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An Indian Agriculture in Search of Second Green Revolution for Sustainable Livelihood of Small Farmer

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Abstract

India hosts over 20 percent of world's poor. In rural India most of the families are dependent on agriculture for their livelihood. Unfortunately, the natural resources such as land, livestock and water which are required for agriculture production are degraded due to over exploitation and unsound technologies. This is concern to focus on raising farm incomes. For this it is needed to launch the Second Green Revolution Through promotion of agri-horti-pastures on marginally productive, wasteland and livestock development, with a special focus on generation of gainful self-employment for the poor.

Keywords: Green Revolution, Sustainable livelihood, Agri-horti-pastures, Capacity building

Introduction

India has already established its advancement in space and nuclear technology and heavy engineering. The challenge is in now to sustain the growth and ensure economic prosperity, particularly in rural areas. Rural development in India requires priority because more than 65% of the population are still living in villages and over, 85% of the rural people are dependent on agriculture for their livelihood. In rural India the communities are unable to earn their livelihood due to declining land productivity, erratic monsoon, depleting forests, inefficient use of water resources and increasing population of unproductive livestock. While the decreasing crop yields are affecting the livelihood of rural population, environmental degradation poses a serious threat to improve the survival of future generation. Hence, it is necessary to develop a suitable strategy to improve the economy of rural sector through agricultural development and sustainable use of natural agro resources.

Agriculture contribution in the gross domestic product is declining in India, which in 2008-09 touched at 15.7% from about 30% in 1990-91. But the proportion of workforce engaged in agriculture did not commensurate with the decline of its share in the gross domestic product. At present also, agriculture Sector provides employment to about 52% of the workforce. During the last two decades, the average annual growth of agriculture sector was less than half (around 3 percent) of the overall average growth of the economy (6-7 percent). Nearly one-third of the country's population lives below poverty line, and about 80 percent of our land mass is highly vulnerable to drought, floods and cyclones.

Therefore, the policy makers and agriculture experts have been urging for the Second Green Revolution to accelerate growth in the agriculture sector. However, the task is more challenging as the potentials for enhancing crop yields have already been exhausted in the fertile agricultural belts covered under assured irrigation.

Prime Minister, in his address to The Indian National science congress in Hyderabad in January, 2006 called for a Second Green Revolution. This concern focused on raising farm incomes and not securing the food supply. He called for a fresh emphasis on fruits, vegetables and new plant varieties.

Objective of the Study

The purpose of this paper is to examine the need to launch Second Green Revolution through promotion of agri-horti-pastures on marginally productive and wastelands and livestock development, particularly dairy husbandry, with a special focus on generation of gainful self-employment for the small farmers.

Data Source and Methodology

The necessary data and information for the study have been drawn from various reports from different national and international agencies. The scopes of the study have been severely constrained by the available information. Simple tools like percentages, ratios and averages and used.

Why Second Green Revolution

In the 70s, India was successful in creating a Green Revolution, which gave a boost to the agriculture sector across country. Green Revolution accelerate the fields of major food crops such as paddy, wheat, millets and oil seeds, particularly in the states of Punjab, Haryana, parts of UP and Rajasthan. In the Green revolution era, which began in the late 60s and early 70s, increase in productivity became the main aim. The food grains production increase to a level of 257.32 million tons in 2012-13 from 89.36 million tons in 1964-65. The fruits of the Green Revolution however did not fully trickle down to the dry and marginal rural farmlands to make any significant dent in the lives of the poorest inhabitants of these areas. It mostly covered the relatively better endowed regions like Punjab and had its impact mainly on cereals more responsive to inputs such as fertilizers and irrigation. The farmers who could not afford the inputs were left behind.

During the past two decades agriculture as percentage of GDP is declining where as the demand for the food grains is increasing. The share of service sector is rising (68.6 percent) whereas the agricultural sector share is declining. A notable feature of current growth rate is that the production of food grains is 2.80 percent per annum in pre- reform period (from 1970-71 to the end of the 1990s) which declined to 1.98 percent in post- reform period (from 1991-92 to 2008-09). It is also important that there will be the substantial increase in demand for food grains up to 2030 (355 million tons) and the demand for high-value commodities (such as horticulture, dairy livestock and fish) is increasing faster than food grains as shown in **Table 1 & 2**.

Table 1

Projected demand for food grains in 2000 and 2030 (in million tons)				
Year	Rice	Wheat/ Cereals	Pulses	Food grains
2000	81	64/33	14	192
2030	156	95/102	30	355

Table 2

The Demand for high-value commodities in 2000 and 2030 (in million tons)						
Year	Meat	Fish	Eggs	Fruits	Vegetables	Milk
2000	4.5	6	17	43	93	76
2030	15	16	57	110	180	182

To meet the needs, there is a need for a new revolution, which should be based on traditional wisdom and new agriculture, which is the main stay of our livelihood security and ecological security system. It carried out in such a way that it can be produce more but in a sustainable way. The new revolution is greener than the first in terms of conserving natural resources and the environment. Therefore; the Second Green Revolution should aim at promoting sustainable livelihood enabling the poor to come out of poverty by generating gainful self-employment. While the First Green Revolution aimed at understanding mass agriculture production, the Second Green Revolution should be to promote agriculture production to masses. This is the Gandhian thought to equitable sharing of prosperity by involving the poor in development. For achieving this goal, we need to search for technology which can be adopted by the farmers in arid and semi – arid regions, and those who are dependent on rainfall for crop production.

Smallholder's Agriculture

Our agriculture is dominated by small farmers, having small landholdings for cultivation. The average size of landholding declined to 1.32 ha in 2000-01 from 2.30 ha in 1970-71, and absolute number of operational holdings increased from about 70 million to 121 million. If this trend continues, the average size of holding in India would be mere 0.68 ha in 2020, which had become a product of the 'Laws of Divided Inheritance' (with farms being split between the sons of the farmer on his death). This is a very serious and complex problem. Declining size of landholdings without any alternative income-augmenting opportunity is resulting in fall in farm income, causing agrarian distress.

Change in Farming

Existing rice varieties grew rapidly but very tall so fell over easily and had to be grown quite far apart. The solution was the development of new high yielding varieties of rice. Unfortunately for many farmers the cost of machinery was too much and they simply couldn't afford it, as well as the high initial out pay money was also required for fuel and repair.

Available estimates reveal that nearly 120.72 million ha of land in the country is degraded due to soil erosion and about 84 million ha has soil salinity and water logging problems, huge quantities of nutrients are lost during crop-production cycle. Problems are further aggravated by imbalanced application of nutrients (especially nitrogen, phosphorus and potash), and excessive mining of micronutrients, leading to deficiency of macro and micro nutrients in the soils. Similarly, the water table is lowering steeply in most of the irrigated areas, and water quality is also deteriorating, due to leaching of salts and other

pollutants. The green-revolution belt is exhibiting second-generation problems owing to overexploitation and mismanagement of soil and water resources.

Agro forestry on Degraded Land

For Sustainable livelihood, there is a need to focus on generation of employment for small and marginal farmers, while enhancing agricultural production in unirrigated areas. Presently, these are not being used intensively for high value crop. In fact, farmers often incur losses by farming on such lands, due to natural calamities. Such lands can be profitable used for establishment of drought tolerant fruit crops and agri-horti-pastures. These crops have the ability to withstand the vagaries of nature without sustaining heavy losses. Tree-based farming can also provide year-round employment while protecting the soil from erosion and runoff of rainwater. Promotion of tree-based farming will also enrich soil fertility and increase the water table while absorbing atmospheric carbon dioxide all round the year.

There are many under-utilized plant species having food,- and medicinal uses which can be planted as inter crops to fetch premium price even in local markets. Therefore, tree-based farming can improve the quality of life and protect the environment. Promotion of horticulture can further open up opportunities for post harvest processing and marketing opportunities not only to add value to the produce but also to generate additional employment in rural areas. Presently horticulture – which are includes fruits, vegetables, spices, floriculture and coconut, contributed 28% of GDP from agriculture. The National Horticulture Mission (NHM) was launched in May 2005 as a major initiative to ring about diversification in agriculture and augment income of farmers through cultivation of high value horticulture crops.

Apart from unirrigated lands, these are large stretches of wastelands in India. Among the estimated 40-50 million ha of wastelands, more than 9 million ha are sodic wastelands. Most of these lands had been fertile irrigated fields which turned sodic due to management of rich irrigation and poor drainage facilities. As a result of such miss-management of rich natural resources, the agricultural production has been seriously affected while causing unemployment for the land owners. With reclamation of sodic lands, it is possible to enhance food production by 50-75 million tons per annum, while creating employment for 8-10 million people. Similarly, several million hectares of ravine lands remaining idle for decades can be brought under agri-silvi-pasture system while improving the local economy and the biodiversity.

Livestock Poultry and Fisheries

Livestock contributes 26% of the agricultural GDP. It can provide gainful self-employment and food security for the poor. A majority o the small farmers in India who don't have good quality land for agriculture, are dependent on live stock for supplementary income. India owns one of the largest livestock populations in the world. It accounts for 57 percent of the world's buffalo population and 16 percent of the cattle population. It ranks first in respect of cattle and buffalo population, third in sheep and second in goat population in the world, but its production potential has not been optimally tapped so far. The livestock

sector produced 121.84 million tons of milk, 63.02 billion eggs, 4.83 million tons of meat and 42.99 million kgs of wool in 2010-11. The Eighteenth Livestock Census (2007) has placed total livestock population at 529.7 million and total of poultry birds at 648.8 millions. The fisheries sector is a source of livelihood of over 11 million people engaged fully, partially or in subsidiary activities pertaining to the sector. Fish production increased from 3.8 million tons in 1990-91 to 8.29 million tons in 2011-11. India's share in the global aquaculture output is 4.2% in terms of both volume and trade, that of China being 69.6 percent in terms of production and 51% in value.

Livestock being the major source of organic manure, animal husbandry should be an integral part of agriculture. With the introduction of agricultural implements to improve the efficiency, preferably operated by a single animal, bullock power can become an ideal farm power for small farmers. Thus tree-based farming, particularly agri-horti-pasture system linked with live stock development can help in boosting the agricultural production which providing gainful self-employment to small farmers.

Efficient Management of Water Resource

Water is crucial input required to enhance agricultural production. As most of the small farmers are living in arid and semi arid regions are deprived of irrigation facilities, promotion of watershed development schemes and sustainable use of all the available water resources should be ensured to improve the crop yields. In the absence of adequate water conservation measures, water scarcity is likely to be a serious bottleneck in the future. Water crisis can be serious problem with the anticipated global warming and climate change. By the end of this century global earth temperature is likely to be increase by 1.8 degree Celsius to 4.0 degree Celsius. Dynamics of pests and diseases would be significantly altered. The projected increase in these events will result in greater instability in food production and will threaten farmers' livelihood security.

Capacity Building

To ensure agricultural prosperity, involving rural masses particularly those at the bottom of the pyramid, it is necessary to build the capabilities of the participant families, particularly the women. Status of rural women has a direct influence on the agricultural production in India, as about 60-70% of the labour in crop production is contributed by women. Thus woman empowerment is the pre-requisite to boost agricultural production unless we undertake drudgery reduction community health care, nutritional and educational programmes for children and training in various skills, women will not be able to contribute to agricultural improvement.

Formation of self help groups of farmers having common interest and user groups can be encouraged for awareness and motivation of the fellow farmers. Generally, the poor farmers need regular support and peer group pressure to take active part in various development initiatives. It is easy and effective to communicate these farmers through SHG. It is also essential to re-built the infrastructure establish backward and forward linkages while launching various programmes.

In rural areas, and approach with a “supply push” is not a proper way. In these areas we need to create a “demand pull” through awareness among the poor about various opportunities and motivate them to take active part in socio-economic development. The local communities particularly, those belonging to the weaker sections of the society, who represent over 65-70 % of the rural population, should demand for the services to fulfil their needs, instead of the donors and traders imposing their ideas and products in rural areas. We need to build their capabilities and confidence to a level, when they will start demanding various inputs and services.

Farm Credit

The flow of credit to the farm sector has been improving over the years. But the distribution aspects of agricultural credit need special attention. The share of small and marginal farmer’s in total agricultural credit disbursed should improve and regional inequalities in credit should be addressed immediately.

Infrastructure Development

The base of agricultural development depends on the growth of infrastructure like irrigation, roads, power, cold storage etc. Infrastructure helps in ensuring term and adequate delivery of inputs to the farmers. There is a need to integrate local markets with nation and international markets.

Concluding Remarks

India hosts over 20 percent of world’s poor. Poverty is more serious in rural India where most of the families are dependent on agriculture for their livelihood. Unfortunately, the natural resources such as land, live stock and water which are required for agricultural production are scarce. Further these resources are degraded due to over exploitation and unsound technologies. Denudation of these resources coupled with poor infrastructure to transfer appropriate technologies and establish backward and forward linkages, has been accelerating unemployment, food insecurity, loss of bio-diversity and environmental pollution.

With a view to provide gainful self employment and sustainable livelihood for the rural poor, we need to launch the second Green Revolution through promotion of agri-horti-pastures on marginally productive, wasteland and livestock development, particularly dairy husbandry, with a special focus on generation of gainful self-employment for the poor and weaker sections of the society. The programme should enhance agricultural production by involving a large number of small farmers and integrate with women empowerment, literacy and development of community organizations, for ensuring its success. Such a comprehensive programme can empower the rural poor to come out of poverty and enable the country to achieve the millennium development goals for a sustainable future.

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