

Case study: An agricultural system – intensive rice production in the Lower Ganges Valley

Location

An important area of intensive subsistence rice cultivation is the lower Ganges valley (Figure 8) in India and Bangladesh. The Ganges basin is India's most extensive and productive agricultural area and its most densely populated. The delta region of the Ganges occupies a large part of Bangladesh, one of the most densely populated countries in the world. Rice contributes over 75 per cent of the diet in many parts of the region. The physical conditions in the lower Ganges valley and delta are very suitable for rice cultivation:

- temperatures of 21 °C and over throughout the year, allowing two crops to be grown annually (rice needs a growing season of only 100 days)
- monsoon rainfall over 2000 mm providing sufficient water for the fields to flood, which is necessary for wet rice cultivation
- rich alluvial soils built up through regular flooding over a long time period during the monsoon season
- an important dry period for harvesting the rice.

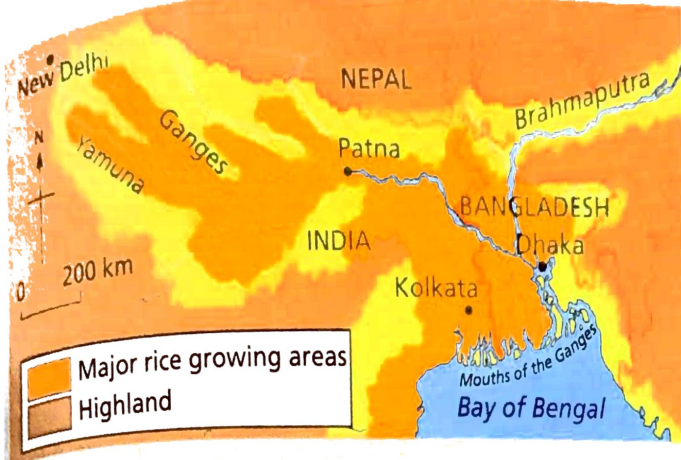


Figure 8 The Lower Ganges valley

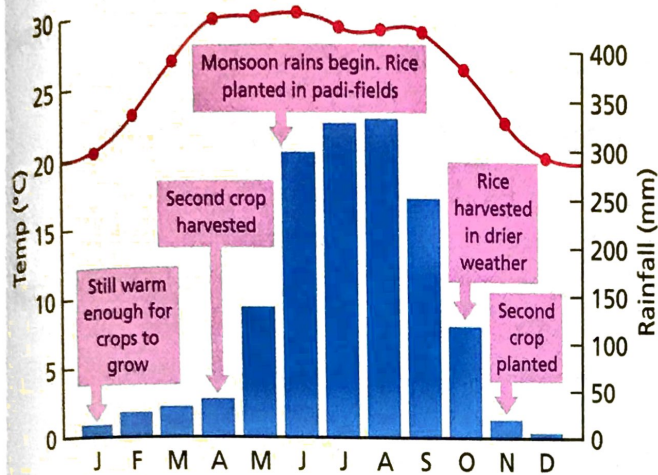


Figure 9 Climate graph for Kolkata

A water intensive staple crop

Rice is the staple or main food crop in many parts of Asia. This is not surprising considering its high nutritional value. Current rice production systems are extremely water intensive. Ninety per cent of agricultural water in Asia is used for rice production. The International Rice Research Institute estimates that it takes 5000 litres of water to produce one kilogram of rice. Much of Asia's rice production can be classed as intensive subsistence cultivation where the crop is grown on very small plots of land using a very high input of labour. Rice cultivation by small farmers is sometimes referred to as 'pre-modern intensive farming' because of the traditional techniques used, in contrast to intensive farming systems in developed countries such as market gardening which are very capital intensive.

'Wet' rice is grown in the fertile silt and flooded areas of the lowlands while 'dry' rice is cultivated on terraces on the hillsides. A **terrace** is a levelled section of a hilly cultivated area. Terracing is a method of soil conservation. It also prevents the rapid runoff of irrigated water. Dry rice is easier to grow but provides lower yields than wet rice.

The farming system

Padi-fields (flooded parcels of land) characterise lowland rice production. Water for irrigation is provided either when the Ganges floods or by means of gravity canals. At first, rice is grown in nurseries. It is then transplanted when the **monsoon rains** flood the padi-fields. The flooded fields may be stocked

with fish for an additional source of food. The main rice crop is harvested when the drier season begins in late October. The rice crop gives high yields per hectare. A second rice crop can then be planted in November, although water supply can be a problem in some areas for the second crop.



Figure 10 Rice padi-field scene in lower Ganges valley

Water buffalo are used for work. This is the only draught animal adapted for life in wetlands. The water buffalo provide an important source of manure in the fields. However, the manure is also used as domestic fuel. The labour-intensive nature of rice cultivation provides work for large numbers of people. This is important in areas of very dense population where there are limited alternative employment opportunities. The low incomes and lack of capital of these subsistence farmers means that hand labour still dominates in the region. It takes an average of 2000 hours a year to farm one hectare of land. A high labour input is needed to:

- build the embankments (bunds) that surround the fields – these are stabilised by tree crops such as coconut and banana
- construct irrigation canals where they are required for adequate water supply to the fields
- plant nursery rice, plough the padi-field, transplant the rice from the nursery to the padi-field, weed and harvest the mature rice crop
- cultivate other crops in the dry season and possibly tend a few chickens or other livestock.

Rice seeds are stored from one year to provide the next year's crop. During the dry season when there may be insufficient water for rice cultivation, other crops such as cereals and vegetables are grown. Farms are generally small, often no more than one hectare in size. Many farmers are tenants and pay for use of the land by giving a share of their crop to the landlord.

Case study analysis

- 1 Describe the location of the Lower Ganges valley.
- 2 Why is rice cultivation in the area considered to be an intensive form of agriculture?
- 3 Explain why the physical environment provides good conditions for rice cultivation.
- 4 Describe the inputs, processes and outputs of this type of agriculture.