UG_6th Semester_Honours_Paper_DSE4T: Agricultural Geography

Topic :Problems of agriculture with special reference to South Asian countries

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Introduction:

The greater part of Asia remains uncultivated, primarily because of climate and soil conditions are unfavourable. Conversely, in the best growing areas ,an extraordinarily intensive agriculture is practiced, made possible by irrigating the alluvial soils of the great river deltas and valleys. Of the principal crops cultivated, rice, sugarcane, and, in Central Asia, sugar beets require the most water. Legumes, root crops, and cereals other than rice can be grown even on land watered only by natural precipitation.

The most important modern development in Asian agriculture has been the introduction of new high-yielding strains of cereals. Several Asian countries have utilized this technology, and the yield per acre for cereals has increased substantially since the late 1960s. These improved yields can be attributed to partnership between international organizations, such as the International Rice Research Institute (IRRI) in the Philippines, and national agricultural research stations. Thus, in the case of rice, countries have adapted the IRRI strains to local conditions and have implemented their own seed improvement programs and extension (advisory) services to farmers. Access to a reliable water supply has been crucial to the new agricultural technology, which has also required using fertilizer in conjunction with the improved cereal seeds that have been developed. Huge irrigation projects in southern Siberia, Central Asia, and Pakistan have been rapidly altering traditional agricultural patterns.

Role of agriculture in South Asian economies:

- Of the 1.2 billion people worldwide living in dollar poverty, over 43 percent are found in South Asia. Of these, the vast majority live in rural areas. South Asia is still predominantly rural. Over 70% of its population live in rural areas, the majority of whom make their living by depending on the natural resources that surround them — land, freshwater, coastal fisheries.
- Much of the agriculture in South Asia is rainfed, so there is a fundamental dependence on rains that come seasonally. Too much rain, too little, too soon, too late — the types of variability expected to increase as global temperatures warm — will have signify cant impacts on the region because of this dependence.
- Much of the agricultural production in the region is undertaken by smallholders, on very small landholdings and dependence on livestock for draft power, manure, milk, and food security.
- The brief statistics below help to illustrate these essential characteristics of the region's agricultural systems:
    1. The average size of holdings in Bangladesh is only 0.5 hectares, and small farms account for 96% of operational holdings.
    2. In Bangladesh, fish provides 60% of national animal protein consumption, and the sector plays an important role in rural employment generation and poverty alleviation.
    3. The majority of India's poor (some 70%) are found in rural areas; in Sri Lanka the rural poor account for 95% of the country's poor.
    4. 63% of India's land under cultivation is rainfed.
    5. In India, about 81% of holdings are less than 2 hectares in size, with an average size of 1.4 hectares.
    6. The average size of holdings in Sri Lanka is 0.8 hectares.
    7. The average size of holdings in Nepal is 0.8 hectares, with nearly half less than 0.5 hectare; 93% of holdings in the country are operated by small farmers.
    8. In Nepal, the sale of livestock and livestock products is an important source for cash income. In the mountainous areas 44.4% of the farm cash income comes from livestock and 47.6% in the rural hills.
    9. The average size of Pakistani landholding is 3.0 hectares, with 58% of farms less than 2 hectares in size. However, less than half of rural households own agricultural land.

10. In Pakistan, the livestock sector contributes around 49.1% to overall agriculture value added and about 11.4% to national GDP in economic terms. Women are responsible for much of the labour of tending livestock.
11. The average farm size in Bhutan is a little over 1 hectare; women own 70% of the land.
12. 86% of farmers own livestock in Bhutan; about 10 percent of the country's population is dependent on yak production.
13. In Afghanistan, 68 % of households own some kind of livestock. For most Afghan farmers, animals are the only source for power for cultivation and transport.

Table 1: Selected statistics demonstrating the significance of agriculture in South Asian economies

Country	% labor force in agriculture[6]	% population living in rural areas	Agricultural GDP[7] (as % of total GDP)
Afghanistan	59.4%	Over 75 %	29.9%
Bangladesh	44 %	80% (57% landless)	18.6% (fisheries 4.4% of GDP)[8]
Bhutan	92.8 %	85 %	18.7%
India	54 %	69%	17.7% (fisheries 1.1% of GDP)[9]
Nepal	92.9 %	92.9%	36.5%
Maldives	17.8 % (30% in fisheries)	57.4%	3.1%[10] (fisheries 15% of GDP)[11]
Pakistan	38.6 %	63%	21.2%
Sri Lanka	43 %	80%	12.8% (fisheries 1.7% of GDP)[12]

Problems of agriculture in South-Asian Countries:

1. Inequality in Land Distribution and Fragmentation of holdings:

- The distribution of agricultural land in South-Asia has not been fairly distributed. Rather there is a considerable degree of concentration of land holding among the rich landlords, farmers and money lenders throughout the country. But the vast majority of small farmers own a very small and uneconomic size of holdings, resulting to higher cost per units. Moreover, a huge number of landless cultivators has been cultivating on the land owned by the absentee landlords, leading to lack of incentives on the part of these cultivators.
- The size of agricultural holding is quite uneconomic, small and fragmented. There is continuous sub-division and fragmentation of agricultural land due to increasing pressure of population and breakdown of the joint family system and also due to forced selling of land for meeting debt repayment obligations. Thus the size of operational holdings has been declining year by year leading to increase in the number of marginal and small holdings and fall in the number of medium and large holdings
- Countries like India about 81% of holdings are less than 2 hectares in size with an average size of 1.4 hectares, the average size of holdings in Bangladesh is only 0.5 hectares and small farms account for 96% of operational holdings, the average size of holdings in Sri Lanka is 0.8 hectares, the average size of holdings in Nepal is 0.8 hectares, with nearly half less than 0.5 hectare, the average size of Pakistani landholding is 3.0 hectares, with 58% of farms less than 2 hectares in size. However, less than half of rural households own agricultural land etc.

2. Land Tenure System:

- The land tenure system practiced in most of the South-Asian countries and is suffering from lots of defects. Insecurity of tenancy was a big problem for the tenants. Although the land tenure system has been improving day-by-day after the introduction of various land reforms measures but the problem of insecurity of tenancy and eviction still prevails to some extent due to the presence of absentee landlords and benami transfer of land in various regions of those countries.

3. Cropping Pattern:

- The cropping pattern which shows the proportion of the area under different crops at a definite point of time is an important indicator of development and diversification of the sector .Food crops and non-food or cash crops arc the two types of crops produced by the agricultural sector of the country. As the prices of the cash crops are becoming more and more attractive therefore, more and more land have been diverted from the production of food crops into cash or commercial crops. This has been creating the problem of food crisis in the South-Asian countries.Thus after 50 years planning the India has failed to evolve a balanced cropping pattern leading to faulty agricultural planning and its poor implementation.

4. Instability and Fluctuations:

- South-Asian agriculture is continuously subjected to instability arising out of fluctuations in weather and gamble of monsoon. As a result, the production of food-grains and other crops fluctuates widely leading to continuous fluctuation of prices of agricultural crops.

5. Conditions of Agricultural Labourers:

- Agricultural labourers are the most exploited unorganized class in the rural population of the country .From the very beginning landlords and Zamindars exploited these labourers for their benefit and converted some of them as slaves or bonded labourers and forced to continue the system generation after generation. All these led to wretched condition and total deprivation of the rural masses.
- After 50 years of independence, in India the situation has improved marginally. But as they remain unorganized, thus economic exploitation of these workers continues. The level of income, the standard of living and the rate of wages remained abnormally low. Total number of agricultural workers has increased from 55.4 million in 1981 to 74.6 million in 1991 which constituted nearly 23.5 per cent of the total working population of the country. This increasing number has been creating the problem of surplus labour or disguised unemployment, which in turn is pushing (heir wage rates below the subsistence level.

6. Poor Farming Techniques and Agricultural Practices:

- The farmers in India have been adopting orthodox and inefficient method and technique of cultivation. It is only in recent years that the Indian farmers have started to adopt improved implements like steel ploughs, seed drills, barrows, hoes etc. to a limited extent only. Most of the farmers were relying on centuries old. Wooden plough and other implements. Such adoption of traditional methods is responsible for low agricultural productivity in the country.

7. Inadequate Use of Inputs:

- Indian agriculture is suffering from inadequate use of inputs like fertilizers and HYV seeds. Indian farmers are not applying sufficient quantity of fertilizers on their lands and even the application of farm yard dung manure is also inadequate. Indian farmers are still applying seeds of indifferent quality. They have no sufficient financial ability to purchase good quality high yielding seeds. Moreover, the supply of HYV seeds is also minimum in the country.

8. Inadequate Irrigation Facilities:

- South-Asian agriculture is still suffering from lack of assumed and controlled water supply through artificial irrigation facilities.Thus the farmers have to depend much upon rainfall which is neither regular nor even. Whatever irrigation potential that has been developed , a very limited number of our farmers can avail the facilities.
- In spite of vigorous programme of major and minor irrigation projects undertaken by India since 1951, the proportion of irrigated land to total cropped area now comes to about 53 per cent in 1998-99. Therefore, in the absence of assured and controlled water supply, the agricultural productivity in India is bound to be low.

9. Absence of Crop Rotation:

- Proper rotation of crops is very much essential for successful agricultural operations as it helps to regain the fertility of the soil. Continuous production of cereals on the same plot of land reduces the fertility of the soil which may be restored if other crops like pulses, vegetables etc. are grown there.
- As the farmers are mostly illiterate, they are not very much conscious about the benefit of crop rotation. Therefore, land loses its fertility to a considerable extent.

10. Lack of Organized Agricultural Marketing:

- Indian farmers are facing the problem of low income from their marketable surplus crops in the absence of proper organized markets and adequate transportation facilities. Scattered and sub-divided holdings are also creating serious problem for marketing their products.
- Agricultural marketing in India is also facing the problem of marketing farmers' produce in the absence of adequate transportation and communication facilities, Therefore, they fell into the clutches of middlemen for the speedy disposal of their crops at an uneconomic and cheaper price.

11. Instability in Agricultural Prices:

- Fluctuation in the prices of agricultural products poses a big threat to Indian agriculture. For the interest of the farmers, the Government should announce the policy of agricultural price support so as to contain a reasonable income from agricultural practices along with providing incentives for its expansion. Stabilization of prices is not only important for the growers but also for the consumers, exporters, agro-based industries etc.
- In India, the movements of prices of agricultural products are neither smooth nor uniform, leading a fluctuating trend. In the absence of proper price support and marketing support, prices of agricultural products has to go down beyond the reasonable limit so as to create a havoc on the financial conditions of the gain the exorbitant prices charged by the middlemen on agricultural crops also pose a serious threat to the consumers. Thus price, fluctuation may lead to disaster as both falling and rising prices of agricultural crops are having its harmful impact on the society as well as on the economy of the country.

12. Agricultural Indebtedness:

- One of the greatest problems of Indian agriculture is its growing indebtedness. The rural people are borrowing a heavy amount of loan regularly for meeting their requirements needed for production, consumption and also for meeting their social commitments. Thus the debt passes from generation to generation. Indian farmers fall into the debt trap as a result of crop failure, poor income arising out of low prices of crops, exorbitantly high rate of interest charged by the moneylenders, manipulation and use of loan accounts by the moneylenders and use of loan for various unproductive social purposes.
- Although they borrow every year but they are not in a position to repay their loans regularly as because either loans are larger or their agricultural production is not sufficient enough to repay their past debt. Thus the debt of farmers gradually increases leading to the problem of rural indebtedness

in our country. Thus it is quite correct to observe that "Indian farmer is born in debt, lives in debt and dies in debt."

13. Adverse terrain condition:

- Some regions of South-Asia have adverse terrain characteristics to develop a proper food crop production site .Such as ,in Bhutan 86% of farmers have own livestock and about 10 percent of the country's population is dependent on yak production.
- In Afghanistan, 68 % of households have own some kind of livestock. For most Afghan farmers, animals are the only source for power for cultivation and transport.

14. Adverse effects of Climate change :

- According to the Intergovernmental Panel on Climate Change (IPCC), climate change refers to any change in climate over time, whether due to natural variability or as a result of human activity (IPCC, 2001). Therefore, climate change is partly due to the natural variability and partly due to the human activity.
- An immediate increases in the temperature after 1970's can be attributed to human activities causing an increase in greenhouse gases (GHGs) into the atmosphere that are responsible for most of the warming of at least last 50 years (IPCC 2001).
- A majority of nations, particularly developing nations, have been affected by the impacts of climate change hence having a devastating effect on the economies of these countries. Evidences suggest that climate change is affecting a large number of people across South Asia in different ways. This includes increased variability in both monsoon and winter rainfall pattern; increase in average temperature, with warmer winters; increased salinity in coastal areas as a result of rising sea level and reduced discharge from major rivers; weakening ecosystems; the recession of glaciers in the Himalayas; and increased frequency and/or severity of extreme weather events (floods, cyclones, droughts).
- The region is particularly vulnerable to climate change owing to high population density and concentrated poverty, and existing climate variability. Hence climate change has the potential to compound the prevailing development problems and increase pressure on key resources needed to sustain growth in South Asia (Sterrett 2011; Abbas 2009).

- In India, more than three-fifth of the area is rain-fed and hence the contribution of agriculture to the economy depends highly on rainfall. In the event of rain failure, the worst affected are the landless and the poor whose sole source of income is from agriculture and allied activities like forestry, lodging and fishing. It has been projected that due to the rise in temperature, India's wheat yields can go down by 2 percent in a pessimistic scenario (GoI 2004). Kavi Kumar and Parikh (2001) show that with a 2 degree rise in temperature, and mean precipitation increase of 7 percent, the net revenue from agriculture sector will reduce by 8.4 percent. Lal (2007) also shows that temperature rise is expected to lessen yield of important crops such as wheat and rice in parts of South Asia where they are cultivated close to their upper temperature threshold. Cereals production is expected to decline at least by 4-10 percent by the end of 21st century.

15. Temperature variations on crop yields:

- Temperature is significant for a range of crop physiological processes, the most important being pollination and grain filling, as well as basic photosynthesis. High temperatures, whether lasting over a series of days or an extreme spike of several hours, can have serious negative effect on these processes, with downstream consequences for crop yields. Especially sensitive are the reproductive organs; extreme heat events of even short duration during flowering or pollination can severely reduce a harvest. The current projections for the region of an "increase in extreme heat affecting 10 percent of total land area by 2020 and 15 percent by 2030 poses a high risk to crop yields." Temperature increases will affect yields of most of the major staple crops in the region, including wheat, maize, rice, and potatoes:

- "Compared to calculations of potential yields without historic trends of temperature changes since the 1980s," scientists have shown reductions already in global maize and wheat production, over the period from 1980-2008, by 3.8% and 5.5% respectively.
- In a similar study, scientists find that "rice and wheat yields have declined by approximately 8 percent for every 1°C increase in average growing-season temperatures."
- Another study "found that warmer nights and lower precipitation at the end of the growing season has caused a significant loss of rice production in India: yields could have been almost 6 percent higher without the historic change in climatic conditions."
- Potato production in the region is also threatened. As potatoes are better suited to cooler temperatures, "steadily rising temperatures are likely to reduce potato yields in places where people already struggle to meet basic nutritional needs," such as India.

16. Fluctuation of water availability on agriculture:

- Authors of the recent World Bank report, Turn down the heat, warn that the South Asia region is "highly vulnerable even at warming of less than 2°C given the significant areas affected by droughts and flooding at present temperatures."
- Changes in the timing and strength of the monsoons, which account for more than 70 percent of the region's annual precipitation, threaten rainfed crops and livelihoods dependent upon them. "Under future climate change, the frequency of years with above normal monsoon rainfall and of years with extremely deficient rainfall is expected to increase."
- Impacts on the monsoons are likely already happing: "recent studies indicate a decline of as much as 10 percent in South Asian monsoon rainfall since the 1950s." World Bank authors also note that "droughts are expected to pose an increasing risk in parts of the region, particularly Pakistan, while increasing wetness is projected for southern India."

Strategies to address the Climate Change impacts: Role of technology and best practices:

- Dealing with the impacts of climate change in the agriculture sector would mean: developing cultivars tolerant to heat and salinity stress and resistant to flood and drought, modifying crop management practices, improving water management, adopting new farm techniques such as resource conserving technologies, crop diversification, improving pest management, better weather forecasting, and harnessing indigenous technical knowledge of farmers.
- India with its infrastructure of research institutes has been involved in developing new crop varieties with higher yield potential and resistance to multiple stresses. Germplasm research and their improvement is an important aspect of such programmes involved in the development of multiple stress resistant crops. In addition, improvements in water use and nitrogen efficiencies are also part of the research. Under the future climate change scenarios these research programmes become more crucial for addressing the adverse effects of climate change.
- Diversification of crop and livestock varieties, including replacement of plant types, cultivars, hybrids and animal breeds with new varieties intended for higher drought or heat tolerance is being advocated as having potential to increase productivity in the face of temperature and moisture stresses. Diversification from rice-wheat towards high value commodities will increase income and result in reduced water and fertilizer use. A significant limitation of diversification is that it is costly in terms of income opportunities that farmers forego. So switching crop diversification can be costly and may be typically less profitable, especially in the short run.