
A STUDY ON SUSTAINABLE GROWTH AND DEVELOPMENT OF AGRICULTURE SECTOR IN INDIA – A REVIEW

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Abstract: The agriculture sector has a vital place in the economic development of India. The main objective of this research is to study sustainable growth and development of agriculture sector in India. It refers to an agriculture production and distribution system and promotes opportunities in family farming and farm communities, and minimizes adverse impact on health safety, wildlife, soil, water quality and the environment. Agriculture sustainability entails attaining equilibrium between the demand and supply of agriculture production. The green revolution may bring the efficiency in agriculture produce and thus, the productivity increases. The ultimate performance of agriculture depends on the performance of various resources, to face dryness due to the decrease in the rainfall the agriculturist has to use the innovative strategies. The innovative strategies and achieving the growth of the contribution of agriculture and its allied sectors to India's Gross Domestic Product (GDP) stood at 14 percent and working population is 52 percent during 2013 - 14. More than half of the Indian population is dependent on agriculture for its subsistence. It has been one of the main drivers of growth of the economy as it supplies was a major source of raw materials to most of the manufacturers. In spite of its great significance to the Indian economy, my paper findings are The Sustainability problems of Indian agricultural productivity are very less compared to world standards due to use of obsolete farming technology. Therefore shift from modern agriculture to sustainable agriculture is the need of the hour for the conservation of natural resources, environment, crop diversity and production of nutritious food grains. Coupled with this, lack of understanding of the need for sustainability in the poor farming community has made things worse. Water usage is also unplanned with some arid areas misusing the irrigation facilities provided by planting water intensive crops. In areas where irrigation in the form of rivers and canals is not sufficiently available, ground water resources are heavily exploited. Sustainability in agriculture is of utmost importance as many problems faced by farmers are related to this. Excess fertiliser usage not only makes the plants dependent on artificial fertilisers but also erodes the land quality, polluted ground water and in case of a surface runoff, pollutes the nearby water bodies. Similarly, planting crops which require more water like rice on the basis of irrigation facilities extended to areas which are water deficient uses up more water than required. Sustainable agriculture has several benefits over modern agriculture as it is cheap, conservation water, soil and environment, maintain crop diversity, and the food grains, produced are nutritious and free from pesticide residues.

Introduction: Economic development process has to be sustainable so as to achieve long terms goals. When a development methodology is developed, it should be capable of increasing income, employment and production for a long time. The agriculture sector has a vital place in the economic development of India it contributes to Gross Domestic Product (GDP) stood at 14 percent and working population is 52 percent during 2013 - 14. More than half of the Indian population is dependent on agriculture for its subsistence. The sustainable agriculture is a broad term which includes organic agriculture as well as sustainable agriculture is in fact the successful management of resources for agriculture to satisfying the changing the human needs while maintain or enhancing the quality of environment and conserving the natural resources it is a balanced management system of renewable resources including soil, wildlife, forests, crops, fish, livestock, plant genetic resources and ecosystems without degradation and to provide food, livelihood, for current agriculture generation maintain and improving productivity and

ecosystem services of this resources. Sustainable agriculture systems are designed to use existing soil nutrient and water cycles, and naturally accruing energy flows for food production, furthermore such systems aim to produce food that is both nutritious and without products. In practice such systems have tended to avoid as far as possible the use of chemical fertilizers, pesticides, growth regulators, and live stock feed instead relying upon crop rotations, crop residues, animal manures, off - farm organic wastes, mechanical cultivation and mineral caring rocks to maintain soil fertility and productivity, and on natural biological and cultural controls for insects, weeds, and other pests. Sustaining agricultural productivity depends on quality and availability of natural resources like soil and water. Agricultural growth can be sustained by promoting conservation and sustainable use of these scarce natural resources through appropriate location specific measures. The agriculture remains predominantly depends rain fed covering about 60 percent of the country, net sown area and accounts for 40 percent of the total food production. Thus, conservation of natural resources in conjunction with development of rain fed agriculture holds the key to meet burgeoning demands for food grain in the country. Towards this end, National Mission for Sustainable Agriculture (NMSA) has been formulated for enhancing agricultural productivity especially in rain fed areas focusing on integrated farming, water use efficiency, soil health management and synergizing resource conservation.

The agriculture sector in India has always played a crucial role in driving the wheels of socio-economic development of the country. India was primarily an agrarian economy it is one of the largest contributor to the Gross Domestic Product (GDP) is 14 percent in 2010 - 11 and the share of agriculture and its allied activities in India GDP is continuously declining over the years. In 1950 - 51, it was 57.2 percent which declined to 13.9 percent in 2013 - 14. As per the 2nd advised estimates by the Central Statistics Office (CSO), the share of agriculture and allied sectors (including agriculture, livestock, forestry and fishery) is expected to be 17.3 percent of the Gross Value Added (GVA) during 2016-17 at 2011-12 prices. India is the largest producer, consumer and exporter of spices and spice products. Indian fruit production has grown faster than vegetables, making it the second largest fruit producer in the world. Indian horticulture output, is estimated to be 287.3 million tonnes (MT) in 2016 - 17 after the first advance estimate. It ranks third in farm and agriculture outputs. Agricultural export constitutes 10 percent of the country exports and is the fourth - largest exported principal commodity. The agro industry in India is divided into several sub segments such as canned, dairy, processed, frozen food to fisheries, meat, poultry, and food grains. The Department of Agriculture and Cooperation under the Ministry of Agriculture is responsible for the development of the agriculture sector in India.

In view of the foregoing, the Government has been implementing several schemes and programmes for promoting sustainable agriculture practices. the National Mission on Sustainable Agriculture (NMSA), which aims at enhancing food security and protection of resources such as land, water, biodiversity and genetics the National Initiative on Climate Resilient Agriculture, In addition, the National Food Security Mission, for Integrated Development of Horticulture and National Mission on Agricultural Extension and Technology are being implemented to cover other major aspects of farming. The agriculture and allied sector continues to be pivotal to the sustainable growth and development of the Indian economy. Not only does it meet the food and nutritional requirements of 1.3 billion Indians, it contributes significantly to production, employment and demand generation through various backward and forward linkages. Moreover, the role of the agricultural sector in alleviating poverty and in ensuring the sustainable development of the economy is well established. The era of economic reforms had strongly impacted the agriculture sector in terms of productivity, new techniques of production, credit facilities and others. After this affect on export and import of agricultural commodities a major source of income in India. In this regard, the concept of sustainable agriculture has gathered great importance over the years. Sustainable agriculture implies the presence of eco - friendly agricultural practices which originate from paying special attention to conservation of the environment as much as to crop yield. Hence equipment, fertilizers, pesticides, etc used are monitored in field of agriculture.

Sustainable Agriculture Development and its Importance: The issue of sustainable development can be studied under three broad areas farming system which consist traditional production system, modern agriculture system and sustainable agriculture system. Further we can compare them by three

dimensions, ecological, economic and social sustainability. Ecological sustainability is most of the traditional practices are not ecologically sustainable. It does not use natural resources properly, reducing the fertility of soil which causes problem of soil erosion. The sustainable development in agricultural sector has come up to with major advantages to reduce the effect of these causes. Soil erosion is the major problem in the agricultural sector. This can be rectified with the practices of sustainable development. Sustainable agriculture facilitates to increase the quality of top soil, by facilitating to store and retain the rain water. Biodiversity The concept of mixed cropping was introduced by which increasing the diversity of crops can be produced and raising the diversity of insects and other animals and plants and around the fields. Sustainable development facilitates the optimum utilization of the available natural resources health & pollution use chemicals, pesticides and fertilizers adversely affect the total ecology as well as the population. Improper use of pesticides, improper storage etc. may lead to health problems. Sustainable development of agriculture reduces the use of hazardous chemical and control pests. Pattern of using land now a day the because of multiple cropping system soil (land) is over utilized. This over utilization of land causes degradation of soil quality and further productivity decreases. By the practice of sustainable agriculture we can overcome by this serious issue.

Economic sustainability to make agricultural sector sustainable it should be viable over long period. As agriculture is the main source of employment in rural areas. It should focus on specialization of the skills. Specialization will help in enhancing the efficiency level and greater production viz. in other words productivity will increase. The development is meaningless if it is not able to reduce the level of poverty. Many modern technologies are failed because of their limitation like complexities in use and are not easily accessible to poor farmers. In old method of in the field of agriculture the women's had more burden of work. Agriculture and allied activities contributed nearly 14 percent to India national income. Around 56.7 percent of total working population was engaged in Agriculture, male – 46.0 percent female - 65.0 percent and share of exports is 12.3 percent (in 2011-12). These confirm that Indian economy was a backward and agricultural based economy. After 70 year of Independence, the share of agriculture in total national income declined from 56.5 percent in 1950 - 51 to 14 percent in 2012 - 13. But even today more than 48 percent of workforce is engaged in agriculture. In spite of this, it is also an important feature of agriculture that is to be noted that growth of other sectors and overall economy depends on the performance of agriculture to a considerable extent. Because of these reasons agriculture continues to be the dominant sector in Indian Economy. India GDP is expected to grow at 7.1 percent in FY 2016 - 17, led by growth in private consumption, while agriculture GDP is expected to grow above-trend at 4.1 percent to Rs 1.11 trillion (US\$ 1,640 billion)\$. As per the 2nd Advance Estimates, India food grain production is expected to be 271.98 MT in 2016 - 17. Production of pulses is estimated at 22.14 MT. Wheat production in India is expected to touch an all-time high of 96.6 MT during 2016 -17. Groundnut exports from India are expected to cross 700,000 tonnes during 2016 -17 as compared to 537,888 tonnes during 2015 - 16, owing to the expected 70 percent increase in the crop size due to good monsoons. The NITI Aayog has proposed various reforms in agriculture sector, including liberal contract farming, direct purchase from farmers by private players, direct sale by farmers to consumers, and single trader license, among other measures, in order to double rural income in the next five years. The Ministry of Agriculture, Government of India, has been conducting various consultations and seeking suggestions from numerous stakeholders in the agriculture sector, in order to devise a strategy to double the income of farmers by 2022.

Review of Literature:

1. **James K. Nyoro (JUNE 2002):** Focused on various issues like Structure of Agricultural Production including Coffee, Tea, Horticulture, Pyrethrum, Maize and wheat and Dairy. He also discussed the institutes in agriculture like marketing, credit banks, and cooperative societies. But the strategy to meet demand and supply of agri production is not explained in his paper.
2. **Amarnath Tripathi & A.R. Prasad:** Had explained the nature of agriculture and decelerating growth trend in agriculture. They found that the cause of failure of all development policy for agriculture is that there is no availability of any separate development strategy for Indian agriculture. This is due to the fact that we had not available necessary data to study the characteristics of Indian agriculture. But

presently we have come a long way from Independence and now we have long-terms data pertaining to Indian agriculture. The innovative strategies are not focused in his paper to overcome dryness in summer.

Need of the Study: Sustainable agriculture is in sustainable ways based on an understanding of , the study of relationships between organisms and their environment. It has been defined as an integrated system of plant and animal production practices having a site-specific application that will last over the long term, for example: Satisfy human food and fibre needs, Enhance environmental quality and the natural resource base upon which the agricultural economy depends, Make the most efficient use of non - renewable resources and on - sfarm resources and integrate,where appropriate, natural biological cycles and controls. Agricultural performance in the 90s has erratically fluctuated widely with a declining trend over the period. However, for agriculture to grow at the expected rate, it is imperative that quality investments are done in key areas that have potential for growth. In the last three decades the government has realized that non-targeted investments in agriculture could be disappointing. For example, even with the general poor performance of agriculture, few sub sectors such as horticulture and dairy have performed well. Thus investments in agriculture should be targeted to areas that are likely to attain high productivity.

Objectives of the Study:

1. To study the need of the sustainable agricultural trends and to identify the key factors those encourage the growth as a part of Gross Domestic Product, employment in India.
2. To analyze that how and to what extent sustainable development is affecting the production policy in agricultural sector in India.
3. To identify areas of intervention that could achieve sustainable agricultural growth. To evaluate the in India in comparison to other sectors of the economy.

Methodology of the Study: The study is based on the secondary data which data collected from the different sources such as books, journals, government publications, reports, research papers, articles and websites. The entire study focused on The Sustainable Growth and Development of Indian Agriculture Sector production and yield of crops, per capita food grain availability and related data have been compiled from relating to selected crops on output, area, yield, fertiliser, consumption, rainfall, irrigation, and other inputs. Though there are several economic factors that influence the productivity behaviour in this sector.

Significance of the Study: This paper aims to study the extent and importance of sustainable growth development of agriculture sector its impact and effect in India, and how the production policies are changing in accordance with changing scenario of the world. Agricultural sector is the primary sector whose growth will act as a catalyst to the growth of other sectors. Theorists have propounded the growth stages in that an economy growth is transited from agriculture through industry to the service sector. However, one cannot neglect the primary sector if one seeks long run sustainable growth of the economy. The performance of the agricultural sector, especially in India often depends on environments outside the reach of policy makers in the country.

Scope and Limitation of the Study: This study is restricted to the crop sector of the India, though a study of agricultural sector encompasses several aspects from agricultural sustainability and production to marketing this study takes into account only the production side of the crop sector. The eleven crops included were grouped into seasonal, annual and perennial crops.

India lacks modernized infrastructure for promoting the agriculture sector. Rudimentary policies and old fashioned equipment's and practices used by farmers in India are not sustainable, resulting in low yield for many agricultural commodities. Low level investment coupled with the use of obsolete technologies results in declined production, inefficiency and a higher cost that in turn becomes one of the causes for food inflation Illiteracy, lack of awareness about recent developments in the field of agriculture, and poor socio-economic background of the farmers are some of the fundamental reasons

for continuously decreasing agricultural productivity. In addition to this, high level of income gap between rich and poor farmers, agricultural and non agricultural employees are responsible for non-fulfilment of even the basic necessities of Indian farmers. Inadequate finance, untimely finance and inconsistent or contradictory policies of government have aggravated farmers' problems severely. Timely and sufficient availability of credit on regular basis is one of the enabling factors that are responsible for high agricultural output. Availability of formal credit influences the output in many dimensions; for instance, it can be used to purchase good quality seeds during the seeding season that enables a farmer to maximize the yield over the cultivated area or it can also be used to replace the informal credit which is more often than not accompanied by high rate of interest.

Importance of the Study: Gravity of the problem agriculture, especially in the context of India, constitutes the back bone of the whole economic system. It provides employment opportunities to millions of Indians in addition to providing necessary inputs for high industrial growth. It also supplies fodder for India's huge livestock and has become a major way to earn foreign currency. Therefore, required attention in the form of realistic policy measures such as timely availability of formal credit and other inputs to the farmers, creating the awareness about policies and programs of the government meant for educating the farmers through different media platforms is the need of hour on the part of the Indian government. Agricultural growth can be seen as an enabler of the overall economic growth of India. Irrigation facility problems most of the farming in India is monsoon dependent if monsoons are good, the entire economy is upbeat and when the monsoon fails, everyone everywhere takes a hit to some extent. The problem here is of proper management of water or the lack of it. Irrigation which consumes more than 80 percent of the total water use in the country needs a proper overhaul if the country has to improve agricultural output and boost the overall economy. Seed problems especially the poor and marginal ones are dependent on seeds sold in the market. Moreover, the High Yielding Varieties (HYV) seeds as well as the GM seeds which promise higher yields force the farmers to buy seeds for every crop. With spurious seeds hitting the market, the farmers' woes have exceeded all limits.

GDP, Working Population, Food Grains, Irrigation Area, Exports, and Growth Rate in Agriculture Sector in India from 1950-51 to 2010-11

Year	Gross Domestic Product	Working population	Food grains (MT)	Area Under irrigation	Exports in Crores in US Dollars	Growth rate
1950-51	57.2	71.9	50.8	18.1	606	1.25
1960-61	56.6	76.0	82.0	19.1	642	1.96
1970-71	50.1	62.2	108.4	24.1	1535	2.22
1980-81	41.1	62.5	129.6	29.7	6711	2.20
1990-91	33.2	59.7	176.4	35.1	32553	2.14
2000-01	25.1	54.4	196.8	43.4	203571	1.95
2010-11	20.5	45.1	244.5	47.8	845534	2.22

Source: Indian economic statistics in 2013-14.

The above table reflects that the growth and performance of agriculture sector in India. The GDP and working population slowly decreases and the food grains and area under irrigation increases than the exports also increases agriculture growth is slowly increases.

Indian agricultural productivity is very less compared to world standards due to use of obsolete farming technology. Coupled with this, lack of understanding of the need for sustainability in the poor farming community has made things worse. Water usage is also unplanned with some arid areas misusing the irrigation facilities provided by planting water intensive crops. In areas where irrigation in the form of rivers and canals is not sufficiently available, ground water resources are heavily exploited. Sustainability in agriculture is of utmost importance as many problems faced by farmers are related to this. Excess fertiliser usage not only makes the plants dependent on artificial fertilisers but also erodes the land quality, polluted ground water and in case of a surface runoff, pollutes the nearby water bodies. Similarly, planting crops which require more water like rice on the basis of irrigation facilities extended to areas which are water deficient uses up more water than required. Besides, the excessive

evaporation cause salts to accumulate on the fields making them lose their fertility quickly. Lack of proper understanding of the need to grow crops sustainably will push farmers into a vicious circle of debts, heavy use of fertilisers, water mismanagement, low productivity and thus more debts for the next cycle. Over dependence on traditional crops like rice and wheat every crop requires certain climatic conditions to give the best yields. Though rice and wheat are produced in a large area in India, certain areas can readily switch to other crops to get better productivity. India is importing cooking oil from abroad though we have the necessary conditions to grow more oilseeds here. Lack of a proper marketing channel forces the farmers to distress sale, makes them victims in the hands of greedy middlemen and ultimately restricts their income. An improper marketing and storage channel also leads to storage problems in the years where productivity is good, leads to poor agricultural exports due to problems in maintaining quality and in many cases leads to gross wastage of valuable food grains and other farm output. Government handling of the issue Minimum Support Prices (MSP), overall agricultural strategy of the country, PDS, storage/granaries, lack of export market creation. India lacks the required number of storage facilities (granaries, warehouses, cold storage etc) which negates the advantage of having a bumper crop in years of good monsoon. Exports in agricultural sector are also not very encouraging with a share of just 10 percent of the total exports, for a country where more than 50 percent of population is dependent on agriculture.

Suggestions:

1. Consolidation of village lands and cooperative farming will ease the burden of fragmented land holdings. When the farmers form a consortium at the village level, the aggregate land can be farmed by using the latest technology. Banks too will be willing to lend money to a village consortium which can be utilised to boost farm productivity, employ sustainable farming methods, reduce over dependence on fertilisers and thus solve many problems. The sustainability solutions are proper crop management on the basis of water availability, crop rotation, deploying modern agricultural practices to boost productivity, switching over to organic farming (village pools will reduce costs), thrust on allied activities. Agricultural credit and farm mechanisation for small and marginal farmers will continue to be difficult unless pooling of farm resources and/or a joint usage of farm technology is employed.
2. Scientific research in this subject is to be encouraged to promote seeds which are mild on resource requirements but help the farmers in boosting the yields. Sometimes small innovations at the grass root levels can solve a host of problems specific to a particular backward region. District agricultural officers must make it a habit to encourage such ideas and also take part in knowledge sharing to implement the ideas at a regional level. Irrigation problems can be addressed by Government preferably at the State and National levels. Though the Government cannot force farmers to produce only the designated crops in particular areas, it can surely educate them about the alternatives.
3. When proper techniques (in water management at the national, state, regional levels as well as a crop plan of what to produce and where to produce) are employed, it will be a win – win situation for both the farmers in the country. Irrigation problems as well as problems due to single/traditional crop dependence can be solved by a national level plan for agricultural production. Government can encourage farmers to shift to commercial crops (oil seeds etc) instead of food crops in areas where food crops are not at an advantage to reduce imports and also to boost exports.
4. Seed problems can be overcome by creating in house seed banks at the village level for traditional crops (thereby reducing farmer dependence on external seed banks), selling Government approved seeds through proper channels (to eradicate spurious seeds) and strict penalties on seed marketing companies in case the seeds do not match the claims germination and yield - of the companies.
5. For organic farming, first of all, a proper awareness has to be built among both the farmers as well as consumers. Organic farming reduces the unnecessary usage of artificial fertilisers, reduces water consumption, strikes a good balance between the local environment and the farm output, and helps the land retain its fertility for a long time.
6. Storage facilities can be boosted by small cold storage or granaries at village level which can be established from Panchayat funds and loans to the village society (this eliminates dumping of excess crops in the market yard). A 700 ton cold storage cum warehouse will cost around Rs. 1.5 crores which is very reasonable cost for a group of villages or a large Panchayat, provided the state or Union

Government funds the cost. E-Mandis will also help the farmers to correctly predict the prices and thus market them profitably. Proper management of PDS has to be done to cut down wastes so that a reliable estimate of the food grain needs will be made.

Conclusion: Sustainable agriculture has several benefits over modern agriculture as it is cheap, conservation water, soil and environment, maintain crop diversity, and the food grains, produced are nutritious and free from pesticide residues. Therefore shift from modern agriculture to sustainable agriculture is the need of the hour for the conservation of natural resources, environment, crop diversity and production of nutritious food grains. It has been observed that for a growing country like India the practice of sustainable agriculture is of quite importance as it accelerates the productivity, efficiency, employment, and providing guidance to reduce the practices which affect the quality of soil, water resources and degradation of other natural resources. It basically aims at adopting specialization and using environment friendly tools to protect and preserve the environment as well as to enhance the level of production without harming to the environment. To create a favourable environment for investors in the agriculture market, focus should be on high REO's (returns on equity), increasing investor comfort with renewable generation risk, and strong commitment from the central government to ensure renewable feasibility. For the success of sustainable micro-financing, the financials need to mobilising their own resources through savings and equity, augmented by other domestic resources, recovering their loans, covering their costs from their operational income, financing their expansion from their profits, acquiring an appropriate legal status, submitting to appropriate regulators for supervision, etc. agricultural research and extension systems need to be strengthened to improve access to productivity enhancing technologies. The diverse conditions across India suggest the importance of regionally differentiated strategies, with a strong focus on the lagging states. The government needs to shift its role from direct intervention and overregulation to creating the enabling environment for private sector participation and competition for agribusiness and more broadly, the rural non-farm sector growth. Local government capacity to identify local priorities through participatory budgeting and planning needs to be strengthened this, in turn, would improve the rural investment climate, facilitating the involvement of the private sector, creating employment opportunities and linkages between farm and non-farm sectors for better future and well established economy.

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