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III Seminar on
Smart Agriculture for Resource Use Efficiency
Synopsis

World's population is expecting a one third increase by 2050 and most of these additional two billion people will live in developing countries. At the same time, more people will be living in cities. Food and Agriculture Organisation (FAO) estimates that agricultural production will have to increase by 60 per cent by 2050 to satisfy the expected demands for food and feed. Agriculture must therefore transform itself if it is to feed a burgeoning global population and provide the basis for economic growth and poverty reduction despite changing climate has adverse impacts on agriculture, requiring new technologies, which seems very promising to move to the next level of farm productivity and profitability. India has demonstrated a big transformation in the agriculture sector in the second half of the 20th century with the 'Green Revolution' but now we need to go for a 'Technology Revolution' to accelerate the growth in the agriculture sector. However, this transformation must be accomplished without depletion of the natural resource base. Smart agriculture has all the technological inputs that can steer us away from the problems of present-day agriculture. Smart agriculture has the potential to double the food production in 40 years with lesser impact on climate change. Further, it can reduce the losses and wastage by 50 per cent. Smart agriculture has been continuously evolving in the last few decades. It is the all-new agricultural production mode and ecosystem which is based on digital agriculture and precision agriculture. With this background, the present study has been conceptualized with the following objectives.

Objectives:

1. To understand the concept of Smart Agriculture and Smart Agriculture Practices
2. To deliberate smart agricultural practices for higher farm resource use efficiency
3. To review the case studies/ research studies related to smart agriculture and their implications

Smart Agriculture: Smart Agriculture involves the integration of advanced technologies into existing farming practices in order to increase production efficiency and the quality of agricultural products. Smart agriculture consists of applying inputs (what is needed) when and where it is needed and has become the third wave of the modern agriculture revolution.

Smart agriculture digitizes the planning, process and result of agricultural production, such as big data, ai, cloud computing and blockchain. precision agriculture uses information technology to achieve precision management, such as drone, robot and intelligent irrigation.

Smart agricultural practices for higher farm resource use efficiency: The recent developments, such as cloud computing, internet of things, big data, blockchain, robotics and

artificial intelligence have taken the management of agricultural operations to a much higher level of technology. It allowed for the integration of so far isolated lines of development into smart, connected system of systems. Integration of these technologies will help the agriculture to evolve in a data-driven, intelligent, agile and autonomously connected system of systems. Recent smart agricultural practices for higher farm resource use efficiency are precision in seed sowing and seed planting, precision in nutrient management, efficient water management practices, efficient weed and pest management practices, resource conserving practices, and practices for higher productivity and profitability.

Review of the research studies:

Anonymous (2014) reported that among 64 districts covered in 13 states, indicated that micro-irrigation has benefited farmers significantly by reducing electricity consumption by about 31 per cent, the irrigation cost has also decreased by an average of 32.3 per cent. Furthermore, about 28 per cent reduction in total fertilizer consumption. It also enhanced the average productivity of fruits and vegetables by about 42.3 per cent and 52.8 per cent, respectively and increase in farmers' income in the range of 20 per cent to 68 per cent with an average increase of 48.5 per cent.

Kapoor (2020) reported that spraying of pesticides with limited amount of water is one of the great features of the Agribot drone. Normally 400 litres of water is used for spraying pesticides in one-acre field, the Agribot can spray it in 8 litres of water. Amidst the terror of the locust attack, in January 2020, the drone sprayed over 500 hectares of land in 16 days and freed the area from locusts. Around 99 per cent of grasshoppers pile up in about 10 minutes. Apart from saving water, the use of pesticides is 15 to 35 per cent higher efficient with drones than the conventional methods as the amount of chemical is scientifically determined. By spraying pesticides with drones, farmers stay away from chemicals and they do not have any side effects on their health.

Conclusion:

Smart agriculture has the potential to double the food production along with reducing the losses and wastage. It is estimated that the smart agriculture has the potential to increase agricultural productivity by 70 per cent by 2050. There is a need to develop an infrastructure in our agricultural institutions to have scientific understanding for such technologies so that the farmers can be trained to use of such technologies and equipments in the field. There is a need for convergence of available institutional resources in the country for their efficient utilization.

Reference:

- ANONYMOUS, 2014, Impact evaluation study of National Mission on Micro-irrigation, *Gol Report*, Ministry of Agriculture.
- KAPOOR, N., 2020, Agribot: Saving Water and Spraying Pesticides, *Vigyan Prasara (Kurukshetra Magazine)*, 58 (8):18.