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Smart Agriculture: A Revolutionary Idea For Farming

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Abstract

India is an agricultural country and agriculture, rural sides and farmers are the main issues in the development of India. Smart agriculture is mostly used to denote the application of internet of things in agriculture. It is a revolution in the agriculture industry that helps to guide actions required to modify and reorient agricultural system to effectively support the development and guarantee food security during an everchanging climate. Farmers and scientists have used plant selection and breeding technique to improve crop yield years. Genetic engineering technology can improve a plant's insect resistance, drought tolerance, herbicide resistance and disease resistance. This technology gives farmers and additional tool to help increase crop yields. Agricultural technologies could increase global crop yields up to 67%. Increase demand for food due to population and income growth and the impacts of climate change on agriculture will ratchet up the pressure for increased and more sustainable agricultural production to feed the planet. Technologies and internet of things can improve agriculture by the many ways, such as, monitoring of climate conditions, greenhouse automation, crop management, cattle monitoring and management, end- to- end farm management systems etc. the perfect combination of them can promote development of agricultural modernization realizing smart agriculture and effectively solve the problems of agriculture, rural sides and farmers in India.
Key Words: agriculture, farmers, development, technology.

Introduction

Smart farming represents the application of modern information and communication technologies (ICT) into agriculture, leading to what can be called a "third green revolution" or "third agricultural revolution". It is a set of research technology transfer initiatives occurring between 1950 and the late 1960s that increased agricultural production worldwide, particularly in the developing world, beginning most markedly in the late 1960s. the initiatives resulted in the adoption of new technologies, including high yielding varieties of cereals, especially dwarf wheat and rice, in association with chemical fertilizers and agrochemicals and with controlled water supply and new methods of cultivation, including mechanization. All of these together were seen as a package of practices' to supersede 'traditional' technology and to be adopted as a whole. In coming days, the smart farming will create a large effect on the agricultural economy. It will work as a bridge between small and large- scale businesses. The value of smart farming will realize by developed and developing countries both.

Smart agriculture is a revolution in the agriculture industry that helps to guide actions required to modify and reorient agricultural systems to effectively support the development and guarantee food security during an ever- changing climate.

Technology in agriculture: with that in mind, here are, some emerging technologies that can literally change the agricultural landscape in the years ahead:

Soil and Water sensors
Weather tracking
Satellite imaging
Pervasive automation

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Mini chromosomal technology
RFID technology
Vertical farming

Farmers and scientists have used plant selection and breeding techniques to improve crop yield for years. GE technology can improve a plant's insect resistance, drought tolerance, herbicide tolerance and disease resistance. This technology gives farmers an additional tool to help increase crop yields. Agricultural technologies could increase global crop yields up to 67%. Increased demand for food due to population and income growth, and the impacts to climate change on agriculture will ratchet up the pressure for increased and more sustainable agricultural production to feed the planed.

Where we can use technologies in smart farming? Technologies have improved medicines and healthcare, communications and transportation. Agriculture totally changed now a day by using technologies. There are some examples:

1**.Plant breeding and pest management:** plant breeding has been practiced for thousands of years by farmers. It is now practiced worldwide by government institutions, scientists and commercial industries. It plays a great role in crop improvement, such as rice, maize, wheat etc.

Integrated pest management (IPM) promotes sound structures and healthy plants, sustainable bio- based pest management alternatives, reduces environmental risk associated with pest management, and reduces the potential for air and ground water contamination.

2.Genetics of livestock and animal breeding: genetic improvement may be carried by identification and recording of large number of animals of the selected breed in an area, identification of best performing animals (Bulls and Cows/ buffaloes) for producing next generation, maximize use of these "selected" animals in breeding programs. Farmers breed animals for increased production, disease resistance, successful reproduction and resilience to climate stresses, most often heat and drought. Highly productive animals use a greater portion of their nutritional to intake desired products such as milk and meat. Animal breeding makes use of the natural variation among animals. It can yield permanent and cumulative improvements in the population because the selected traits are directly transferred from generation to generation. It is common for beef cattle and pig farmers to purchase semen from male animals with superior genetics use artificial insemination to breed farmers.

3.Mechanization: mechanized agriculture is the process of using agricultural machinery to mechanize the work of agriculture, especially increased farm worker productivity. Improved farm equipment has probably had the most significant impact on how farmers raise crops and care for livestock. Tractors, planters and combines are much larger and efficient. Livestock barns have automated feeders. Robotic milking machines milk cows. These technologies and others have enabled farmers to produce more with less labor.

Farmers today are even more specialized. If farmers raise livestock, they usually raise one type and even focus on one growth stage. Most pig farms specialize in furrowing or finishing. Beef cattle farmers generally have cow- calf herd and focus on breeding, calving and weaning, or finishing operations where they raise weaned caves to market weight. Specializing enables farmers to acquire the facilities, technology, knowledge and skills needed to produce the chosen crop or animals, and produce it well.

4.Hydroponics and aeroponics: Herbivore Farms is an example of a newly popular and successful type of urban farming—hydroponics. Simply put, it is growing plants in water. Soil is replaced by a water solution that is rich in macronutrients like nitrogen, potassium, phosphorous, calcium nitrate and micronutrients like manganese zinc etc. A 'grow system' controls the balance of nutrition, humidity and temperature, uses less

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water than soil-based farming and increases yield without chemicals or pesticides. There are many advantages to urban farming. The land requirement is quite low, water consumption is 80 percent less, the water is recycled and saved, it is pesticide-free and in cases of high-tech farms there is no real dependency on the weather. Hydroponic farming is setting up roots all across India because it beneficial in many way, such as, no soil needed for this, it make better use of space and location, it can control climate, the nutrients used effectively in this process, pH control of solution, better growth rate, no weeds, fewer pests and diseases, less use of insecticides and herbicides, labor and time saver. It is stress relieving hobby.

Just like hydroponics, aeroponics also a reliable technique for smart farming. It is the process of growing plants in an air and mist environment without the use of soil or an aggregate medium. It uses considerably less energy and water than traditional agriculture. Since, air acts as a medium to grow plants, considerably less maintenance is needed. In this system, the plant roots are exposed to sufficient oxygen and they can easily absorb it.

Is India ready to adopt smart farming technology? Farming families in rural areas are increasingly losing the next generation farmer plagued by low per capita productivity and high cost of cultivation to insufficient soil management and prefer migration to a non- farming but better paying occupation. The situation in India can never be as ripe as it is today for the adoption of smart technologies. We are at the cusp of digital revolution, joining this vast landmass with wireless connectivity. It is high time we leverage the digital connectivity to help our farmers. We need to initiate smart farming technologies systematically, starting preferably with progressive states where the adoption will be easy.

Smart farming also needs smart farmers! According to Rajesh Agrawal (MD, Insecticides India Limited) "The dream of a future where farmers know whether there will be enough rain or sun or whether the cattle walked or ate enough sounds rosy. However, most of our farmers are either illiterate or have elementary education and therefore are wary of using digital devices, considering they are too complex. So they are thinking that such activities, like transaction, are the waste of money. Sometimes, they are unable to understand the icons used in a mobile application since that is a popular icon, while those used by the farmers are based on traditional understanding. This gap between their knowledge and available format is the key hurdle to adopting smart technologies. Our farmers need to be digitally literate in order to leverage the benefits smart farming technologies offers. At the same time, the agri- tech companies who are offering their service should realize the limitations and use icons that are easily understand by farmers".

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