The Problems of Agriculture in the Indian Context

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Abstract
This paper discusses the status of agriculture in the Indian context – the problems the industry faces, the historical context of agriculture and agrarian life, why it is important to go back, review the traditional practices we have discarded; why it is again important to pioneer new practices and methods which are sustainable and feasible. The problems associated with agriculture boils down to one simple issue - post independent policies that promoted Green revolution. Under green revolution, traditional agricultural practices all of a sudden became associated with primitive, outdated modes of cultivation and came chemical, mechanized, efficient, modern western practices. The pioneers of Green Revolution wouldn’t have imagined the kind of impact it would have on our lives – the loss of soil fertility, the loss of biodiversity, the disappearance of local species and breeds, farmers’ suicides etc. These issues are discussed in detail in this paper. Another issue we have looked at is the impending food crisis that everyone is talking about. With the introduction of Green revolution, the Indian farmers have successfully produced over 130 million metric tons of rice and 80,000 million metric tons of wheat. However, we have not been successful in feeding all the mouths in India. Thus 5 million people die annually due to starvation. With more and more people moving away from farming, with more and more arable land lost to development, with more and more land becoming uncultivable, India could easily be facing a food crisis in the future. Also the rate of farmer suicides is climbing up to a suicide every half an hour. Why are they committing suicides? This along with the various solutions combining sustainability and economics is included in the last section of the paper.

Keywords: Green revolution, sustainability, species and breeds, cultivation.

Introduction
The performance of Agriculture in India is important as the sector not only contributes to overall growth of the economy but also provides employment and food security to majority of the population in the country. The 11th Five Year Plan also indicates that agricultural development is an important component of inclusive growth approach. Structural reforms were introduced in India in a big way in 1991. These reforms were followed by India becoming founder member of WTO in 1994. The structural reforms and obligations of WTO have positive and negative effects on Indian agriculture. India is largely an agricultural country. Eighty per cent of her vast populations live, directly or indirectly, on income derived from agriculture. But to say that India lives by agriculture does not mean that India is agriculturally advanced. Rather she is extremely backward in this respect. Her annual yield of crops per acre is lamentably below what it ought to be. There was a time when small plots of land, cultivated by individual farmers who followed age-old methods, summed up the position of Indian agricultural system. The employment of scientific technique, especially in America and Russia, has achieved tremendous progress. In the first place, machines have superseded manual labour. That means a larger acreage is brought under cultivation in more efficient manner. Secondly, the fertility of the soil has been increased by scientific, i.e. chemical manuring. Thirdly, new crops of a better quality and higher yield have been introduced. Fourthly, highly improved methods of irrigation and crop-protection and storing have been adopted.

Fortunately, India in recent times has brought about a Green Revolution, resulting not only in self-sufficiency but also surplus production of food. India has now a huge buffer stock of foodstuffs and she is in a position to export food grains.
There are other problems connected with our soil organization. There is the problem of agricultural indebtedness.

It is necessary to modernize the antiquated outlook of our peasants. This is not to be done by a few touring officers delivering lectures. Establishment of Gramin Banks and the village Panchayets has largely improved the situation. Still much remains to be done. Large numbers of trained officers with modern equipment are necessary to ensure a new outlook.

All this needs far-sighted planning. When the ownership of land is restored to the cultivators, and determined efforts are made to modernize their outlook, agriculture in India will flourish much more. It is good, therefore, that the abolition of private proprietary rights in lands is being followed by Plans to introduce cooperative farming.

It is a good sign that the claims of agriculture have been taken into adequate consideration in our successive Five-Year Plans. Now greater emphasis has been placed on the development of agriculture than ever before.

**Literature View:**


This review seeks to provide an accurate and up-to-date picture of the information sources available on the ‘social impacts’ of cotton cultivation in ten focus countries, identified as the largest producers by volume. These countries are: China, India, USA, Pakistan, Brazil, Uzbekistan, Turkey, Greece, Syria and Burkina Faso.

‘Social impacts’ are understood in this review to connote two categories of information:

First, data on the ‘positive’ impacts relating to the role of cotton production in creating jobs and supporting livelihoods, and second, on the ‘negative’ impacts relating to illegal or unsustainable labour practices. Consistent with the ICAC (2006) definition 1, sustainable production is understood through this report as ‘the ability to produce cotton today without diminishing the ability of future generations to produce cotton’.

(ii). Preliminary Literature Review on Small Farmer Credit Problems

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This study on small farmer credits shows that not much progress has been attained in most of the current agricultural credit programs which are carried out in developing countries. Failures have been largely attributed to many factors but the frequent causes are the result of lack of initial data to work from, interest rate ceilings, lack of specific studies on the characteristics of small farmer population and credit agency personal deficiencies.

(iii). Literature review of mitigation and adaptation measures to climate change impacts in tropical river basins, with focus on India:

This study shows that, to improve water use efficiency in agriculture is one option to deal with scarce water resources. The objective is to obtain more crops per drop. One possible way to go is to increase irrigation efficiencies by changing field water application and invest in the rehabilitation of irrigation works like lining of canal systems and improvements of water distribution systems.

However, careful studies have to be carried out on the present use of water. An overview has to be made, especially in the rural areas, where and how irrigation water is used and who the water users are. Often inefficient irrigation water use application can be noticed in the field and immediate decisions can be made to improve the utilization of water the farmer gets delivered through the open canal system to the field. Also seepage to groundwater and direct losses from
irrigation canals not necessarily has to be considered as a loss. The inefficient use of water in an irrigation project might well be used at other locations by farmers profiting from this inefficient use of irrigation water. Any improvements and the subsequent diversion of the “so-called” gained water to others area can therefore have serious consequences for already existing activities.

(iv). The Adoption of Agricultural Innovations: A Review by Gershon Feder and Dina L. Umali

This paper reviews the theoretical and empirical literature on the adoption of agricultural innovations during the last decade and the impact of policy interventions promoting technology adoption. The analysis of the final stage of the Green Revolution technology diffusion cycle reveals that the agro climatic environment is the most significant determinant of location differences in adoption rates. The linkage between micro-adoption and the aggregate diffusion process needs to be more firmly established to achieve a clearer understanding of diffusion patterns. Several studies showed that the impact of policy interventions to promote technology adoption depend on the type of technology, market structure, and the nature and duration of the policy intervention.

Problems

Farmers manually harvesting rice in southern India

A rural market in India - farmers with limited marketing options sell their surplus produce
India lacks cold storage, food packaging as well as safe and efficient rural transport system. This causes one of the world’s highest food spoilage rates, particularly during Indian monsoons and other adverse weather conditions. Food travels to the Indian consumer through a slow and inefficient chain of traders. Indian consumers buy agricultural produce in suburban markets known as 'sabzi mandi' such as one shown or from roadside vendors.

Cotton flower in India. This is the main cash crop in Vidarbha region.

Indian agriculture includes a mix of traditional to modern farming techniques. In some parts of India, traditional use of cattle to plough farms remains in use. Traditional farms have some of the lowest per capita productivities and farmer incomes.

"Slow agricultural growth is a concern for policymakers as some two-thirds of India’s people depend on rural employment for a living. Current agricultural practices are neither economically nor environmentally sustainable and India's yields for many agricultural commodities are low. Poorly maintained irrigation systems and almost universal lack of good extension services are among the factors responsible. Farmers' access to markets is hampered by poor roads, rudimentary market infrastructure, and excessive regulation."

—World Bank: "India Country Overview 2008"

"With a population of just over 1.2 billion, India is the world’s largest democracy. In the past decade, the country has witnessed accelerated..."
economic growth, emerged as a global player with the world’s fourth largest economy in purchasing power parity terms, and made progress towards achieving most of the Millennium Development Goals. India’s integration into the global economy has been accompanied by impressive economic growth that has brought significant economic and social benefits to the country. Nevertheless, disparities in income and human development are on the rise. Preliminary estimates suggest that in 2009-10 the combined all India poverty rate was 32% compared to 37% in 2004-05. Going forward, it will be essential for India to build a productive, competitive, and diversified agricultural sector and facilitate rural, non-farm entrepreneurship and employment. Encouraging policies that promote competition in agricultural marketing will ensure that farmers receive better prices."

—World Bank: "India Country Overview 2011

A 2003 analysis of India’s agricultural growth from 1970 to 2001, by Food and Agriculture Organization of the United Nations, identified systemic problems in Indian agriculture. For food staples, the annual growth rate in production during the six-year segments 1970-76, 1976-82, 1982-88, 1988-1994, 1994-2000 were found to be respectively 2.5, 2.5, 3.0, 2.6, and 1.8 percent per annum. Corresponding analyses for the index of total agricultural production show a similar pattern, with the growth rate for 1994-2000 attaining only 1.5 percent per annum. The low growth rates may constitute in part a response to inadequate returns to Indian farmers. India has very poor rural roads affecting timely supply of inputs and timely transfer of outputs from Indian farms, inadequate irrigation systems, crop failures in some parts of the country because of lack of water while in other parts because of regional floods, poor seed quality and inefficient farming practices in certain parts of India, lack of cold storage and harvest spoilage causing over 30% of farmer's produce going to waste, lack of organized retail and competing buyers thereby limiting Indian farmer's ability to sell the surplus and commercial crops. The Indian farmer receives just 10 to 23 percent of the price the Indian consumer pays for exactly the same produce, the difference going to losses, inefficiencies and middlemen traders. Farmers in developed economies of Europe and the United States, in contrast, receive 64 to 81 percent of the price the local consumer pays for exactly the same produce in their supermarkets. Even though, India has shown remarkable progress in recent years and has attained self sufficiency in food staples, the productivity of Indian farms for the same crop is very low compared to farms in Brazil, the United States, France and other nations. Indian wheat farms, for example, produce about a third of wheat per hectare per year in contrast with wheat farms in France. Similarly, at 44 million hectares, India had the largest farm area under rice production in 2009; yet, the rice farm productivity in India was less than half the rice farm productivity in China. Other food staples productivity in India is similarly low, suggesting a major opportunity for growth and future agricultural prosperity potential in India. Indian total factor productivity growth remains below 2 percent per annum; in contrast, China has shown total factor productivity growths of about 6 percent per annum, even though China too has smallholding farmers. If India could adopt technologies and improve its infrastructure, several studies suggest India could eradicate hunger and malnutrition within India, and be a major source of food for the world.

Indian farms are not poor performing for every crop. For some, Indian farms post the best yields. For example, some of India's regions consistently posts some of the highest yields for sugarcane, cassava and tea crops every year. Within India, average yields for various crops vary significantly between Indian states. Some Indian states produce two to three times more grains per acre of land than the grain produced in same acre of land in other Indian states. The table compares the statewide average yields for a few major agricultural crops within India, again for 2001-2002 agricultural year.
Crop yields for some farms within India are within 90% of the best achieved yields by farms in developed countries such as the United States and in European Union. No single state of India is best in every crop. Indian states such as Tamil Nadu achieve highest yields in rice and sugarcane. Haryana enjoys the highest yields in wheat and coarse grains. Karnataka does well in cotton, Bihar does well in pulses, while other states do well in horticulture, aquaculture, flower and fruit plantations. These differences in agricultural productivity within India is a function of local infrastructure, soil quality, micro-climates, local resources, farmer knowledge and innovations. However, one of the serious problems in India is the lack of rural road network, storage, logistics network, and efficient retail to allow free flow of farm produce from most productive but distant Indian farms to Indian consumers. Indian retail system is highly inefficient. Movement of agricultural produce within India is heavily and overly regulated, with inter-state and even inter-district restrictions on marketing and movement of agricultural goods. The talented and efficient farms are currently unable to focus on the crops they can produce with high yields and at lowest costs.

One study suggests Indian agricultural policy should best focus on improving rural infrastructure primarily in form of irrigation and flood control infrastructure, knowledge transfer in forms of better yielding and more disease resistant seeds with the goal of sustainably producing as many kilograms of food staples per hectare as already produced sustainably in other nations. Additionally, cold storage, hygienic food packaging and efficient modern retail to reduce waste can also dramatically improve India’s agricultural output availability and rural incomes.

The low productivity in India is a result of the following factors:

- The average size of land holdings is very small (less than 2 hectares) and is

<table>
<thead>
<tr>
<th>Crop</th>
<th>Average farm yield in Bihar</th>
<th>Average farm yield in Karnataka</th>
<th>Average farm yield in Punjab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>2020 kilogram per hectare</td>
<td>unknown kilogram per hectare</td>
<td>3880 kilogram per hectare</td>
</tr>
<tr>
<td>Rice</td>
<td>1370 kilogram per hectare</td>
<td>2380 kilogram per hectare</td>
<td>3130 kilogram per hectare</td>
</tr>
<tr>
<td>Pulses</td>
<td>610 kilogram per hectare</td>
<td>470 kilogram per hectare</td>
<td>820 kilogram per hectare</td>
</tr>
<tr>
<td>Oil seeds</td>
<td>620 kilogram per hectare</td>
<td>680 kilogram per hectare</td>
<td>1200 kilogram per hectare</td>
</tr>
<tr>
<td>Sugarcane</td>
<td>45510 kilogram per hectare</td>
<td>79560 kilogram per hectare</td>
<td>65300 kilogram per hectare</td>
</tr>
</tbody>
</table>
subject to fragmentation due to land ceiling acts, and in some cases, family disputes. Such small holdings are often over-manned, resulting in disguised unemployment and low productivity of labour. Some reports claim smallholder farming may not be cause of poor productivity, since the productivity is higher in China and many developing economies even though China smallholder farmers constitute over 97 percent of its farming population. Chinese smallholder farmer is able to rent his land to larger farmers, China's organized retail and extensive Chinese highways are able to provide the incentive and infrastructure necessary to its farmers for sharp increases in farm productivity.

- Adoption of modern agricultural practices and use of technology is inadequate, hampered by ignorance of such practices, high costs and impracticality in the case of small land holdings.
- According to the World Bank, Indian Branch: Priorities for Agriculture and Rural Development”, India's large agricultural subsidies are hampering productivity-enhancing investment. Overregulation of agriculture has increased costs, price risks and uncertainty. Government intervenes in labour, land, and credit markets. India has inadequate infrastructure and services. World Bank also says that the allocation of water is inefficient, unsustainable and inequitable. The irrigation infrastructure is deteriorating. The overuse of water is currently being covered by over pumping aquifers, but as these are falling by foot of groundwater each year, this is a limited resource.
- Illiteracy, general socio-economic backwardness, slow progress in implementing land reforms and inadequate or inefficient finance and marketing services for farm produce.
- Inconsistent government policy. Agricultural subsidies and taxes often changed without notice for short term political ends.
- Irrigation facilities are inadequate, as revealed by the fact that only 52.6% of the land was irrigated in 2003–04, which result in farmers still being dependent on rainfall, specifically the Monsoon season. A good monsoon results in a robust growth for the economy as a whole, while a poor monsoon leads to a sluggish growth. Farm credit is regulated by NABARD, which is the statutory apex agent for rural development in the subcontinent. At the same time over pumping made possible by subsidized electric power is leading to an alarming drop in aquifer levels.
- A third of all food that is produced rots due to inefficient supply chains and the use of the "Walmart model" to improve efficiency is blocked by laws against foreign investment in the retail sector.

In a synchronized way we can reveal that the major problems confronting Indian agriculture are those of population pressure, small holdings, depleted soils, lack of modern technology and poor facilities for storage.

(a) Population Pressure:

India has a huge population of over one billion and it is increasing at a very fast rate. According to 2001 census figures the over all density of population is 324 persons per sq. km. This is likely to increase further in future. This has created great demand for land. Every bit of land has been brought under the plough. Even the hill slopes have been cut into terraces for cultivation.

(b) Small and Fragmented Land Holdings:

The pressure of increasing population and the practice of dividing land equally among the heirs has caused excessive sub divisions of farm holdings. Consequently, the holdings are small and fragmented. The small size of holdings makes farming activity unecomonical and leads to social tension, violence and discontentment.
(c) Inadequate Irrigation Facilities:

By and large the irrigation facilities available in India are far from adequate. So for half of the total area under food crops has been brought under irrigation and the remaining half is left to the mercy of monsoon rains which are erratic in time and space.

(d) Depleted Soils:

Indian soils have been used for growing crops for thousands of years which have resulted in the depletion of soil fertility. With deforestation the sources of maintaining natural fertility of soil has been drying out. Lack of material resources and ignorance of scientific knowledge have further depleted the soils of the natural fertility. Earlier only animal waste was enough to maintain soil fertility.

(e) Storage of food grains:

Storage of food grains is a big problem. Nearly 10 per cent of our harvest goes waste every year in the absence of proper storage facilities. This colossal wastage can be avoided by developing scientific warehousing facilities. The government has taken several steps to provide storage facilities.

(f) Farm Implements:

Although some mechanization of farming has taken place in some parts of the country, most of the farmers are poor and do not have enough resources to purchase modern farm implements and tools. This hampers the development of agriculture.

Conclusion

Basically in this paper we discuss the status of agriculture in the present Indian context – the problems the industry faces, the historical context of agriculture and agrarian life, why it is important to go back, review the traditional practices we have discarded; why is it again important to pioneer new practices and methods which are sustainable and feasible. This paper suggests that Indian agricultural policy should best focus on improving rural infrastructure primarily in form of irrigation and flood control infrastructure, knowledge transfer in forms of better yielding and more disease resistant seeds with the goal of sustainably producing as many kilograms of food staples per hectare as already produced sustainably in other nations. Additionally, cold storage, hygienic food packaging and efficient modern retail to reduce waste can also dramatically improve India’s agricultural output availability and rural incomes.

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