

# Technological Innovations and Social inclusion in Agriculture Sector

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## ABSTRACT

Agriculture sector is the mainstay of the Indian economy around which socio-economic privileges and deprivation revolve, and any change in its structure is likely to have a corresponding impact on the existing pattern of social equality. 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. Men and women can benefit simply from improvements to their wellbeing in terms of health, nutrition or income. But innovations can also sometimes lead to women's empowerment, better household decision-making and new agents of change appearing in communities.

**Keywords:** Technology, Innovation, Empowerment and Social Inclusion.

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Agriculture plays a vital role in the Indian economy and will continue to play a dominant role in the growth of Indian economy in the foreseeable future. It represents the largest sector producing around 28 per cent of the GDP, is the largest employer providing more than 60 per cent of the jobs and is the prime arbiter of living standards for seventy per cent of India's population living in the rural areas. These factors together with a strong determination to achieve self-sufficiency in food grains production have ensured a high priority for agriculture sector in the successive development plans of the country. The food grain production has increased tremendously from 51 million tonnes (MT) in 1950-51 to 264 MT during 2013-14 but meeting future demands (280.6 MT by 2020-21) for the increasing population is a great challenge as this would require about 1.34% growth rate annually against the current growth rate of 0.48% .

## Impact of Economic Reform and Liberalization Policy on Indian Agriculture

The Indian agriculture sector has been undergoing economic reform since 1990s in a move to liberalize the economy to benefit from globalization. India, which is one of the largest agriculture based economies, remained closed until the early 1990s. India's economic reforms were initiated in June 1991, but it was observed that the expected increase in exports due to liberalization did not occur. In addition, the agriculture sector's output growth decreased during 1992-1993 to 1998-1999. The reason behind this was the decline in the environmental quality of land which reduced the marginal productivity of the modern inputs. Agriculture sector is the mainstay of the Indian economy around which socio-economic privileges and deprivation revolve, and any change in its structure is likely to have a corresponding impact on the existing pattern of social equality. No strategy of economic reform

can succeed without sustained and broad based agriculture development, which is critical for raising living standards, alleviating poverty, assuring food security and making substantial contribution to the national economic growth.

### **Socio-economic Status of Indian farmers and Farm women – Some hard facts**

A primary survey conducted by Centre for the Study of Developing Societies (CSDS) conducted across 18 states covering 274 villages spread over 137 districts of the Country revealed that:

- ❑ 36 per cent farmers live either in a hut or a kuchha house. 44 per cent live in a Kuchha-pucca or mixed house. *Only 18 per cent of them have a pucca independent house.*
- ❑ 28 per cent of the farmers were found to be non-literate. 14 per cent were Matriculate: *Only 6 per cent entered for a college degree.*
- ❑ Overall 83 per cent of the farmers consider agriculture to be their main occupation (varies from 62 per cent in Tamil Nadu to 98 per cent in Gujarat).
- ❑ 32 per cent of the farmers do other works for additional household income.
- ❑ One in every ten farm- families had to remain without food on few occasions.
- ❑ Most farmer households (61 per cent) have two meals a day. Only 2 per cent have one meal a day and 34 per cent eat more than two times a day.
- ❑ 65 per cent farmers said that other members from the family also helped in activities related to farming.
- ❑ 75 per cent of the farmers are engaged in farming for more than ten years.
- ❑ Only 10 per cent of the farmers are members of a farmer's organization.
- ❑ 86 per cent of the farmers or their family owns land.
- ❑ 14 per cent of the farmers were found to be landless or without any land of their own. 60

per cent are small farmers (those who own 1-3 acres of land), 19 per cent fall in the category of medium farmers (own 4-9 acres of land) and 7 per cent are large farmers (own 10 or more acres of land).

- ❑ About 66 per cent of the women belonging to farmer households are involved in farming.
- ❑ 18 per cent women of the farmer households do other non-farming work to contribute financially to the family income.
- ❑ 67 per cent women say that the income from agriculture is not sufficient to fulfill the livelihood needs of their family. Only 20 per cent found it to be sufficient.
- ❑ Only 24 per cent youth belonging to farmer households are interested in continuing farming while 76 per cent would prefer to do some other work rather than farming.
- ❑ Among the youth who are interested in continuing farming, most said it is their traditional occupation and they wanted to take it forward.

**Issues & Challenges:** 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.

**Future Prospects and Solution for Indian Agriculture:** This sector is an important contributor to the Indian economy around which socio-economic privileges and deprivations revolve and any change in its structure is likely to have a corresponding impact on the existing pattern of social equity. Sustainable agricultural production depends upon the efficient

use of soil, water, livestock, plant genetics, forest, climate, rainfall and topology. Indian agriculture faces resource constraints, infrastructural constraints, institutional constraints, technological constraints and policy induced limitations. Sustainable development is the management and conservation of the natural resource base and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for the present and future generations. Such sustainable development (in the agriculture, forestry and fisheries sector) conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable and socially acceptable.

So, to achieve sustainable agriculture development the optimum use of natural resources, human resources, capital resources and technical resources are required. In India the crop yield is heavily dependent on rain which is the main reason for the declining growth rate of agriculture sector. These uncertainties hit the small farmers and laborers worst which are usually leading a hand to mouth life.

Therefore something must be done to support farmers and sufficient amount of water and electricity must be supplied to them as they feel insecure and continue to die of drought, flood, and fire. India is the second largest country of the world in terms of population; it should realize it is a great resource for the country. India has a huge number of idle people. There is a need to find ways to explore their talent and make the numbers contribute towards the growth.

Especially in agriculture passive unemployment can be noticed. The sustainable development in India can also be achieved by full utilization of human resources. A large part of poor population of the country is engaged in agriculture, unless we increase their living standard, overall growth of this country is not possible. If we keep ignoring the poor, this disparity will keep on increasing between classes. Debt traps in country are forcing farmers to commit suicides. People are migrating towards city with the hope of better livelihood but it is also increasing the slum population in cities. Therefore rural population must be given employment in their areas and a

chance to prosper. India has been carrying the tag of “developing” country for quite long now; for making the move towards “developed” countries we must shed this huge dependence on agriculture sector.

## INNOVATIONS IN AGRICULTURE

It is well known that agricultural innovation is critical to reducing poverty. Men and women can benefit simply from improvements to their wellbeing in terms of health, nutrition or income. But innovations can also sometimes lead to women’s empowerment, better household decision-making and new agents of change appearing in communities. Or, in stark contrast, innovation that ignores gender inequality can be limited in its impact and may even worsen the poverty, workload and well-being of poor rural women and their families. Yet there is still relatively little understanding of whether and why innovations can have such contradictory dynamics.

### Innovative technologies for sustainable food production

- ❑ **Drip irrigation** — Approaches that involve applying water directly around roots
- ❑ **Drought tolerance** — Plant varieties that can process available moisture more readily and that are less vulnerable to water deficiency
- ❑ **Heat tolerance** — Varieties that can withstand or thrive in higher temperatures
- ❑ **Integrated soil fertility management** — New fertilizer and composting combinations
- ❑ **Nitrogen use efficiency** — Plants that respond better to fertilizers
- ❑ **No-till** — Farming that involves little or no soil disturbance and potentially the use of cover crops
- ❑ **Organic agriculture** — Cultivation that excludes manufactured fertilizers, growth enhancers or genetically modified organisms (GMOs)
- ❑ **Precision agriculture** — GPS-assisted, machine to machine solutions that combine information collected by sensors with automated management

- ❑ **Sprinkler irrigation** – Water delivered through overhead nozzles
- ❑ **Water harvesting:** Irrigation that uses earth dams, channels and other ways of directing water toward crops
- ❑ **Improved farm tools and Machinery:** Gender Friendly tools

The reality is that no single agricultural technology or farming practice will provide sufficient food for the world; we must utilize a range of these technologies in order to maximize yields.

Women – whether young or old, healthy or sick – can be found across the developing world working long hours without rest. They pick tea, process tobacco, shell cotton pods, spread fertilizers on fields and transplant rice. The seemingly simple act of removing the husks from maize cobs by hand is tougher than it sounds. A female worker uses her fingertips on average 522 times, her fingernails 144 times and her palms 55 times for every single kilogram of grain she produces, according to a survey carried out last year by India's Ministry of Agriculture. In the developed world, this work is usually done by machines. But in poor countries, much of the labour is done by hand – and a woman's hand at that and we are far from easing the drudgery of women farm workers. But there is growing interest in designing technologies to improve their lives.

### Some Suggestions to Social Inclusion of Innovations

**Empower women to boost farm productivity:** All along as agricultural expert's continuously urge to increase farm productivity across the globe, one of the latest reports by the United Nations Food and Agriculture Organizations point out that helping the women farmers could increase agriculture output in the developing countries by as much as 2.5% to 4.0% per annum.

**Front Line Demonstration under NFSM:** Front Line Demonstration (FLD) is a unique approach to provide a direct interface between researcher and farmers as the scientists are directly involved

in planning, execution and monitoring of the technology demonstrated and get direct feedback from the farmers' field about the crop in general and technology being demonstrated in particular. This enable the scientists to improve research programme according to the need if the farmer.

**Role of KVKs / KGKs:** The Indian Council of Agricultural Research (ICAR), New Delhi has started the Krishi Vigyan Kendras (KVKs) in all the districts of the country with the following mandate.

- ❑ Conducting on-farm testing to identify the location specificity of agricultural technologies under various farming systems.
- ❑ Organizing frontline demonstrations to establish production potential of various crops and enterprises on the farmers' fields.
- ❑ Organizing need based training for farmers to update their knowledge and skills in modern agricultural technologies related to technology assessment, refinement and demonstration, and training of extension personnel to orient them in the frontier areas of technology development
- ❑ Creating awareness about improved agricultural technologies among various clientele through an appropriate extension programmes
- ❑ Production of quality seeds, planting materials, livestock breeds, animal products, bio-products etc., as per the demand and supply the same to different clientele
- ❑ Work as resource and knowledge centre of Agricultural Technology to support the initiatives of public, private and voluntary sectors for improving the agricultural economy of the district..

18 KVKs under university jurisdiction are running in- Kanpur Dehat, Kannauj, Farrukhabad, Fatehpur, Aligarh, Firozabad, Lakhimpurkheeri, Hathras, Raebareilly, Jalaun. Banda, Mahoba, Jhansi, Lalitpur, Etawah, mainpuri, Hardoi and Hamirpur.

**University Industry Interaction:** University and industry interactions are of paramount importance for imparting quality education perusing engineering

and agriculture so that emphasis should be on need based quality product development.

**Gender Friendly Farm Tools to overcome drudgery of the women**

The women are the backbone of agricultural workforce but worldwide her hard work has mostly been unpaid. She does the most tedious and back-breaking tasks in agriculture, animal husbandry and

homes. The research efforts at the ICAR institutes have been tried to relieve her of the drudgery by providing time and labour saving tools. Vocational trainings are also being conducted, to impart skills to undertake different avocations. In extension activities the women is now the centre point and activities are being planned keeping her in view. Her enlightenment will change the face of rural India.



Paddy parboiling unit



Sitting type groundnut decorticator



Improved Sickle



Tubular Maize Sheller



Cono Weeder



Two row paddy Transplanter

