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Low productivity of Indian agriculture with special reference on cereals

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Abstract

In this review paper we mentioned about the situation of productivity of Indian agriculture, with chief concern on productivity of cereals in India. Since 15 years India is standing on top position in area under cereals cultivation. Although, India standing on top position in total area under cereals, the productivity of cereals is not so satisfying, comparing with other nations with less area under cereals. Here we tried to explain the concept of agriculture productivity and reasons for low productivity in India under twelve sub-sects and need for improve the Productivity. Also, we have mentioned the strategies to overcome the problem of low productivity.

Keywords: India, Low Agricultural Productivity, Cereals, Strategy.

Introduction

Agriculture has been the backbone of the Indian economy and it will continue to remain so for a long time. It has to support 17 per cent of world population from 2.3 per cent of world geographical area and 4.2 per cent of world's water resources ^[1]. In India between 1965-66 and 2010-11, total food grain production was increased by over 230 per cent. During this period, rice production increased from 30.59 MT to 95.32 MT – a straight line growth of over 211 per cent; wheat production performed substantially better, increasing from 10.40 MT to 85.93 MT – a growth of 726 per cent; while coarse cereals (increasing from 21.42 MT to 43.68 MT) registered growths of 103 per cent in same period ^[2].

Understanding Agricultural Productivity

Productivity of land is a very important factor of agriculture because it is the most permanent and fixed factor among the three categories of input; land, labor and capital. Agricultural productivity of land is explained by production of crops in terms of output or yield per unit of land ^[3].

Formula

Agriculture productivity = Total agriculture crop production/Total land area (hectares)

Agricultural productivity is measured as the ratio of agricultural outputs to agricultural inputs ^[4]. While individual products are usually measured by weight; their varying densities make measuring overall agricultural output difficult.

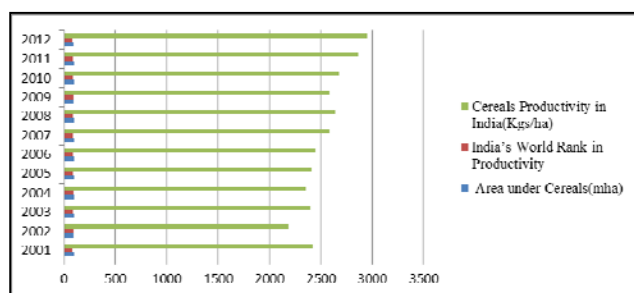
Agricultural Productivity of India

The nation is striving to find ways and means to keep its burgeoning population adequately fed. On the one hand it is facing the problem of declining productivity and on the other, challenges posed by liberalization ^[1]. Agricultural production has two components food grains and non-food grains. The former contributes approximately two-thirds of total agricultural production. As far as food grains output in concerned, the total production increased from 50.8 million tons in 1950-51 to 264.77 million tons in 2014-15 ^[5]. Now, the central challenge of Indian agriculture is low productivity, evident in modest average yields, especially in cereals and pulses. First, consider the main food grains – wheat and rice. These two cereals are grown on the most fertile and irrigated areas in the country. And they use a large part of the resources that the government channels to agriculture, whether water, fertilizer, power, credit or procurement under the MSP program. Even then, average yields of wheat and rice in India are much below that of China's – 46 per cent below in the case of rice and 39 per cent in the case of wheat and the situation of productivity of all the cereals are on par with rice and wheat ^[6].

Table 1: India's Rank in Area and Productivity of Cereals: [7]

Year	Area under Cereals in India(mha)	India's World Rank in Area	Cereals Productivity in India (Kgs/ha)	India's World Rank in Productivity
2001	100.7	1	2,423.07	82
2002	94.47	1	2,187.30	96
2003	98.60	1	2,399.45	86
2004	97.81	1	2,350.02	94
2005	99.52	1	2,411.57	91
2006	99.24	1	2,446.53	90
2007	100.83	1	2,583.33	89
2008	101.16	1	2,637.87	91
2009	97.17	1	2,580.83	95
2010	100.08	1	2,676.35	91
2011	100.52	1	2,863.83	89
2012	97.00	1	2,953.61	84

Compiled by author using data from www.nationmaster.com



*Compiled by author using data from www.nationmaster.com

Graph 1: India's Rank in Area and Productivity of Cereals:

This is not to say that Indian agricultural productivity in cereals has not improved over the years. Yield rates in major cereals like wheat have grown at a compounded annual growth rate of 1.8% from 1983 to 2012 and in rice by 1.71% over the same period. India uses the most land to grow rice and wheat. At Chinese levels of productivity, we could nearly double our output. If India increases its yield rates, it could drastically reduce the amount of land needed to produce the current quantity. For example, if India's yield rate in rice was at Chinese levels, we could halve the amount of land devoted to rice cultivation—freeing up that land for other purposes. For wheat, at Chinese levels of productivity, India's land use would come down by 36% to produce the same quantity we currently do [8].

Reasons for low productivity in India

Productivity levels in Indian agriculture are very low as compared to the productivity levels of other countries, in terms of global rank, the productivity levels of India in major agricultural crops is very disappointing. There are many reasons for low productivity in agriculture in India. The causes of low productivity are as given below:

(i) Excessive Pressure of Population on Land

India has experienced extraordinary population growth between 2001 and 2011. India added 181 million people to the world, slightly less than the entire population of Brazil. With increase in population Urbanization rate has been increased. In 2050 India's population is projected to be 1.69 billion [9]. This heavy pressure of population on land is caused by the limited growth of employment opportunities in the non-agricultural sector for rural people and rapid growth of rural population. The increasing population is largely responsible for subdivision, fragmentation of land holdings

that results into low productivity of land [5].

(ii) Social Environment

The social environment in terms of illiteracy, superstitious attitude and unresponsive behavior towards the new technology is also a major limiting factor to the improvement in the agricultural productivity. Further, the human factor engaged in the agriculture sector is most unsatisfactory due to poor health and hygiene conditions [5]. In India most of the small farmers are 'guided' by large farmers and agriculture input dealers on what to plant, when and how. A notable portion of farmers are not willing to grow the GMO (Genetically Modified Crops). What works for the large holder may not work for the small holder and input dealers have a conflict of interest [10].

(iii) Land Degradation

For an agricultural country like India, soil is a precious resource, and degradation- of soil is a serious problem, which leads to depletion of soil fertility. Soil erosion is the main form of degradation which occurs because of deforestation and unscientific agricultural practices like shifting cultivation. Increasing salinity, alkalinity and aridity because of mismanagement and repeated use are other reasons for loss of soil fertility. Also the excess unscientific methods of irrigation further harm the fertility levels of the soil [11].

(iv) Uneconomic Land Holdings

The State of the Indian Agricultural Report for 2012-2013 points out that: "As per Agriculture Census 2010-11, small and marginal holdings of less than 2 hectare account for 85 percent of the total operational holdings and 44 percent of the total operated area. Small farm sizes inhibit mechanization. This creates difficulties in application of modern inputs, adoption of scientific land improvement, water conservation and plant protection measures. The tardy progress of land reforms in most states has compounded this problem. Consolidation of land can help improve productivity [11].

(v) Uncertain Monsoons and Inadequate Irrigation Facilities

India has failed to provide irrigation support to its farmers. In 2000-01 about 43.4% of the cultivated land had irrigation facilities. Almost a whole decade later, in 2008-09, only 48.3% of the cultivated area came under irrigation [12]. Not surprisingly, Indian farmers are still exposed to the vagaries of the monsoons. Indian agriculture is thus rightly remarked as a gamble against monsoon. With more than half of the gross cropped area being rainfed, failure or inadequacy of rains causes fluctuation in yields. Even if the maximum irrigation potential is realized, around 86.5 mha of gross cropped area will remain under rainfed conditions. This underlines the need to develop rainfed agriculture on scientific lines [11].

(vi) Inability to use HYV Seeds

High yielding variety of seeds heralded the green revolution in India. Yet even in terms of wheat and rice only 86% and 74% of the total produce comes from HYV seeds. This is mainly because these HYV requires plenty of water in addition to pesticides and chemical fertilizer support. All these call for a fair investment, which becomes all the more risky due to the absence of assured irrigation facility and blind reliance on monsoons [11]. The efficacy of other agricultural inputs such as fertilizers, pesticides and irrigation is largely determined by the quality of the seed used. It is estimated that

quality of seed accounts for 20-25 percent of productivity. Hence timely availability of quality seeds at affordable prices to farmers is necessary for achieving higher agricultural productivity and production ^[13].

(vii) Unscientific Fertilizer Consumption

Unbalanced use of fertilizers is one of the biggest reasons for stagnant yields and depleting soil fertility. The average N: P: K ratio in the past two decades has been 7:3:1 against recommended 4:2:1^[14]. Consider paddy for example, India used a lot of fertilizer: 138.6 kg/hectare but failed to increase productivity to the levels of China or Vietnam. China, the most productive country in wheat and rice, used much less fertilizer than India, which was the second largest producer in both crop categories. Vietnam, which was ranked 2nd in paddy productivity, used the maximum fertilizer among the top 5 countries. Indonesia, which was 3rd in terms of productivity, used the least amount of fertilizer ^[15].

(viii) Incidence of Pests and Diseases

Insect pests, diseases, and weeds are the major factors limiting agricultural productivity growth. Pest problem is one of the major deterrents for achieving higher production in agriculture crops. It is estimated that herbivorous insects eat about 26 percent of the potential food production. India loses about 30% of its crops every year due to pests and diseases. The insect pests inflict crop losses to the tune of 40 percent in vegetable production. The production losses have shown an increasing trend over the years. In 1983, the losses due to insect pests were estimated worth Rs 6,000 crores which increased to Rs 20,000 crores in 1993 and to 29,000 crores in 1996 ^[16].

(ix) Capital Formation in Agriculture

Capital formation is vital for inclusive and sustainable growth of the agriculture and allied sector. The rate of growth of gross capital formation (GCF) in agriculture has shown a positive relation with the agricultural output. Public sector investment has been an important source of GCF in agriculture and an enabling factor in maintaining agricultural growth. For example, the relatively higher growth rate of agriculture between 2004-05 and 2007-08 was largely on account of measures taken to infuse public investment in the sector. The much-needed capital infusion in agricultural research and extension was facilitated by the implementation of schemes like Rashtriya Krishi Vikas Yojana (RKVY), National Horticulture Mission, National Agricultural Innovation Project, central support to state extension programmes, etc. As a consequence, the proportion of public sector GCF in agriculture increased between 2004-05 and 2006-07, after which it started falling in comparison to the private sector's share ^[17].

(x) Poor mechanization of farming

Instead of large mechanization in many parts of country with increased power availability for carrying out various agriculture operations from 0.3 Kw in 1971-72 to 14 Kw in 2003-04, still there are many parts in country where farm operations are depending on animal and human labour, which greatly reduces the productivity ^[18]. The tractor density in India is estimated to be about 27 tractors for 1,000 hectares in 2013-14 and this indicates an opportunity for the mechanization of agriculture in India ^[17].

(xi) Subsistence Nature of Farming

Indian agriculture is characterized by its subsistence nature,

i.e., most of the produce is directly consumed by the producers and surplus, if any, is generally low. This is because most Indian farmers, being poor, use outdated implements and technology, and are not able to afford costly inputs. This results in low levels of returns and meager incomes, which in turn means low savings and low levels of reinvestments. Thus, coupled with disguised unemployment is a vicious circle operates and stagnation in agriculture prevails ^[11].

(xii) Weakness in Policy Perspectives

Owing to a number of economic and political compulsions, the Indian strategy for agricultural growth remained preoccupied with the goal of achieving quick increases in food-grains production by concentrating the resources and efforts on the relatively better-endowed areas and strata of cultivators. A consequence of the approach has been the less-than-optimum allocation of the critically scarce inputs like water and fertilizers across crops and a group of farmers ^[11].

Strategies to Overcome the Low Productivity

Several measures have been adopted from the view of socio-economic angles to raise the productivity of Indian agricultural system.

(i) Consolidation of Holdings

Consolidation of holding is a first step towards the modernization of Indian agriculture and this should be done immediately by enacting proper legislation required in this regard. Uneconomic small farms should be properly consolidated and small fragmented holdings should also be consolidated by forming co-operatives and co-operative farming societies ^[19].

(ii) Overcoming Natural Factors

Proper steps should be undertaken to overcome various problems of agriculture resulted from natural factors. All these steps include extensive flood control measures, creation of adequate irrigation facilities and supplying adequate quantity of pesticides and insecticides ^[19].

(iii) Application of Modern Techniques

Indian farmers must apply modern techniques of cultivation by utilizing modern implements, applying adequate quantity of fertilizers, using high yielding variety of seeds, by adopting scientific rotation of crops and careful crop planning. Agricultural research should be carefully intensified and fruits of research should be made available to the Indian farmers ^[19].

(iv) Economic Measures

Economic measures must be adopted in order to make the Indian agriculture more remunerative. Proper steps must be undertaken for the improvement of farm organization and land management. Besides, steps must be taken for the establishment of different types of agro-based industries in rural areas; provision also be made for adequate credit and marketing facilities. Moreover, the Government must introduce minimum price support policy, guarantee minimum prices of the agricultural produce of the country and implement crop-insurance scheme to cover the various risks in agriculture ^[19].

(v) Human Development

For the improvement of agricultural productivity in India, the quality of farmers should be improved and they should be imparted with adequate general and technical education.

Adequate public health measures should also be undertaken in the rural areas. Farmers should shed off their fatalism and adopt themselves with changing ideas. Thus the agricultural productivity in India can be improved with the adoption of aforesaid measures in the agricultural sector of the country [19].

(vi) Proper Education

Positive efforts have been taken by the government to educate the illiterate poor farmers about the new methods of technical farming. All the marginal farmers and tillers must know how to introduce latest scientific technology in the cultivable lands. This will increase the productivity [20].

(vii) Package Programmes

Proper implementation of 'Package Programme' (i.e. irrigation, high yielding variety seeds chemical fertilizers, modern machineries etc. is necessary to increase the productivity of the soil. The effects of green revolution are huge All these not only increase the fertility of land, but change the single time crop producing land into multi-production. In India most the lands are unfertile and have no permanent water flowing system. Thus per hectare production is very poor. Therefore, the government has to take positive initiatives! Implements 'Package Programme' throughout every corner of the country. These will help to increase the fertility of the soil [20].

(viii) Crop Protection

According to agricultural scientists in India nearly 5% of the total crop production is destroyed by different insects, pests and diseases. Maximum farmers are ignorant about the use of insecticides and pesticides. Hence to increase productivity the government must take initiatives to start several programmes [20].

(ix) Adequate Credit and Marketing Facilities

To apply 'Package Programme' the farmers need adequate amount of low rate of interest credit facilities. Farmers should get easy loans at the beginning of the cultivation so that they can use all the modern technologies in the land and improve both crop production and productivity. Not only that, the government must pay proper attention to expand the agricultural market from remote corners villages to urban areas so that sufficient amount of marketable surpluses can be generated [20].

(x) Encouragement to the producers

Government must encourage the producers by giving various incentives like:

- (a) By giving agricultural subsidy;
- (b) Provide adequate credit facility;
- (c) Rendering price support;
- (d) Providing crop-insurance to the poor farmers;
- (e) Implementing land reform programmes countrywide;
- (f) Use of improved seeds, fertilizers, etc.
- (g) Implementing irrigation facilities; and
- (h) Expansion of technical know-how [20].

(xi) Research and Development

Government of India made Indian Council of Agricultural Research and several Agricultural Universities to organize several research and development programme for the improvement of cultivation. In West Bengal, Kalyani Krishi (Agriculture) Vishwavidyalaya (University) has been

introduced to initiate agricultural research and development [20].

Conclusion

India: a developing country benefiting from the green revolution technologies introduced in 1965-66, the per capita net availability of food grains per annum in India increased from 144.1 kg per capita per year in 1951 to a peak of 186.2 kg per capita per year in 1991. Post-1990s though, there is a clear decline in the per capita food grain availability which has declined to 160.1 kg per capita per year in 2010 [21]. But to feed the growing population, Both the area and Productivity should be increased as developing countries depend more on cereal grains for their nutritional needs than the developed world. Close to 60% of calories in developing countries are derived directly from cereals, with values exceeding 80% in the poorest countries [22]. This shows the importance to increase both the area and Productivity of cereal.

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