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Sustainable Development of the Agricultural Sector in India

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ABSTRACT

Sustainable development is development that meets the needs of present without compromising the ability of future generations to meet their own needs. One cannot deny the fact that our world is constantly changing, along with our needs and aspirations. We may be technically advanced, but ultimately we need to survive by consuming what is cultivated on our land. As the population of the Indian economy is increasing, the need for food grains is also increasing. Today people are more concerned, about their own survival and accumulation of wealth, without considering the needs of posterity. This is where sustainable agricultural development comes in to picture. In this paper an attempt has been made to review the challenges towards achieving sustainable development of the agricultural sector in India, like water pollution, climate change, increasing soil salinity etc, and it also makes some recommendations which could be considered by the policy makers for achieving the said objective.

Keywords: Sustainable development, organic farming, climate change, technology.

INTRODUCTION

It would be quiet obvious to clarify the concept of sustainable agriculture before proceeding further. Sustainable Agriculture can simply

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be defined as environmentally friendly methods of farming that allows the production of crops without damage to the farm. It means that it prevents adverse effect of farming activity on water, soil, or the nature. Food and Agriculture Organization (FAO) has defined sustainable agriculture as the management and conservation of resource base and the orientation of technological and institutional changes in such a manner that ensures attainment and continued satisfaction of human needs of present and future generations. It follows that sustainable agriculture is that path of agricultural development, which is environmentally non-degrading, technologically appropriate, economically viable and socially acceptable (Acharya, 2006). At present India is facing the problem of food scarcity. This can be attributed due to rising population, decrease in farming activities, decrease in crop productivity due to soil salinity and other factors. Under these circumstances, it is indeed the responsibility of the policy makers to promote sustainable agricultural development.

OBJECTIVES

1. To study the challenges towards sustainable agricultural development.
2. To suggest strategies for achieving sustainable agricultural development.

METHODOLOGY

The paper is based on secondary data sources like research journals, internet etc.

Challenges towards sustainable agricultural development

The central issue in agricultural development is the necessity to improve productivity, generate employment and provide a source of income to the poor segments of population. Studies by FAO have shown that small farms in developing countries contribute around 30-35% to the total agricultural output. The **pace of adoption of modern technology** in India is slow and the farming practices are too haphazard and unscientific. Some of the basic issues for development of Indian agriculture sector are revitalization of cooperative institutions, improving rural credits, research, human resource development, trade and export promotion, land reforms and education (Ashok Sengupta, 2012).

This continuous and massive application of the **agrochemicals** causing degradation of environment in terms of reduction in soil fertility,

water pollution and indirectly significant contribution to the global warming, climate change and ozone layer depletion. According to the National Bureau of Soil Survey and Land Use Planning (NBSSLUP) 21.97 million hectare (mha) of land is degraded in terms of acidity and alkalinity /salinity. Thus, the indiscriminate use of the fertilizer directly affects the soil health in terms of productivity and mineral composition (Aher Satish, 2012).

Most farmers are poor in India with small landholdings. Farming systems are commonly heterogeneous with mixes of food crops, livestock, and trees. About 70% of the cultivated land is rain-fed, with unreliable distribution and intensity of rainfall. Thus, the increase in food production during the next 25 years will have to be achieved using less labour, water, and cultivated land. Water will become the most important limiting factor in agricultural production. The quality and quantity is declined due to **water pollution**. Due to fast Urbanization, the agricultural land is converted into residential and industrial development, which has resulted in turn down in the number of farm workers. (Ghadiyali Tejaskumar R, 2012)

The environmental challenges, especially in terms of land degradation and groundwater depletion, water logging and excessive use of chemical inputs are posing problems for the future of Indian agriculture. (Deshmukh M.P, 2014)

Climate Change is projected to have significant impact on conditions affecting agriculture, including temperature, precipitation and glacial run off. Rise in temperatures caused by increasing green house gases is likely to affect crops differently from region to region. As a result of climate change the amount of arable land in high-latitude region is likely to increase by reduction of the amount of frozen lands. At the same time arable land along the coast lines is bound to be reduced as a result of rising sea level. Erosion, submergence of shorelines, salinity of the water table due to the increased sea levels, could mainly affect agriculture through inundation of low lying lands (Research Unit, 2008). Although firm statistics on land areas affected by **salinity** and water logging are lacking but according to the CSSRI report (2011), nearly 6.73 million hectares of agricultural land is affected by varying degrees of salt problems and represent a serious threat to food production to meet the needs of the country. The estimates indicate that by 2030 the country may have about 15.5 million hectares area under salt affected soils. (Vijay, 2011)

Instability is one of the important decision parameters in development dynamics and more so in the context of agricultural production. An analysis of fluctuations in crop output, apart from growth, is of importance for understanding the nature of food security and income stability. **Wide fluctuations in crop output** not only affect prices and bring about sharp fluctuation in them but also results in wide variations in disposable income of the farmers. The magnitude of fluctuations depends on the nature of crop production technology, its sensitivity to weather, economic environment, availability of material inputs and many other factors. (Amarnath Tripathi, 2009) High level of instability could pose a serious threat for sustainable development of agriculture in India.

Even though there has been an impressive growth in institutional credit since 1951, the dependence of farmers on **non-institutional sources for agricultural credit** remains as high as 36 per cent in 2013. What is striking is that there is a rising trend in the share of private moneylenders from 17.2 per cent in 1981, 17.5 per cent in 1991, 26.8 per cent in 2002 and 29.6 per cent in 2013 (Anwarul Hoda, 2015). The money lenders are responsible for exploitation of the farmers by charging high rate of interest, manipulating their accounts and cheating the illiterate farmers etc. We cannot expect the agricultural sector to develop until and unless the share of non-institutional sources of agricultural credit is completely eliminated.

Land degradation due to desertification, soil erosion, excessive and unscientific use of agricultural inputs such as irrigation water, fertilizers, agrochemicals, etc. and deforestation is accelerating at an unprecedented rate. Land degradation will remain an important issue because of its adverse impact on crop productivity, the environment, and its effect on food security. The data on the extent of soil degradation in the country has been assessed by various agencies and these estimates vary widely from 63.9 million hectare to 187 million hectare, due to different approaches in defining degraded soils and adopting various criteria for delineation. The National Bureau of Soil Survey and Land Use Planning, Nagpur has estimated that 146.82 million hectare area is affected from various types of land degradation, which includes water erosion 93.68 million hectares, wind erosion 9.48 million hectares, water logging/flooding 14.30 million hectares, etc. (Vijay, 2011)

Strategies for achieving sustainable agricultural development

Traditional agriculture is believed to have been sustainable. This stimulates conservationists to analyze and, if possible, benefit from the wisdom of indigenous knowledge; at least what has remained from it or can still be remembered by local people. It is important to recognize that indigenous/ local knowledge supports the survival of cultural and biological diversity. The practice of cultivation of a majority of the crops without using fertilizers and pesticides is a good sign because it is environmentally sustainable (Anil, 2010).

India has adopted the National Environment Policy in the year 2006, which provides for several measures and policy initiatives, to create awareness about climate change and help capacity building for taking suitable measures. The National Forest Policy also envisages active measures for expanding carbon sinks through increase in forest and tree cover. The government should implement **afforestation** programmes in the nation for achieving the said objective.

Biotechnologies have played an important role in the development of food products over many centuries. In recent years the "modern biotechnologies" of molecular biology and gene technologies have gained a significant role in the cereals sector. Sustainable development goals that embody ecological, social, and economic requirements. In addition, biotechnology should be considered one tool in a larger portfolio of technological options, to be applied where it is needed and where it offers the best available option for solving specific problems (Sharma, Sep-Oct 2010).

Due to the improvement and development in **green technology**, the irrigation of deserts is upgrading from low productivity marginal lands to higher productivity lands in India. This renewable energy technology has been the best substitute for improving the quality of life of rural households in terms of cooking and lighting, producing bio-fertilizers and food production activities. Renewable energy is energy generated from natural resources such as sunlight, wind, rain, tides and geothermal heat, which are renewable. For farmer communities, this technology is a feasible option as it provides sustainable energy services to meet their energy needs in the agriculture sector. In the long-term, these eco friendly and sustainable energy sources will help to meet the energy requirements of the large rural population of India. (Ghadiyali Tejaskumar R, 2012)

Organic agriculture is a method which can help us in achieving sustainable agricultural development. It is a holistic production management system that avoids use of synthetic fertilizers, pesticides and genetically modified organisms, minimizes pollution of air, soil and water, and optimizes the health and productivity of interdependent communities of plants, animals and people. To meet these objectives, organic agriculture farmers need to implement a series of practices that optimize nutrient and energy flows and minimize risk, such as: crop rotations and enhanced crop diversity; different combinations of livestock and plants; symbiotic Nitrogen fixation with legumes; application of organic manure; and biological pest control. All these strategies seek to make the best use of local resources (Aher Satish, 2012).

A study conducted by Shenggen (2002) has found that **agricultural research** has played an important role in reducing urban poverty in India. Without investments in agricultural research, urban poverty in India would be much higher today. He has also found out that since 1990, agricultural research investment in India has stagnated. By 1997, government investment in agricultural research as a percentage of agricultural GDP was only about 0.4%. This is extremely low when compared with 2-3% in many developed countries, and is even lower than the average of 0.5% for all developing countries. Considering the nature of the Indian Economy, agricultural research could be referred as a key strategy towards achieving sustainable development of the agricultural sector as well as the Indian Economy.

JaiGanesh (2013) speaks about **nuclear technology**. He says that technology can either be developed through own research and development or it can be purchased through indigenous or imported sources. Radiation techniques are used in agriculture for producing high yields with better crops. The technique called Nuclear Sterilization (NS) is used to eradicate the tsetse flies and have also been used to control the harmful effects of pesticides for human being. Radiation techniques are used to prevent the harmful effects of chemicals that are presently being used in fumigation of food. For effective sustainable agriculture and to get maximum benefits such as water and fertilizer the nuclear techniques are used to optimize the intake of water and fertilizer-uptake. This technique is also used for mapping of micronutrients. Nuclear techniques used in mutation-breeding have resulted in producing improved varieties of cotton, wheat, chickpeas, mungbeans and rice.

What could be suggested for addressing complex agricultural scenario and making it more profitable, are the **innovative extension approaches** comprising latest information and communication technology and suitable infrastructure to upgrade the scientific knowledge, skill and abilities of the farmers. This could facilitate the farmers to be intelligent decision makers and better managers. Besides this effective implementation of programs and policies of agricultural development by integrating management, community participation, monitoring of quality along with the most suitable infrastructure to ensure socio-economic development of the farmers is essential. Provision of work and creation of job opportunities in rural areas, particularly strengthening agriculture based cottage and small industries involving farmers, private and government participation for sustainable growth. Micro-finance to the farmers along with development of required entrepreneurial skills, insurance for risk management and market linkage to ensure livelihood security (Reena, 2011). Innovation process starts with research or that knowledge feeds directly or automatically into new practices, processes, or products. Instead, the knowledge and information flows at the heart of an innovation system are multidirectional. They open opportunities for developing feedback loops that enhance competence building, learning, and adaptation (Rakesh 2014).

ANALYSIS

Agriculture in India is in the midst of various complexities like climate change, soil erosion, water pollution, fluctuations in production, exploitation of the farmers by the middlemen and also by the non institutional sources of finance like the moneylenders, and above all rising population which is not only responsible for increasing the demand for agricultural commodities but is also responsible for converting agricultural land into concrete jungles. Farmers illiteracy and lack of information or communication gap also plays an important role to some extent in depriving the farmers what they deserve, and also adversely affecting the overall agricultural production of the nation. Some of the problems were already existing in the past, and some are of recent origin, like climate change. Day by day the situation is getting worse with the addition of population and destruction of the ozone layer. In the near future some new problems may also evolve. It will be an addition to the already existing load of problems for which we have not yet found solutions. Although there are some strategies available,

like afforestation, organic farming, agricultural research and so on, but still somewhere something is lacking. And hence we are still far away from achieving sustainable development of the agricultural sector.

CONCLUSION

Sustainable development of the agricultural sector is a very broad concept. Its achievement not only requires a more detailed study, but more importantly it requires combined effort from every body, not only the government and the farmers. Each one has to understand their responsibility towards the environment. We were taught in school that water is precious, using different types of scents/body sprays release CFC's in to the atmosphere which are responsible for destroying the ozone layer, and which is further responsible for melting of the glaciers and rising of the sea level. But today don't we waste water? Don't we use aerosol sprays? By doing so we are not realising that we are destroying our own habitat. It's high time and we need to act immediately before it's too late. We can't just hold hands on hands and wait for policy makers to introduce mega reforms in the agricultural sector. We have to initiate the reform process our self, by realising the need of the hour and by visualising how we can contribute positively towards sustainability of the human race.

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