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Problems and Solutions to Low Agricultural Productivity in India

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Abstract

In India large numbers of people still live in extreme poverty and suffer from malnutrition, therefore, focus should be on to increase productivity in agriculture and allied sectors which take care of the benefits of all farmers. High agriculture growth is needed for overall growth of the economy and also to provide employment and food security to majority population. Boosting agricultural sector is important as Indian economy is predominantly agrarian. The farmers were using inorganic methods of cultivation and were replacing food crops with cash crops. Thus organic cultivation methods and technologies of stability and sustainability which will increase productivity of small farms should be promoted. For improving new income generation avenues of tribal/rural farmers' appropriate agro-techniques for on farm value addition to agricultural products, by products and wastes for greater economic returns are being implemented. Capacities of individual farmers and farmer's group are exposed to various composting techniques, new cultivation practices, increased usage of manure, screening of bio-pesticide plants and preparation of bio-pesticides. Azolla, spawn and mushroom, vermin-compost production is adopted for income generation. Training is imparted to prepare panchagavya – a traditional plant tonic for organic farming, 'trichoderma' a bio-control agent and vermin-compost for market production.

Everything as inputs was exogenously arranged by farmers who adopted Green Revolution which increased disparities as those farmers adopted it who could afford these technologies. The demand for credit increased to meet input costs which led to indebtedness of farmers. The Green Revolution adopted in 1960s has increased productivity and production but started showing stagnation and has number of limitations such as interpersonal, inter-crop and inter-regional inequalities. The planners have realised to assure income to the farmers, soil conservation water management, remove health hazards of the overuse of chemical fertilizers and pesticides, sustainable means to be explored from traditions and innovations through research and

development. Traditional farming systems in India have received a major boost at a time when Indian agriculture is struggling to come to terms with modern technologies. The crop insurance can be made better targeted and more effective. Newer path has to be explored to tackle the above problems and adopt sustainable practices. Thus, this paper analyzes the problems of low agricultural productivity and ways to increase it sustainably.

Keywords: agriculture production, agriculture productivity, sustainable practices, agriculture inputs, agriculture extension services

Introduction

The prime economic objective of agricultural development is to contribute to increased per capita incomes. Moreover, agricultural development promotes the proper conditions for farming so that planting, harvesting and processing of crops can be done effectively, which ultimately can reduce poverty and save lives (Mellor, 1966).This approach has brought about changes in agricultural practices all over the world including India. 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 increased. In 2050 India's population is projected to be 1.69 billion. India is considered as one of the fastest growing economies in the world in the post reform period. But this growth is not evenly distributed and one of the excluded sectors during the reform period was agriculture showing low growth, the growth was led by services. Employment is not generated in industry and services where growth is high, whereas growth is low in agriculture where majority of people are employed. In India high agriculture growth is needed for overall growth of the economy and also to provide employment and food security to majority population. Growth may be higher during the previous two decades, but inclusive growth in terms of focus on agriculture has been missing.

If we want pro-poor growth and real development, high agricultural growth and rising incomes for farmers are essential. Though share of agricultural sector in India's income has progressively declined to less than 15% due to increase in industry and services sector but its importance is still much more than indicated by the above share. Basically reflected in (1) Nearly three quarters of India's families depend on rural incomes. (2) Majority of India's about 70 percent reside in rural area. (3) For food security in India along with increased production of cereal crops production of fruits, vegetable and milk needs to be enhanced to meet the demand due to increase in population and incomes. Therefore, we need a strong competitive, diversified and sustainable agricultural sector at fast pace.

Farming has become nonviable activity and net sown area has become limited. Land degradation in the form of depletion of soil fertility, erosion and water logging has increased. There has been a decline in the surface irrigation expansion rate and reduction in ground water table. Risks and vulnerability have increased. Disparities in productivity across regions and crops have persisted. According to the steering committee report on agriculture for 11th plan (GOI 2007) the cause of slowdown are increase in subsidies crowding out investment in infrastructure, degradation of natural resources, failure in conservation and improvement of rainfed land, knowledge gap with existing technology, low market infrastructure and too much regulation, institutions conducive to women farmers lacking, imperfections in land market and plight of small farmers.

In India between 1965-66 and 2010-11, total food grain production has 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. 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. But to feed the growing population, both the area and productivity should be increased. The need for continued investments in agricultural innovation and productivity growth is as important today as it was in the early years of the GR. Low income countries and lagging regions of emerging economies continue to rely on agricultural productivity as an engine of growth and hunger reduction However, sustaining productivity gains, enhancing smallholder competitiveness, and adapting to climate change are becoming increasingly urgent concerns across all production systems. Since the mid-2000s and heightened after the 2008 food price spikes, there has been renewed interest in agricultural investment.

Problems of Agriculture Production and Productivity

In the 1990s and 2000s agricultural growth slowed down with average of 3.5% per annum and cereals yields have increased by only 1.4% per annum in 2000s. Agriculture strategies need to be reformed by strengthening India's agricultural research and extension systems. These services have declined due to underfunding of infrastructure and operations, new researchers have been introduced in

lesser amount. Public extension services are not performing upto the expectations. Linkage between research and extension and between these services and the private sector is low.

1. Land: Though India has abundant net sown area of 141.2 million hectares and total cropped area of 189.7 million hectares (1999-2000) proves in significant as it is divided into uneconomically unviable small and scattered holdings. This problem is more evident and serious in densely populated and intensively cultivated states like Kerala, West Bengal, Bihar and eastern part of Uttar Pradesh where the average size of land holdings in less than one hectare and in certain parts it is less than even 0.5 hectare. States with holding size above national average are Punjab, Haryana, Maharashtra, Gujarat, Karnataka and Madhya Pradesh. Rajasthan and Nagaland have larger average size holdings of 4 and 7.15 hectares respectively due to practice of shifting agriculture.

In 1990-91 59 percent holdings are marginal (below 1 hectare), 19 percent small holdings (1-2 hectare) and 1.6 percent larger holdings (above 10 hectares). This shows wide gap between small farmers, medium farmers and big farmers as due to inheritance laws holdings become smaller and more fragmented with each passing generation. Subdivision and fragmentation of the holdings is one of the major reasons for low agricultural productivity and its backwardness. Irrigation is not viable on small fields and lot of fertile agricultural land is wasted for making boundaries. Consolidation of land holdings should be done for better farm management. Cooperative farming can also prove beneficial in which farmers can pool their resources and share profit.

2. Seeds- For sustained growth in agricultural production seed is a critical and basic input. The production and distribution of good quality seeds is crucial but it remains out of the reach of majority of farmers especially small and marginal farmers due to their higher prices. For this Government of India established National Seeds Corporation in 1963 and State Farmers Corporation of India in 1969. To increase the supply of improved seeds to the farmers Thirteen State Seed Corporations were established. New agricultural strategy for agriculture in form of Green Revolution in late 1960s focused on High Yielding Variety Program for increasing production of food grains. Seed industry has shown impressive growth but its aim should be twin to produce adequate quantity of quality seeds and also to achieve varietal diversity to suit various agro-climate zones of the country. They should be provided at appropriate time, place and at an affordable rate. Indian seeds programme is mainly concerned with production of breeder, foundation and certified seeds.

3. Manures and Fertilizers:

Manures and Fertilizers are important to agricultural land/soil as good nutritional food is required for healthy body for better performance and activity. Likewise well nourished soil is capable of giving high yields. 70 percent of growth in agricultural production is possible through increased fertilizer application.

Chemical fertilizer again acts as an external source of input which needs to be purchased as maximum farmers are poor are not able to purchase sufficient amount. Cow dung manure is not easily available now as due to mechanization of agriculture people rarely rear cattle and whatever is may be used as fuel in the form of cow dung cakes as supply of wood has gone down due to lesser forest cover and demand for fuel in the rural areas increasing due to increase in population. Excessive use of chemical fertilizers have depleted soil fertility, caused environmental problems and health hazards and agricultural production became stagnant.

Thus, the need for biofertilizers and organic manures was realised which is also necessary to keep soil in good health in sustainable manner India has a potential of 650 million tonnes of rural and 160 lakh tonnes of urban compost not uttilised fully and can solve the problem of disposal of waste and provide manure to the soil.

In order to maintain the quality of the fertilizer, 52 fertilizer quality control laboratories have been set up. There is Central Fertilizer Quality Control and Training Institute at Faridabad with its three regional centres at Mumbai, Kolkata and Chennai.

Pests, germs and weeds cause heavy loss to crops. To prevent it biocides are used defined as chemical substance or micro organism intended to destroy, deter, render harmless or exert a controlling effect on any harmful organism by chemical or biological means. Their use as inputs has saved a lot of crops, especially the food-crops from unnecessary wastage. But indiscriminate use of chemical biocides has caused environmental pollution.

4. Irrigation: - In India agriculture is a gamble in the monsoons. The rain may be insufficient or unevenly distributed, uncertain sometimes too much rain causes floods leading to wide spread damage and destruction. Thus, proper irrigation facility and optimum utilization is necessary for increased, assured production in agriculture.

5. Natural Factors: - Natural calamities have negative impact on agricultural production such as floods, drought, frost, hailstorm, pest and insect attack and crops ruined by "Neelgaya".

- There is overcrowding in agriculture. Land being inelastic and population being elastic there is a continuous decline in the perceptive availability of land. The 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.

- Most of the farmers are ignorant, illiterate, superstitious, conservative and caste ridden and have their aspirations low thereby, not motivated by the desire to live better.

Inadequate nonfarm services required by the farmers such as agricultural credit, marketing, warehousing, processing, transport etc. With respect to them farmers mainly depend on non-institutional agencies, like money lenders, traders, commission agents, dalals etc. They exploit the cultivators which reduce farmers profit thereby capital formation is low leading to low productivity as modern agricultural input and output needs are more capital intensive. It is estimated that about 50% of the cultivated area in India suffers from severe soil erosion and requires remedial measures.

Solutions to Problems of Agriculture Production and Productivity

- Since almost all cultivable land is under cultivation to increase production productivity needs to be increased through increasing yields, diversification to higher value crops and develop value chains to reduce market costs.

- Inclusive strategy which benefits the poor, landless, women, scheduled castes and tribes should be adopted for rural development.

- Poverty in rural area is reducing but it needs to be at much more faster rate. The rural population classified as poor fell from nearly 40 percent in the early 1990s to below 30% by the mid 2000s (about 1% fall per year).

- Slow growth in agriculture sector is cause of concern and focused approach should be adopted

Agricultural Universities, Research Institutes, Krishi Vigyan Kendras have been generating ample technologies to improve the productivity and profitability of the farmers. The knowledge gap is prevailing among farmers and those who have access to knowledge harvest better profits. Increase in productivity and profitability can be achieved through:

• Blending practical knowledge with scientific technologies
• Efficient use of natural resources
• Adopting time specific management practices
• Giving priority for quality driven production
• Adopting suitable farming systems
• Adoption of location specific technology
• Market demand driven production
• Adopting low cost and no cost technologies

Cropping patterns based on climate and land capability are sustainable but market forces and farmers' aspirations are forcing unsustainable systems. Farmers must innovate in producing more even from less endowed areas by adopting suitable technologies to cope with changing climate. Planting more drought tolerant crops and increased agro-forestry practices. Agro-forestry systems to provide more stable incomes during years of extreme weather events.

Conservation farming involves

• Farming across the slope
• Strip cropping
• Rotations
• Mixed cropping and intercropping
• Surface mulching
• Timely farm operations
• Improved water user efficiency
• Land leveling
• Providing safe drainage
• Intermittent terraces
• Growing vegetation on the bunds

Best practice in irrigation is sprinkler and drip irrigation in which water is conserved .While irrigating through sprinkler irrigation in which water is pumped through a pipe system and then sprayed onto the crops through sprinkler heads with benefits of water conservation, soil conservation, efficient use of water, saving of labour, early seed germination, fertigation, soil amendments and frost protection. Drip irrigation is also useful in which water is conveyed under pressure through a pipe system to the fields, from where it is discharged slowly through emitters or drippers located close to the root zone of the plants. It is the most efficient irrigation in terms of water use efficiency compared to all other methods.

Government of India has implemented Micro Irrigation Scheme through which interested farmers are supported to increase the area under efficient methods of irrigation. Along with irrigation facilities drainage that is removal of water from the field as a moisture control mechanism is also an important aspect which farmers need to know as it provides desirable environment in the crop root zone.

Alley farming is an agroforestry practice in which perennial, preferably leguminous, trees or shrubs are grown simultaneously with an arable crop. The trees, managed as hedgerows, are grown in wide rows and the crop is planted in the interspace or 'alley' between the tree rows. During the cropping phase, the trees are pruned. Prunings are used as green manure or mulch on the crop to improve the organic matter status of the soil and to provide nutrients, particularly nitrogen, to the crop**.**

Sustainable agriculture makes best use of environmental goods and services without damaging five assets such as natural, social, human, physical and financial, thus an integrated organic farming system is inherently sustainable making best use of local available natural resources. Focus should be on reducing dependence of farmers on external inputs. Agriculture practice should be adopted that generates safe and healthy food minimizing adverse effects on the environment and resources In order to minimise the risk and uncertainty of mono cropping and to have sustainable yield and income, farmers are advised to go for mixed cropping.

Integrated farming is related to whole farm management as a step towards sustainable agriculture. The best of modern technologies and traditional practices are adopted according to the locale and conditions. Integrated farming is looked upon as business opportunity aiming at sustainable farming. Organic farming as far as possible employs farm inputs which can be reused or recycled causing minimum pollution, develops a system that ensures that all forms of life from microbes to livestock, are conserved, productively utilized treated with concern respecting their natural behavioral needs, health and safety: excluding genetic engineering and related technologies. The food produced should be high in nutritional value and free from toxins. Adopting organic farming will boost our exports and benefit small and marginal farmers who are not able to bear the cost of capital intensive green revolution techniques.

Thus, critical factors to be considered while deciding the crops and cropping pattern are climatic factors, soil conservation, water, cropping system options, past and present experiences of farmers, expected profit and risk, economic conditions of farmers including land holding, labour availability, mechanization potential technology availability and suitability, demand and availability of market policies and schemes, public and private extension influence, availability of required agricultural inputs including agricultural credit and post harvest storage and processing technologies .Soil, water and wind erosion may be managed through various recommended practices. Method of irrigation has to be decided

considering the quantity of water available and crop to be grown. Recommended certified seeds may be used. Mechanisation enhances quality of agricultural operations and minimises the cost and dependence on labour. Good Agricultural Practices (GAP) may be considered essentials to enhance the price and market competitiveness of the produce. Good Agricultural Practices (GAP) codes, standards and regulations are guidelines which have been developed in recent years by the food industry, producers' organizations, governments and NGOs aiming to codify agricultural practices at farm level for a range of commodities. Information is the critical input required for the farmers to bring about changes starting from selection of crops till the marketing.

Kisan Call Centre is an online agriculture advisory service provider by the government to farmers who can access information on crops, livestock, fisheries, inputs, credit, government schemes benefits, through toll free number 18001801551.

KVK consists of qualified multidisciplinary experts focusing mainly on locally relevant agricultural issues. KVKs organize front line demonstrations, exposure visits, training programmes, exhibitions, field days and provide agricultural literature to the farmers. Some of the KVKs do provide input support for farmers. Extension services are provided by agricultural universities. Agri-clinics, agri-business centers, agri-business companies, ngo's and mass media will bring changes in agriculture sector and boost its growth. Kisan Credit Card Scheme (KCC) aims at providing adequate and timely support from the banking system to the farmers for their short-term credit needs for cultivation of crops. This mainly helps farmers for purchase of inputs during the cropping season.Insurance coverage is given to farmers mainly by Agricultural Insurance Corporation Ltd (AIC) and many other private agencies.All loanee farmers automatically eligible for agricultural insurance coverage. Non loanee farmers can also avail this

benefit by payment of nominal premium.

Conclusion

The planners have realized to assure income to the farmers through soil conservation, water management, remove health hazards of the overuse of chemical fertilizers and pesticides, sustainable means to be explored from traditions and innovations through research and development. The crop insurance can be made better targeted and more effective.

Government of India has been working in the direction to promote agricultural development through budgetary allocations to this sector, introduction of modern techniques both in input and output processes, setting of agricultural research institutes, providing non-farm employment

opportunities, promoting organic and integrated farming, recognizing revolutionary efforts of exemplary farmers, soil testing, digitalization in rural areas etc. Farmers are motivated to adopt modern techniques for the cultivation of their crops for the improvement in production but the issue of accessability has always been the concern. Most of the farmers remain ignorant to day to day changes in techniques of production and their usage. Low level of their education and lack of communication is the major cause of their ignorance to modern research and inventions in agriculture. Therefore, agricultural development tools have not been as successful as in other parts of the world.

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