigated) land that the family owned, but also worked as an agricultural labourer for Rs 20 a day. She planted groundnut on her land in July 2000 and hoped that her harvest would help pay back a part of her debt of Rs 30,000 to the local agricultural bank and to private moneylenders.

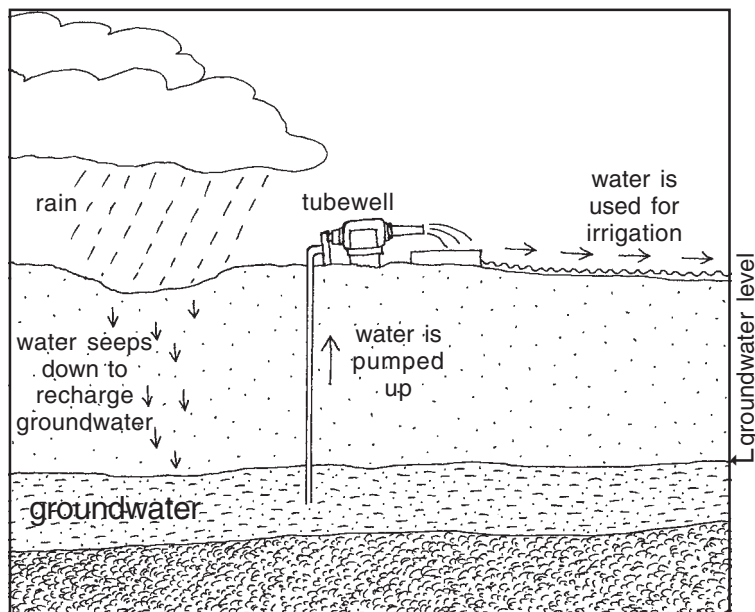


Midway through the season her groundnut crop was hit by pests. She sprayed her crops with the pesticide that the government had distributed, but it made little difference. In great distress she took her own life. The debt burden now falls on her family. They have harvested just two bags of groundnut worth a total of Rs 2,000, after investing 5 or 6 thousand rupees on the crop.

Like Padmamma, 41 farmers in Anantapur district of Andhra Pradesh took their lives between September and November 2000. Similar cases have been reported from Karnataka, Maharashtra and Punjab

Environmental Effects

The Green Revolution has brought in several environmental imbalances. The Green Revolution was first introduced in the northern states of Punjab, Haryana and parts of Uttar Pradesh. We shall study some of the environmental problems of these areas. In these states most farmers have shifted to cultivation of HYVs of rice and wheat, which require plenty of irrigation.



Water problems

The main source of irrigation is tubewells using 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. In other words, what is used up is more than what flows into the groundwater pool, so that the level of groundwater of an area falls. A fall in groundwater level would mean that less groundwater is available for future use.

in the recent years. Farmers complain about rises in the cost of cultivation. The prices of power, fertilizer, and pesticide have gone up, which have hit the small farmer badly. In many cases farmers have been cheated by private agents selling pesticides at very high prices. To make things worse, the pesticides often prove to be ineffective against the pests. In most of cases, there have been a lack of **agricultural extension workers** such as gram sevaks who could provide reliable information to the farmers. All this put together has meant that the risk of cultivation of HYVs is very high for small farmers. And in India, 80 percent of farmers are small farmers like Padamma, who cultivate less than 5 acres of land.

Discuss in the class the reasons for Padamma's problems and what steps can be taken so that situations like this do not arise.

The problem of falling groundwater level is faced by 10 out of 12 districts of Punjab and 9 out of 12 districts of Haryana.

If the groundwater level falls, irrigation becomes more expensive. Can you say why?

Use this Table to answer the following questions:

Annual Groundwater Recharge and Usage in Punjab (million cubic metres)

	1990	1993	1996
Groundwater Recharge	16,048	15,111	15,111
Groundwater Usage	15,762	15,758	17,674

1. Which is the only year when groundwater recharge was more than groundwater use? What happened in the other two years?

2. What happened to the ground water level in 1996? Why did this happen?

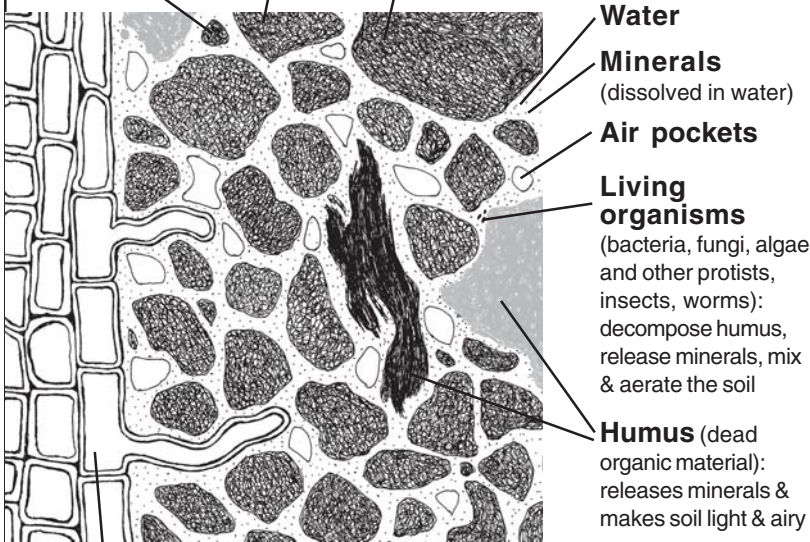
3. If a situation like 1996 continues how would it affect Punjab farmers? Make a list and discuss all the effects it may have.

What is fertile soil?

To be fertile, soil has to provide the roots of plants with the right amounts of water, minerals, and air. 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.

Soil particles - composed of minerals (broken-down rocks) the amounts of each size determine the soil texture

clay (small): retains minerals & water
silt (medium)
sand (large): provides air spaces



Root: helps keep fertile soil from being washed away

One teaspoon of fertile soil may contain 5 billion live bacteria!

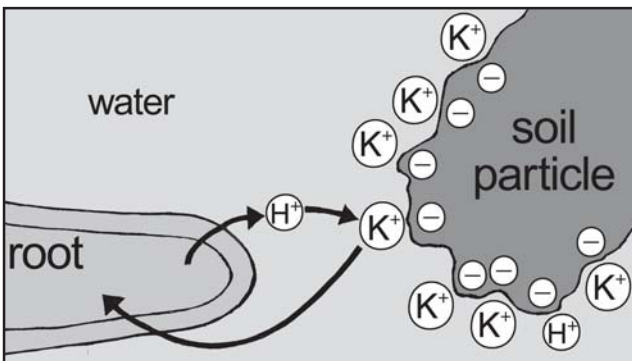
Fertilizer Problems

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 soil. This means that some time after their use, the soil will be less fertile than ever before. Without micro-organisms, the soil will be will 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.

Experts fear that Punjab agriculture is in danger due to environmental damage over the past three decades.

Environmental resources like soil fertility and groundwater are built up over 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 controversial question which is currently being debated.



A root takes up Potassium (K+)

The minerals taken up by roots are in the form of positive or negative ions dissolved in water. Soil particles are negatively charged, so positive ions, such as potassium (K^+) bind tightly to them. Plants produce hydrogen ions (H^+) to displace these ions, as shown. But negative ions, such as nitrate (NO_3^-) and phosphate ($H_2PO_4^-$), do not stick to the soil particles and are easily washed (leached) down into the groundwater during heavy rains or irrigation.

Why might fertilizer factory owners like to kill micro-organisms in soil? Would farmers also agree? Discuss.

Do farmers in your area face environmental problems? Compare with the problems of Punjab and Haryana.

Changes in Agriculture Policy: 1991 to the present

As we have seen, in the period from 1967 to 1991 Indian farmers sold their produce to markets within the country and to the government through the FCI. Also, people were dependent for their food purchases on markets within the country. Foreign trade in farm products was not allowed. Export of most farm products, especially foodgrains, was banned. Imports were also not allowed. Only the government had the right to import in case of scarcity.

Why didn't the Indian government allow farmers to export foodgrains during the Green Revolution years?

We have also seen that the government supported farmers through the supply of cheap farm inputs and by offering to buy farm products at minimum support prices. Thus the Indian farmer, produced for markets within the country, and was dependent on government's support to earn a reasonable income from farming.

Foreign Trade in Farm Products

In the nineties, there has been a significant change in Agriculture policy. The government has taken steps to gradually allow import and export of farm products. Simultaneously, it has reduced support to farmers in various forms. We shall discuss these changes below.

Changes in farm trade policy are not taking place in India alone. Many low income countries in Asia,

Africa and South America have made similar changes in the policies. This is because the rich countries are putting pressure on them to allow foreign trade. These rich countries want to sell their surplus farm products in the low income countries that have a large number of buyers. The rich country governments are also telling governments in these countries to stop supporting local farmers.

What would happen if the Indian government does not support the local farmers? Most likely, production of farm products will not continue to increase. Our country will again become dependent on imports as we were before the Green Revolution.

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

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



What could be the effect of foreign trade on farmers? Let's look at the case of the farmer Arif to find out.

Arif's Story

1995: Arif cultivated cotton in his field. He found a new opportunity to export cotton to TEXCO, a company in England. He calculated that he would get a higher price for selling in England than by selling it at the local mandi. And exactly such a thing happened. This year he was able to get a much higher profit than all other farmers in the village.

1998: Now there are more people who have started cultivating cotton. They all expect to export their cotton to England. But something unexpected happened. There was a huge increase in cotton production in USA,

cotton corporations in USA are selling these at a very low price. Now the cotton factories in England like TEXCO decide to buy cotton from corporations in USA as they are available at a cheaper rate than Indian cotton. In addition, Arif and the other cotton farmers find that factories in India are importing cotton from USA as it is cheaper. The farmers can do nothing now and have to sell the cotton at a low price at the local mandi. After repaying loans on seed, fertilizer and pesticide, Arif and the other cotton farmers have little money left in their hands.

In the year 1995, does Arif gain from foreign trade?

What happens to Arif and his farmer friends in 1998? Why is their income low?

Is foreign trade beneficial or loss making?

The example above shows that foreign trade could cause farmers income to fluctuate a lot. 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.

Most farms in the USA are now owned by large private corporations. Migrant farm workers (often immigrants from poor countries) travel around the country to find low-paying work on these huge, mechanised farms. One field may cover 500 acres or more. The government sometimes pays the corporations subsidies so that they can export their produce at very low rates.



Government's Role in Agriculture

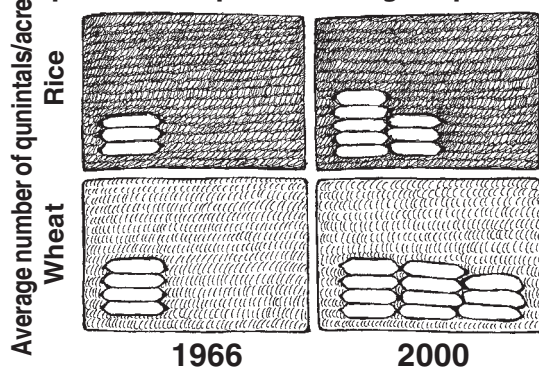
During the green revolution years, the government supported farmers in a number of ways so that the farmers could use the new variety of seeds. In the recent years, however, the government support has not been so strong. For example, the government has started very few new irrigation projects. There is also neglect in maintaining and completing some of the old irrigation projects. Similarly, many rural areas face power shortages. Farmers don't get power when required. Getting loan from the banks has become a major problem these days as many farmers have been complaining. Unlike in the past banks are lending less to small farmers.

In the previous pages you have read about the various problems the Indian farmers are facing. This has appeared at different places - in Padamma's story, in the case of Punjab farmers who are faced with the problem of falling ground water level, and in the discussion on dryland farming. Do you think that the government should play an important role to support Indian farmers? In your view, what should the government do? Discuss in class.

EXERCISES

- 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:
 - duration of crop
 - number of times irrigated
 - production
 - fertilizers
 - diseases
 - insecticides
- This diagram shows the average number of quintals of wheat and rice that were produced in India on each acre in 1966 and in 2000. Use it to answer the following questions.

Crop Production per Acre (1 bag = 1 quintal)



- How many quintals of wheat were produced on each acre of land in 2000?
 - Between 1966 and 2000 what was the increase in the production of rice on one acre of land?
 - Suppose in the year 2000 wheat was grown in 640 lakh acres of land. How much would be the total production of wheat?
- Refer to Diagram 5 in the Chapter. Can you guess by looking at the graph what would be the production of foodgrains in 2005? Find out the actual production of foodgrain in 2005 with the help of your teacher. Discuss.
 - What is a Minimum Support Price (MSP)? Why is a MSP needed?
 - Explain all the ways the Indian government supported the Green Revolution.
 - Suppose Ram Singh's extra land (more than the ceiling amount) was taken by the government and distributed among the landless, how would this change their lives?
 - Do you think it is important for India to be self-sufficient in foodgrain production? Discuss.
 - What were the most important events occurring in Indian agriculture during the following periods:
 - 1950 - 66
 - 1967 - 90
 - 1991 - present
 - How is dryland agriculture different from agriculture in other areas?
 - Can you recall the recent incident of pesticides being found in soft drinks? How is this related to the use of pesticides? Discuss.
 - What are the environmental problems faced by the farmers of Punjab and Haryana?
 - Why is chemical fertilizer used in new farming methods? How could use of fertilizers make soil less fertile? What are the alternative ways of enriching soil?
 - How has the Green Revolution in some areas resulted in short-term gains but long-term losses to farmers??
 - What could be the effects of foreign trade on farmers income?
 - Write a letter to the Agriculture Minister saying what you think should be done to improve the agriculture situation in the country.