Role of Modern Technology in Agriculture Sector

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Abstract : Agriculture is one of the most prominent sectors in India. Today the greater part of the workforce is yet occupied with agribusiness for their occupation and business. Currently, India is a larger supplier toward many agricultural products like tea, coffee, spices, oil meal, fruits, vegetables, rice, meat, and marine items to the worldwide market. As far as production, India is the top producer of milk, and second largest in wheat and rice, despite the above fact the national Gross Domestic Product has been declining, the progress in this field is still lagging behind. The main purpose of this paper is to identify the problems that the agricultural industry is facing and how superior technological advancements are solving their issues.

Index Terms **- GDP, agricultural production, modern technology.**

I. INTRODUCTION:

Agriculture is a backbone of the Indian economy. Since independence it has gained an excellent level of progress, it has experienced a green, white, yellow, blue revolution. Today, India stands second worldwide in farm production like wheat, vegetables, sugar and fish and the third biggest producer of tobacco; it is even biggest producer of milk, organic products, cashew nuts, coconuts and tea on the planet. Agriculture is demographically the broadest economic sector which plays a vital role in the overall economic scenario. The development of different regions and the entire economy relies upon the performance of agriculture to a significant degree. The data's by Department of Economics and Statics (DES) states that the production of food grains for the year 2017-2018 is 284.83 million tons which is the highest production whining last 5 years i.e. (2012-13) 247.6 million tons, which is a good indication for the Indian economy from the farming segment. Despite of all this, with the growth of other sectors the contribution of agriculture towards GDP is eventually declining from 50 percent in in 1950 to 8.2 percent in 2018. Presently, agricultural systems is neither economically nor environmentally sustainable. It was observed that in past the technologies that have contributed formed severe problems in environmental and natural resource degradation. This indicates that in future the technologies should lead to a sustainable improvement in agriculture production which should not only increase productivity but enhanced the quality of natural resources. Today, the poorly maintained irrigation system, low level of new technology and its deprived adoption, farmer low income and access to market, climatic changes are some reasons due to which the growth in agriculture is still slow, which is a major issue as more than half of the population directly depends upon cultivation for their living.

II. SIGNIFICANCE OF AGRICULTURE:

About 70% of the people in India live in rural sectors which are remote and backward area in terms of education and poverty. Agriculture is the main occupation for them. In order to remove poverty, the agricultural sector should be taken more seriously as achieving an eight to nine percent rate of growth in the overall total GDP may not resolve the problem. Actions like proper planning for the development in farming practices, improving rural infrastructure by educating them, bring new innovation might help to solve the issue.

India is advancing in agriculture. People are taking interest in this field by coming with new ideas of using technology to make this field more advance. Recently in Delhi MS Swaminathan was awarded the first World Agriculture Prize for his contributions to Indian agriculture, which show how government, as well as people, is interested in farming.

Since agriculture acts a crucial role in the Indian economy, it not only helps in the formation of capital but also provides provision of employment opportunities for people. The crude materials that are available to the industries are created inside the agrarian division and it is a business opportunity for industrial products. but in recent years we have seen that there is a shift in employment from the agricultural sector which was 63.59 percent in 1991 and has declined to 41.61 percent in 2017-18 to the service sector or industrial sector where farmers are relocating to urban regions in search of employment as in rural area the only scope of earning is practicing farming but due to heavy debt, large scale in the failure of crops or the government doesn't provide a proper price for their crops so they have to take this step.

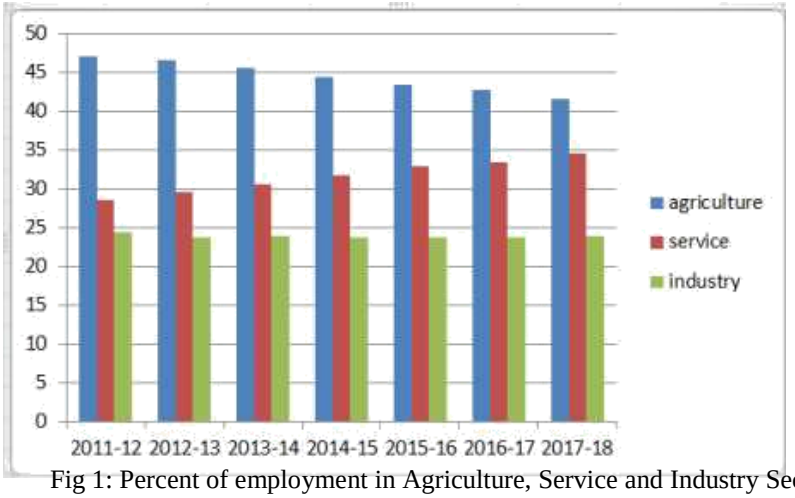

Fig 1: Percent of employment in Agriculture, Service and Industry Sector

III. CHALLENGES FACED IN AGRICULTURE:

Food is an essential human need, and producing enough to feed the booming population is one of the biggest challenges faced in agriculture. Since the rise in food production will affect raises in energy costs, groundwater depletion, and the loss of farmland to urbanization, and potential flooding and droughts caused by climate change, apart from this there are more hurdles which the agriculture sector faces like:

1. Shrinking Landholding:

Approx. 159.7 million hectares of land was there for cultivation whereas now 82.6 million is available for growing. Increase in the population and breakdown of the joint family system, poor farmers are compelled to sell a division of their area to repay their debt that has led to constant subdivision of the agricultural field into smaller and smaller plots, which leads to fragmentation of holdings and therefore cultivation becomes uneconomic because of the reduced size of the land. As a result, a major portion of land is not brought under the plow. According to the census, the small and marginal landholding constitutes up to 86.21% whereas medium holding or semi medium holding consist up to 4.79 and only 9 percent have large land holdings which is not enough for growing. Due to this farmers are forced to quit agriculture and moved to cities in search of Jobs.

2. Lack of Innovation and Education.

Technology has the potential to help farmers to increase their production, but the adoption of such tech is still slow. Innovation fails to keep the farmer at the center stage. As farmers are poor and uneducated they do not understand the importance of change and they are unable to replace traditional agriculture. Today farmers are facing difficulties to approach a proper medium to showcase their own unique product to the world as they are not aware about the market and because of illiteracy they are not able to connect the correct technologies and schemes introduced by the government.

3. Climatic Change:

The planet climate is changing, this is undeniable. Climate changes present a critical challenge for global food security. The farmers who produce our food are hit the hardest by the consequences of climatic change. Farming communities need to build their resilience and ability to the changing climate in a way they can feed the growing population without further depleting our precious preserve of soil and water.

Though climatic changes do allow some areas to grow the new crop, farmers are opposed to giving a try due to as they are not aware about the techniques which can handle the environmental changes.

4. Agricultural Marketing and Exploitative Market:

Marketing has always been much unorganized in India. Due to which farmers remain entangled in exploitation. Since marketing depends on the demand for the product when the market value is high, though due to inadequate revenue and low productivity farmers are forced to sell their goods at a lower price. Lack of communication creates a dilemma for farmers as they are incapable to receive a fair value for the commodities yet after their hard work and get fully exploited by the middlemen.

5. The Scarcity of Capital and No Fixed Source of Income:

Like all other industries, even agriculture is an important industry which requires capital, investment in capital can bring advancement and growth in this field. But unfortunately, farmer's money is secured on his land and stocks and has no fixed rate of income so they are compelled to take a loan from other sources to raise capital for their work at high interest.

IV. ROLE OF TECHNOLOGY FOR SOLVING ISSUES IN AGRICULTURE:

The agricultural industry is changing fast; new technologies have created opportunities that have made farm management simpler and more efficient. Tech Giants like Microsoft, Accenture, and multiple other Agri-tech startups are benefiting farmers to make better-informed choices about equipment, manpower, and resources. Advanced sensors deliver detailed weather and soilinformation from the field. Satellite and UAVs now measure crop growth, intrusion and stress areas. This recent progress in agriculture is the best weapon against poverty.

1. Consolidated Growth Model:

Over time's technology has developed at a great speed, though its effect on agriculture business is not enough. Indian farming sector is not that advanced yet they still follow the old techniques for cultivation. but the issues is not only the machinery but the units of cultivation is not efficient for the use of such machinery. to solve this problem the government has organized Paramparagat Krishi Vikas Yojana (PKVY), as well as startups like Krishine, is working on this problem.

2. New Innovation:

Innovation is the mother of necessity. Today artificial intelligence is helping in reducing agricultural waste and produce more food. Firms like Aarav Unmanned System are promoting precision farming by using a drone to scan the field and accordingly shoot pods with seeds and plant nutrient into the soil. These drones help in spraying the correct amount of chemicals and identifying the affected plants which need remedies.

Platforms like Krishine are helping farmers promote their hand-crafted innovative products online to an audience across the country.

3. Reduction on dependency on Climate:

Agriculture highly depends on the climate. Agri-tech startups like Fasal are providing actionable insights to farmers using machine learning models on top of weather prediction and farm data captured through sensors from fields. The invention of the poly house or greenhouse has helped farmers to cultivate without depending on the climate. People have also started using vertical farming to grow their own veggies in small areas. Furthermore, the new agricultural insurance policies have mitigated the risk of bad weather.

4. Global Market:

Agri-tech platforms such as Crofarm and Ninjacart have brought the entire market to farmer's doorsteps. They not only guarantee farmers a consistent demand with superior prices but also, help in reducing wastage with guidance upon market needs and on-demand harvesting. The improvements in technology have helped in cutting down multiple middleman hops thereby ensuring competitive pricing and fresh deliveries.

5. Micro Financing:

Over the times' farmers have been exploited by the zamindars by lending money at a high rate of interests. The recent establishment of micro-finance firms has enabled farmers to procure loans at economical interest rates. Having access to funding is bringing a positive change in the way agriculture is done. Rental models introduced by firms like farMart and GoldFarms are helping farmers to obtain the existing machinery on rent rather than investing in it. This shift in technology has reduced the age-old dependency on zamindars and rendered ease of mind to farmers.

V. CONCLUSION

Today most of the people are directly or indirectly relying on farming. As some are directly connected with it or some are associated with the business. Since independence, the agricultural sector has gone through a lot of transition process with ample changes in the social, legal, structural field. However, today India has improved in efficiency, it has 82.5 million hector of land and biggest number of individuals working in this division yet at the same time lingers behind from different nations.

India's is assumed to touch 1.5 billion populations by 2030, with the increasing population it is important to increase food production and without technology, it is impossible to meet the requirement of the population. Farmers have the potential to bring changes in this sector, proper education, understand and utilizing the technology might help to generate more as well as protect the environment for next generation.

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