TOWARDS THE NEXT GREEN REVOLUTION IN INDIA: DATA DRIVEN AGRICULTURE

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The first Green Revolution was a series of rapid technological and agronomic advances that took place after World War II (late 1950 onwards) transforming agriculture and saving more than a billion people from starvation. World's grain production increased by 160%, setting the stage for the world's population to increase from 3 billion in the late 1960s to an estimated 7.3 billion today. This phenomenal growth, however, poses significant challenge to the continued expansion of this first green revolution, and in some ways it has been the victim of its own success. Increased water use for irrigation, soil degradation, and chemical runoff are just some of the unintended consequences impacting the landscape. The deterioration of the agricultural resource base due to these factors suggests that the long-term success of the first green revolution may be at risk. Meanwhile, the need to produce more food remains urgent. The world is looking towards the next set of innovations to usher in the second Green Revolution.

AI (Artificial Intelligence), IoT (Internet of Things), Data Analytics are the current buzzwords in agriculture sector and are touted to have the potential to bring in the next Green Revolution. These technologies can capture various data points across the farm, connect and analyze them to make early predictions so that better practices may be followed leading to sustainability. These systems are being extensively piloted in countries like Israel, America and many in Europe, resulting in high quantity, variety and quality of food using lesser inputs. Technologies such as advanced IoT sensors and monitoring equipment can now allow farmers to monitor crops more precisely and continuously than in the past and without too much of manual involvement. The data analytics can enable farmers to make more effective and strategic decisions that increase productivity with reduced impacts on the environment.

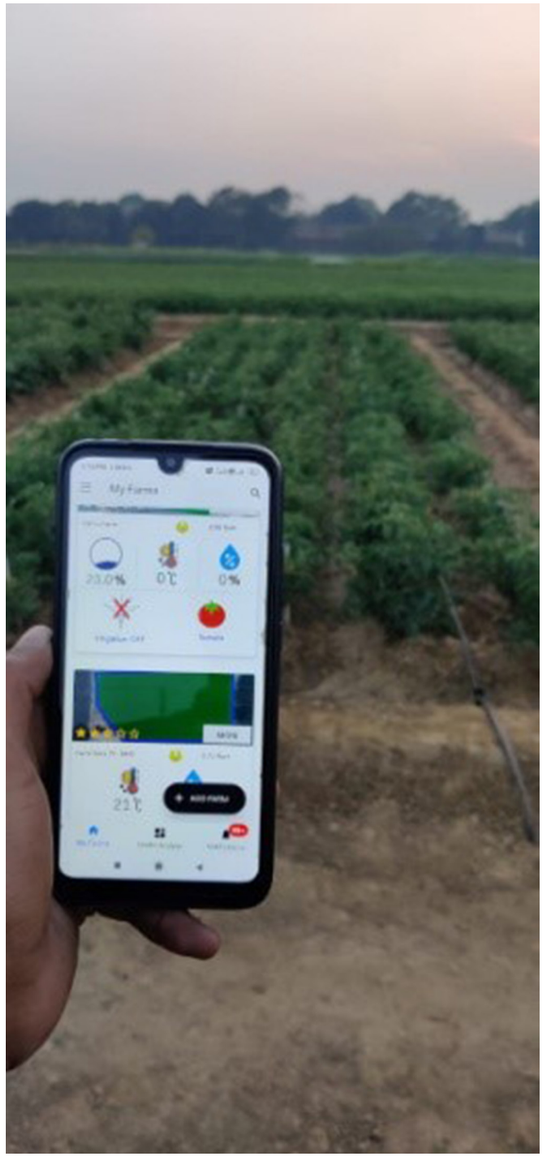
One may ask, can these fancy technologies work in Indian sector since all the above mentioned nations are developed, where agriculture is dominated by large farmers. It is no secret that the small land-holding of farmers in India poses a huge challenge but companies like AgSmartic Technologies are slowly but successfully convincing farmers to adopt some of these systems.

One of the applications of Artificial Intelligence (AI) and Internet of Things (IoT) in the pre-harvest segment of agriculture value-chain is to monitor crop growth, crop water demand, diseases and pests to help achieve the potential yield while optimizing the inputs like fertilizers, pesticides and conserving resources like water and electricity. To implement such a system the fields are geo-tagged and IoT sensors are installed to gather field data like soil moisture, pest detection, weather conditions like temperature and humidity. These data are regularly sent to the Cloud processor where AI modelling collates them with data from weather stations, satellite imagery, current crop model for the crop sown in the field, evapotranspiration and many other indices. This real time monitoring gives valuable insights about the farm situation and the system can then be used to manage activities like irrigation and fertigation. The advisories and alerts sent to the farmer to empower them to take better informed and sustainable decisions.

The farmers can visualize their farms and manage them through their phone from anywhere in the world.

CASE STUDY

Imapgro Farming Solutions is a company that provides pack house services and market linkages to farmers for better returns on their produce. They helped horticulture farmers in Bhopal to install wireless IoT soil sensors, wireless valves and pump controllers on 7 acres of land with crops like Brinjal, Tomato, Chili and Pea. The technology intervention has helped farmers to improve the average crop yield by almost 15% and increase income by more than 20% through better yield and reduced input cost. The technology helped provide adequate irrigation throughout the crop cycle based on crop water demand, provided timely alerts and notifications about inconsistencies in crop growth.



The system noticed stress in Brinjal in one of the fields and identified the possible cause of the infestation and/or nutrient deficiency. On close examination of the marked field area the farmer identified very early stage of Leaf Spot disease. Timely action helped mitigate the damage to the crop.

The data analytics, adequate and timely irrigation and continuous vigilance by the system among other initiatives taken, helped the pea crop to grow without any chemical sprays till harvesting leading to a high value residue free produce.

CONCLUSION

These technologies are implementable and feasible in Indian context too and several agri-tech startups are bringing them to the farmers to increase their income through improved quality and quantity of yield and reduced input costs. It also encourages more sustainable way of farming by optimizing resources like water and electricity. Various combination of these technologies can be bundled to provide a cost effective solution to all segments of farmers. The ease of farming, which is a byproduct of technology use, and profitability is attracting the youth towards farming and many youngsters are leaving their cushy jobs in cities and going towards agriculture sector. Government of India has also realized the potential of data driven technologies and has hence, included them in all of their recent guidelines and reforms. The way ahead for agriculture in India is very productive.