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The role of modern technology in transforming Indian agriculture.

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Abstract: *Agricultural practices and production techniques are considered important to increase agricultural production in developing country like India. Due to higher agricultural production and increasing population, there is a need for new technology agriculture. About 65% of the population is employed in the agriculture sector, which contributes only 18% to the Indian GDP. Indian agriculture largely depends on natural factors such as climate which varies due to regional variations. Main factors of agriculture: It is necessary to use resources wisely like climate, soil, water, etc along with other factors in agricultural, currently due to climate change and global warming, agricultural production is also getting affected, which is impacting the economy. New agricultural revolution can be led through modern technology to increase agricultural production and highlight the importance of new agricultural system. Because India is a country with a monsoon climate, its geographical conditions are highly variable. Due to regional disparity and changes in traditional agricultural methods, a lack of information about agricultural produce, etc., there are obstacles to economic development, which is a matter of serious concern. These obstacles can be overcome through modern technology. Through smart farming, digital agriculture, and analytical data, useful information can be obtained regarding the factors affecting agriculture and their predictions. Information on crop yield will help farmers to develop suitable crops.*

Key words: Agricultural practices, production techniques, agricultural production, soil, water

Introduction: The development of agriculture and food security is essential for mankind. In an agricultural country like India, the sustenance of most of the population depends on agriculture-based crops. The demand for food products increases due to the growing population. Agriculture also affects the annual economy of the country. Currently, 60% of India's population is directly or indirectly associated with agricultural practices or any related enterprise, including agricultural machinery, fertilizer companies, market centre etc. India's climate, soil, and terrain display geographical disparity, leading to visible changes in agricultural crops. Regional variation is clear in the agricultural production of the country. Major food crops include rice, wheat, cereals, pulses, and various vegetables such as potatoes, carrots, mangoes, oranges, and red chilies. But still, the major food crops include rice, wheat, cereals, pulses, and various vegetables. Potatoes, carrots, mangoes, oranges, red chilies, and some various commercial crops are also being produced. Indian agriculture has a major impact on the socio-economic structure of the country. Some factors such as soil fertility, climatic conditions, weather forecasts, temperature, water levels, irrigation conditions, and the availability of fertilizers, pesticides, and weeds can be clearly seen in agricultural production. India is a country with an agricultural economy that dates back to ancient times. There has been a shift from primitive agricultural systems to modern agricultural systems. However, at present, the aim of the government is to solve the problems faced in agriculture and to increase agricultural production. Since India's agriculture depends on the monsoon, it is affected by the monsoon climate. Currently, the harmful effects on agriculture due to global warming are becoming evident, with some obvious effects being drought, floods, and irregularity in the amount and severity of rainfall. Therefore, in recent years, attention has been given to agricultural development to introduce new dimensions to agriculture. By connecting Indian agriculture and farmers with modern technology, we can increase agricultural productivity and profits. At present, natural resources are being exploited rapidly, and the human population has increased unexpectedly. This has resulted in an increased demand for housing and shelter, putting pressure on the natural

capacity of the land. Soil pollution and the decline in wildlife populations are some of the consequences. Therefore, agricultural technology can help reduce these consequences, and sustainable development protects humans and their future. Presently, food pressure can be alleviated through agricultural technology, and the scope of agriculture can be widened with various agricultural methods and technical equipment. As a result, agricultural production efficiency has increased, positively impacting the rural economy. Modern data analytical tools have contributed to this.

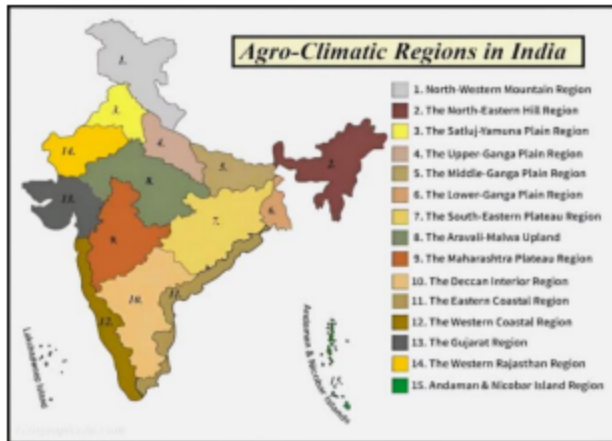


Figure 1: Map Agro -climatic regions in India



Figure 2: Map Major Soil in India

Source: Agriculture Ministry of India

- Objective:**
1. To study modern technology in Indian agriculture.
 2. To study the importance and impact of modern technology in India.

Data source : This research paper is based on secondary data collected from multiple sources like the Ministry of Finance, the Ministry of Social Justice and Welfare, India's budget, economic magazines, various financial data, and research papers.

Agricultural technology AND Scheme : It is a system in which high technology is used to help farmers increase production and agricultural system in a better way. Currently scientific knowledge and data analysis are helpful in gain knowledge about agricultural systems . modern agricultural techniques not only insure crop production but also simplify their sale, sport a useful role in justify agricultural practices .it is a system in which strange techniques of agriculture are used . scientific knowledge and data analysis are collected about agriculture systems.

Financing Schemes of NABARD: NABARD through its subsidiary NABKISAN Finance Limited provides credit assistance of the FPOs at various stages of their life lone . Products are customized to meet the requirement of FPOs with out collateral cover. The items eligible for assistance broadly include capital cost such as cost building , machinery and equipment for processing , specially designed vehicles for transportation etc. working capital requirement for input supply ,procurement ,collective marketing ,and other recurring cost connected with the project .

The Digital India Program aims to provide understanding and use of new technology to provide market information , market prices , direct bank transfer payments . The target has been fixed to double the income of farmers by the year 2022.

In April 2016, prime minster Modi launched the e-NAM app ,which provides an online platform for farmers to get information about services ,prices ,movement of goods and purchase and sale of products etc.

Pradhan Mantri Fasal Bima Yojana (PMFBY) was launched in 2016, which provides financial help to in case of crop failure due to natural calamity ,pests and diseases and any other reason Soil health card scheme ,the scheme was started with the theme Healthy earth and green

fields to overcome the deficiency of nutrients in the soil and to maintain the fertility of the soil. Through Pradhan Mantri Krishi yojana and PM Kisan Samman Nidhi Yojana are role model in Indian agriculture development. mobile phone to work in 22 Indian local regional languages apart from English and Hindi. New technology and knowledge developed, giving grow to the digital revolution in Indian. Smart farming is also an important factor in this.

Smart farming : Agricultural production can be increased through smart farming and importance is given to resource conservation and quality of its utilization .

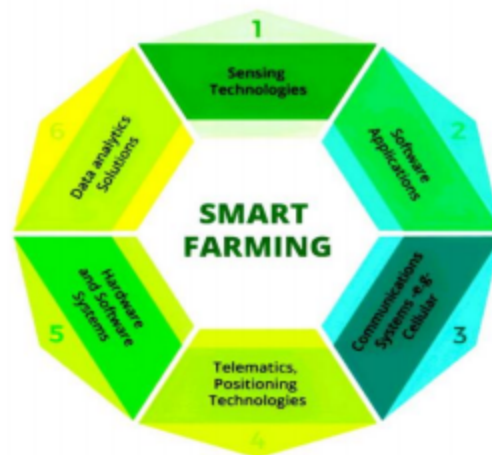


Figure 3: Smart Farming Function

Satellite Images: Images are used to monitor crops and identify areas that need action.

Drone : Drones are used for aerial survey and health of crops located. get clear images of the field .

Sensors And IOT Devices :

Its help to collecting field data and other parameters like soil ,water ,temperature , wind flow etc and send data to the input device.

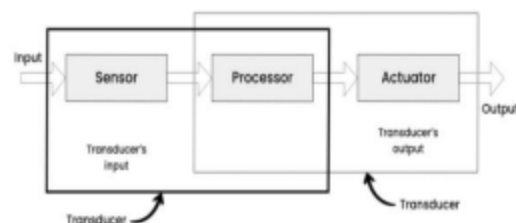


Figure 4: Sensors And IOT working format

Benefits of Technology: Growing in production, facilitation caring for and monitoring crops, accurate assessment of crop conditions, help in taking measures to improve them

Save Time and cost: Time and cost can be reduced cost through modern technology and agricultural machinery. More work done a short time and crop production rate low.

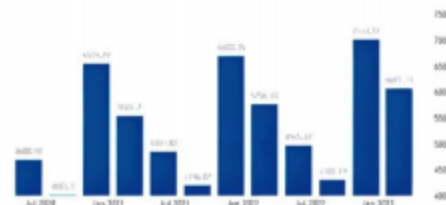
Environmental conjunction facts: Helpful for environment protection and sustainable agriculture ,water and soil fertility.

Impacts on Indian agriculture : Modern technology has opened many opportunities for Indian farmers and farmers income also increased along with agricultural crop production. Agriculture economy playing role in Indian GDP.

GDP and Agriculture : Agricultural GDP raise to agriculture and its products, exercise in the development India . After independence some gain positive growth rate in agriculture and its production since 1960s, the agricultural growth rate was around 1%, and there was a food crisis on agricultural production. after the Green Revolution, agricultural growth increased and contributed play role 8% per year in GDP. During the time from 2004 - 2005 and 2017 -2018 the agricultural growth rate was positive and 3.7% per year counted growth from 2013-14, out of which

the rate was 4.3% per year during the period from 2009 -10 and 2013 - 14. One of the highest percentage growth in Indian agricultural GDP growth over the last four years was 2.5% per year. The growth rate from 2014-15 to 2017-18 was decrease by drought, with negative growth rates of - 0.2% and 0.7% recorded year 2018. A positive growth has been recorded last years and 2022-2023 GDP growth 18.3% in this year.

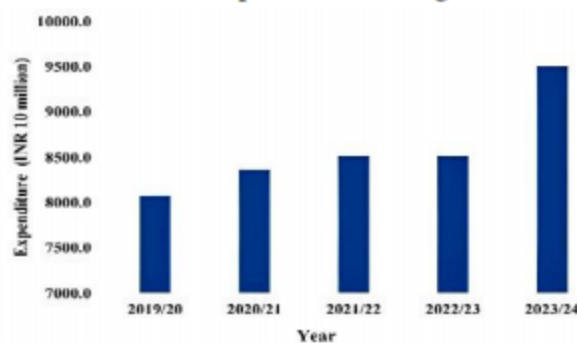
India's GDP from Agriculture
GDP from Agriculture in India decreased to 6071.31 INR Billion in the first quarter of 2023 from 7004.72 INR Billion in the fourth quarter of 2022.



Source: Ministry of Statistics and Programme Implementation (MOSPI) 2023

Figure 5: GDP Budget 2023-2024

Problems and solutions : New technology can increase agricultural productivity and efficiency, extend agricultural performance but at present many challenges exist with new technology for development. Modern technology is pushing human civilization forward as agriculture works to meet the growing demands of the annual population. Some of the major challenges include data security and privacy which require saving the data obtained through alternative mediums and ensuring its privacy so that the answers remain valid. Investment is significant for smallholder farmers' adoption of new technology because it is often very expensive and of high quality. Additionally education and technical knowledge are essential for successfully advancing agricultural practices and educating farmers. The budget 2023-24 needs to increase investment by the private sector in the agriculture sector and observe the technology of farming methods and to increase income. Attention must be paid to the fact that the government has also supported investment in development and research in the agricultural sector and improved the market infrastructure by encouraging the states to develop new technologies.



Source: Budget Documents, Ministry of Finance.

Figure 6: R&D Budget

Conclusion: Modern technology is rapidly giving a new shape to Indian agriculture . Self-reliance is being achieved in agricultural production. The production of various fertilizers, oilseeds, etc . is increasing the market and production of value -based commodities like milk, meat , fish, fruits ,vegetables, and other cash crops are also increasing . Agriculture is gaining momentum. Income generation strategies are being replaced by agriculture, and the pattern of diversified agriculture is clearly visible . The focus is on technology business and economic infrastructure for entrepreneurship ,start-up and technology ,and policies are being insured. Attention has been drawn to sustainability in resource use ,environmental impact, information, business risk management ,and ecosystem development ,giving priority to research and development ,encouraging the privat



sector, supporting new organizations and medium entrepreneurship. Business reasons for agriculture technology in agricultural development with help in balance.

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