

Agriculture in India – Retrospect and Future Prospects

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ABSTRACT

The Agricultural revolutions in India traversed a long distance to ensure country changed status from being a Food importer to Food exporter of range of Food products. The Green Revolution led to self dependent in terms of Food Grains, the second Green revolution bring about enhance income generation consequently leading to economic development of country. Several challenges were faced by agriculture sector which has impacted the agriculture pattern, productivity etc, to do away with the challenges posed to agriculture sector government have undertaken several steps in the field of technology, value addition, backward and forward linkages etc through plans and policies which are guiding the present and future prospect of the Agriculture in India.

Key Words: Agriculture Marketing, Sustainable Agricultural Practices, Artificial Intelligence (AI), Natural Farming.

INTRODUCTION

India is enriched with 20 agro-climatic regions, 15 major climates and 46 soil types, and a diverse variety of agricultural products which fulfill domestic need up to great extent and also made an important component of export goods.

About 54.6% of the total workforce still derives its livelihood directly or indirectly through agriculture.

The combination of factor such as fragmentation of land holding, lack of assured irrigation, unavailability of pesticide and fertilizers, low mechanization due to lack of capital availability etc. held back productivity while India traversed a long distance to achieved food security nutritional security remains elusive.

LITERATURE REVIEW

The Book Titled “Energy –Smart Farming: Efficiency, Renewable Energy and Food” by Ralph. E. H. Sims (2022). It dealt with the sustainable energy utilization for sustainable farming, to make agriculture energy efficient and optimum energy consumer.

The Book Titled “Handbook Digital Farming: Digital Transformation for Sustainable Agriculture” by Joerg Doerr, Matthios Nachtmann. It sheds light on the technological, economic, social and legal perspective of the digital transformation.

The Book Titled “Farm Machinery and Processes Management in sustainable Agriculture: XI International scientific symposium” 2022 by Francesco Santro, Simone Pasuzzi. The book gathers the latest advances, innovations and applications in the field of sustainable and smart agriculture.

The book Titled “Agriculture in India: Crisis and prospects (2021) by Manu Gautam. The book highlights the low line agriculture in India .The weather and technology crisis. It further focuses on the possible prospects of agriculture in India.

The book Titled “Indian Agriculture Toward 2030: Pathways for enhancing Farmers-Income, Nutritional Security and Sustainable Food and Farm systems. By Ramesh. C. Chand, Pramod Joshi, Shyam Khadka. The book brings together varying perspective for transformational change needed in India agriculture and allied sector.

The book Titled “Glimps of Indian Agriculture” (2018) by Sangeeta Verma, P.C Bodh. The book focuses on the economic aspects of agriculture. It discusses about the direct and subsidiary contribution of agriculture in GDP of India.

OBJECTIVE

- Agriculture status at present time and its contributing factor.
- How to improve agriculture practices and make it more remunerative.
- The role of government and voluntary organization in strengthening agriculture sector.
- What can be done to brighten the agriculture prospect.

Challenges in the agriculture sector at the time of independence

At the down of independence the agriculture production and productivity is a major cause of concern because due to lower crop productivity India remain dependent upon other country for it's food security and it also impact the forex reserve.

There are several combination of factor which led to such condition these are lack of assured irrigation facility and the un availability of fertilizer and pesticide, lack of adequate institutional mechanism eg credit facility, very low forward and backward linkages, low penetration of electricity, lack of adequate knowledge to farmers about new cultivation practices.

The monsoon played major role in determining the states of agriculture as most of the cropped area remain rain fed. Fertilizer application was also minuscule. The traditional agricultural practices were not modified according to the changing times, the investment in agriculture was also low, the poor condition of farmer left them with little scope for modern and innovative practices.

Characteristic of the Indian agricultural sector

Indian agriculture is dominated by small and marginal farmers that account for 86 percent of all holdings and 47 percent of the operated area- with an average holding size of 1.08 hectares. The contribution of small and marginal farmers is more than 50 percent of the total agricultural and allied output. Also about 44 percent of the working population is employed in the agriculture and allied sector.

Significance of the agriculture sector to India.

The gross value addition of the agriculture sector in India has continuously through the past decade, the agricultural exports as a percentage of India's GDP comprises 9.9% in 2018-19. Agriculture employs a majority of the Indian population living in rural household.

ACHIEVEMENT OF FOOD SECURITY

Productivity – The advent of Green revolution in 1960's which introduced High- yielding varieties (HYV), the application of fertilizers and pesticides etc has enhanced the yield of rice and wheat. In 2019 the yields of rice and wheat have respectively increased to 2659 kg/ha and 3507 kg/ha. These led to increase in the per-capita availability of food grains while led to reduction in import bills saving the precious forex reserve.

The per-capita net- availability of food grains enhanced from 394.9 g per day to 512.6g per day from 1951 to 2020 respectively. This achievement is highly impressive considering the fact that the population of India quadrupled from 1951 to 2020. The strengthening of the formal institutional mechanism for credit delivery has played great role in enhancing agricultural productivity. The total production of food has shown an impressive growth from around 51 million tones inn 1950-51 to 305 million tonnes in 2021-21.

The operation flood which was introduced in 1970's made India today the largest production of milk in world which is about 19% of the total production of milk of world. The other agricultural revolution are green revolution in cotton production, Blue revolution in fisheries, yellow revolution in edible oil etc are playing important role in enhancing agriculture production and productivity. The growth of transport sector , institutional mechanism for credit delivery, availability of electric connectivity, growth of mechanization, enhanced purchasing power of farmer etc cumulatively leading to higher production and productivity of agriculture.

Agricultural Marketing - Agriculture comes under the ambit of state subject, state governments enacted Agricultural produce market regulations (APMR) Act during the 60s and 70s whereby agricultural produce could only be brought by licensed and registered traders in these market.

The provision are that unlicensed/unregistered traders could not procure from farmers. Several market Yards have been designated with the purpose of ensuring smooth transaction of economic activity related to agriculture. The main objective for the creation of market yards was to ensure transparency, fairness and hindrance free agricultural trade with adequate remuneration to the farmers.

Public Procurement – The Food Corporation of India (FCI) was set up in 1965, it was provided certain specific function such as to distribute food grains under the Public Distribution System (PDS), to undertake price support operations and to maintain adequate buffer stocks. The Commission on Agriculture Costs and Prices (CACP) determines the Minimum support Prices.

NEED FOR A NEW SYSTEM: WHY

Agricultural Marketing – The system which was in existence was not efficient enough to protect farmers interest, was inefficient in the movement and trade of agricultural commodities. The number of market which was expected to multiply failed to grow to its potential.

The provision that only licensed traders could procure from these designated markets, the traders with license formed cartel and blocked the entry of new entrants. The traders with license formed cartel and blocked the entry of new entrants. The cartelization have led to creation of closed system open auction failed to develop the cartel started to fixing prices these leading to failure of present system in existence .

There is need to focus upon the following there key challenges in the coming years. The first is the agriculture markets, second sustainable intensification, the third revolve around achieving nutritional security.

The markets were created far away from the village these led to emergence of large number of middle man, the commission agents acted as a conduit between farmers and traders getting a major chunk of the final retail prices this led farmers with low profit generation through agricultural activity which was creating major hurdle in the fulfilling of target to ensure doubling of farmer income by 2022.

The forward and backward linkages remain Inadequate, the lack of adequate private investment led to linkages with food processing and export markets weak. There was substantial loss of agricultural goods post harvest which was estimated to be at the tune of 90,000 crore annually.

Water – The mismatch between the groundwater extraction leading to depletion of the ground water level. The North western region of India eg Punjab, Rajasthan, Haryana are facing higher threat of groundwater depletion due to over exploitation. For agricultural activity 90% of all groundwater are extracted annually. About 70% of irrigational facility is provided by the ground water. There is requirement to develop and adopt alternative mode of irrigational activity such as drip or sprinkler irrigation, drip and sprinkler enhance the efficiency of water utilization for agriculture activity these reduce the water intake by 30 to 60 %.

Sustainability – The unsustainable practices in agriculture become more vulnerable due to climate change as it further reduces crop yields. Flood irrigation, lopsided/excessive fertilizer usage are some examples. Agriculture also contributes to air pollution through the emission of Green House Gases (GHGs) and stubble burning. Deterioration and degrading soil health is another challenge to sustaining our production levels. It is found that there is decline of soil organic carbon an important indicator of soil health across India. It is also contributed to the fact that there is high imbalance in the fertilizer use and the overuse of nitrogenous fertilizers.

Nutritional security – Malnutrition is widely prevalent in the country, underwent and stunting to be 33.4% and 34.7% respectively. It directly or indirectly affect the household income which in turn improves access of household to more diverse nutritious food, better health and sanitation facilities , bio-fortification etc can be solution to this.

WAY AHEAD

The Role of Technology:

Technology is considered to play a significant role pre harvest and post harvest of agriculture products. Agri-tech has emerged as one of the most attractive destination for start-ups. The rising use of Agri-tech today made India the third largest agri-tech market in the world. Agri-tech application range from development of model which can predict agriculture yields by using satellite data, administrative data and weather data through AI-ML models to Block chain



platforms being developed to provide end to end traceability of agricultural produce a key constraint to growing our export base.

The Artificial Intelligence like Drones are also assisting in monitoring of the crop yield and play important role in crop assessment so that preventive action can be undertaken against crop damages.

Hand held gadgets have been developed to assay and grade produce, which is the other key constraint in marketing. The ministry of Agriculture and Farmer Welfare has been developing the IDE Platform, a database of 100 million of farmers on which the private sector can build solutions scalable across India.

Sustainable Intensification

Agro-climatic Regional Planning (ACRP)- Aligning cropping system means crop identification and cultivation on the basis of the Agro-Climatic region, of that region can boost and enhance India's adaptation and mitigation capabilities is combating climate change.

Agro climatic condition based crop selection will play greater role in sustainable agriculture. Example: Shift in the production base of rice and wheat to eastern part of the country is one avenue. Rice is cultivated in Punjab, Haryana region, which is not sustainable. Rice being a water intensive crop is not sustainable to grow in Punjab, Haryana region. This region is more suitable for wheat cultivation, which is not a water intensive crop. Therefore, the cultivation of rice in the region is leading to steady depletion of ground water level, deterioration and erosion of soil.

There is requirement of designation of incentive mechanisms for farmer's currently growing wheat rice in the water stressed areas. To switch to different crops, it will speed of the shifting of sustainable agricultural practices.

Agro Ecological Farming- It is another concept in India. Natural Farming is promoted as Bharti Prakritik Krishi Paddhati Program (BPKP) under the Centrally Sponsored Scheme- Paramparagat Krishi Vikas Yojna (PKVY). BPKP core aim is to prepare, propagating and promoting traditional indigenous practices, for example- based on use of or from cow dung urine formulations with application of recycling, mulching, periodic soil aeration and exclusion of all synthetic chemical inputs. States such as Andhra Pradesh, Telangana, Tamil Nadu, Himachal Pradesh and Gujarat are the leaders in this movement.

National Institute of Transforming India (NITI) Aayog has taken a multi-dimensional approach which includes scientific evaluation, documentation of best agricultural practices and studies at state, national and international level consultations and technical interventions for traceability and certification of produce.

Nutritional Security- The widespread existence of malnutrition, stunting and require special attention. There is need to enhance the production, accessibility and affordability of nutritional food. The crops such as millets require lesser water in comparison to rice and wheat. They are more nutritious in comparison to rice and wheat. Whilst MSP for millets is declared, procurement and distribution under the PDS is less in comparison to rice and wheat which has wider and larger procurement and distribution. There is the requirement of promoting Research and Development for millets crops to raise their production and productivity, the government should provide incentive to farmers for the adoption of millets crops, the institutional mechanism, forward and backward linkages should be enhanced to ensure higher remuneration for the growing millets.

Cooperative Model- The success of this was well demonstrated in the white revolution. This model needs to be replicated in the field of nutritional crops, example: Millets. The central government is undertaking several steps to ensure organized functioning of the agricultural produce and ensure the central government, creating 10,000 farmers organizations (FPO). The recently formed Ministry of Cooperation is a further demonstration of the same commitment. Its aim is to promote cooperative organization, its enhanced role and function. By making FPOs eligible to borrow under AIF, wider and shared post harvest infrastructure can be created, allowing higher accessibility and outreach to the terminal markets , which will subsequently lead to lower wastage.

Agriculture schemes – For enhancing present and future prospect

- **National mission on edible oils – oil palm**

Objectives

To enhance the edible oilseeds production and oils availability in the country by harnessing oil palm area expansion, increasing current palm oil production.

To reduce import burden on edible oils.

- **Agriculture infrastructure fund(AIF)**

Objectives

To mobilize a medium long term debt financing facility for investment in viable projects for post harvest management.

- **Pradhan mantra kisan samman Nidhi (PM KISHAN)**

Objectives

To provide income support to all landholding eligible farmers families in the country.

Achieve convergence of investment in irrigation at the field level.

Enhance the physical access of water on the farm and expand cultivable area under assured irrigation.

- **Pradhan Mantri Kisan Maan—dhan Yojana(PM-KJY)**

To provide social security to small and marginal farmers in their old age.

- **Promotion of Agricultural Mechanization for IN-SITU Management of crop residue.**

- **National Mission on Sustainable Agriculture**

Objective

Make agriculture more sustainable productive and remunerative as well as climate resilient by promoting location specific integrated composite farming system.

- **Paramparagat Krishi Vikas Yojana (PKVY)**

Objective

To promote natural resource based integrated and climate resilient sustainable farming system.

To reduce cost of agriculture

To protect environment

To empower farmers through their own institutional development

To make farmers entrepreneur.

Integrated scheme for Agricultural Marketing.

To promote creation of agricultural marketing infrastructure by providing backend subsidy support to state cooperative and private sector investments.

- **Soil Health Card (SHC) Scheme**

To issue soil health cards to all farmers, to provide a basis to address nutrient deficiencies in fertilization practices.

- **Kisan Credit Card (KCC)**

To provide adequate and timely credit support from the banking system under single window for cultivation.

- **National innovations on climate Resilient Agriculture (NICRA)**

To enhance the resilience of agriculture to climate variability and climate change

- **Attracting and Retaining youth in Agriculture (ARYA)**

To attract and empower the youth in rural areas to take up various Agriculture, allied and service sector enterprises.

CONCLUSION

India has traversed a long distance from one being a food deficit nation, a import dependent country to fulfill its food security to a food surplus one and also a exporter to large number of crops. The present status reflect the achievement of India in ensuring accessibility and affordability of food grains, there was absence and non-existence of large scale famines.

The role of science and technology, modified and modern patterns of production, growing and strengthening of institutional mechanism eg credit, forward and backward linkages, Public procurement and distributional system have played crucial role towards achieving food security. The next frontier that we need to conquer is nutritional security.

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