SMART AGRICULTURE

India needs a robust and modernized agriculture towards food security for its growing rural and urban population of over 1.3 billion. For this, it needs sustained agricultural productivity for sustained growth of its agricultural sector. Simultaneously, climate change and it's negative impact on crop productivity is now a reality, that poses new challenges for sustainable agriculture. As a result, India has the highest number of severely malnourished children under the age of five, while 14 percent of the population is undernourished. Besides, 51.4 percent of women of reproductive age between 15 to 49 years are anemic and need proper care and nutritious food.

Smart Farming for Zero Poverty and Zero Hunger

The most important sustainability goals (SDGs) such as zero poverty and zero hunger are interdependent, because agriculture employs over half of the Indian working population and contributes 17-18% of the country's GDP. As a result, managing farms using modern Information and Communication Technologies such as IoT (Internet of things) devices, precision agriculture, and livestock farming, drone technology, sensors, AI based solutions, smart

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agriculture inputs such as nano-fertilizers and nano-pesticides, as well as biofertilizers could increase the quality and quantity of the agriculture products which leads to increased farmer's income, elimination of micronutrient deficiencies and the availability of food for all.

Artificial intelligence and machine learning are reshaping industries all over the world. The National AI Strategy of India aims to maximize the technology's potential for economic and social benefits. Agriculture has also been identified as a priority sector for the implementation of AI-driven solutions. (Niti Aayog, 2019).

This would obviously necessitate infusing more funds for agricultural research and development innovation. Additionally, deliberate efforts are required to integrate IoT (Internet of things), Artificial intelligence (AI), and machine learning into already available disruptive innovations such as hybrid technology, genome editing for crop improvement, accelerated breeding, conservation agriculture, protected cultivation, bioenergy/ biofuel crops, biofortified crops, pricing policy, and sales of agricultural produce could make these innovative technologies more controlled and accurate. Smart agriculture must become part of achieving the larger goal of sustainability.

Benefits of Precision Agriculture far outweigh the costs of the New Technology

Currently, only about 20% of global acreage is using advanced farming technologies. It enables farmers to purchase and apply pesticides and fertilisers in precise amounts, resulting in cost savings and a lower environmental impact. As smart agriculture must be smart sustainable agriculture, the application of new methods of fertigation including boom sprayers/ drones can help in increasing the efficacy of crop protection chemicals / nano-fertilizers, nano-pesticides through reduced manpower, time, resource consumption, thereby saving environmental drift and reducing human exposure to chemicals. Farm mechanization, especially through custom hiring, not only creates employment and leads to entrepreneurship development but has a much larger benefit of collecting the crop residue, which instead of being burnt, can be applied for multiple uses.

Obstacles to Smart Agriculture

Data security and accuracy are the first and most crucial factors to take into account. Because production, fertigation, irrigation, harvest, and post-harvest management suggestions actually equate with food product quality. The high costs of implementing these technologies, particularly in developing nations like India, and the potential negative effects of digitalizing agriculture on employment opportunities and job creation in the sector are additional worries that will need to be addressed over time.

While the improvements in yield and soil quality that result from using these techniques are immediately visible, demand for carbon credits can also act as an additional financial incentive for smallholder farmers. Thus, the creation of carbon credits for agri-business would increase the resilience of Indian farmers by ensuring higher yields, improved soil health, and improved livelihoods.

Smart Farming means Profitable Agriculture

Smart farming can potentially make agriculture more profitable by improving resource use efficiency, consequently saving farmer's money and labour, and increasing reliability and reduced risk that are associated with conventional farming. Localized weather forecasts, yield projections, and probability maps for diseases and natural disasters could facilitate optimal cultivation of crops. Thus, information-driven smart farming that would allow us to make ecologically and economically meaningful decisions would soon become a trend. Intelligent use of information and communications would guide the farmers on efficient resource allocation such as fertilizers, pesticides, herbicides and water use, develop efficient pest management strategies, early detection and management of crop diseases and minimize post-harvest losses in an energy efficient and economically viable manner. In addition, having all these information on finger-tips through apps on a smartphone and integrating them with the control systems would allow farmers to control their fields remotely. The key enablers will be smart and precision ground sensors, remote sensing technologies, smart devices and control systems, wireless technologies, unmanned aerial vehicles for crop monitoring and agri-input delivery, on-site renewable energy sources as enabler for total mechanization and automation of agricultural systems, earth observation and navigation satellite systems along with software that could process complex data sets and offer data in a user-friendly and easy-to-read manner.

There is urgent need to collect PAN India data of soil, irrigation, crop productivity, farm mechanisation, agricultural inputs with demand and supply of different agricultural products their profitability margins along with government schemes and policies for agriculture sector to analyse and generate decision-making tools to identify smart agricultural clusters for pilot study to frame recommendations or policies for commodities, support system, relevant industries as takers/ insurance providers be created to improve farmer income in the long term.

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My hobby is playing with cats. I have six cats at home. It is great to observe them and their psychology to seek attention and a sort of jealousy among themselves as who gets more patting.