Catalyst For Indian Agriculture

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Introduction

India is known for its agrarianism and rightly so about 61% of the country's land area is agricultural land, contributes about 14-15% of India's GDP, and reached an all-time high of nearly 6.1 trillion INR in the fourth quarter of 2019. It is the main source of livelihood for over 80% of India's rural population and creates jobs for north of 52% of all labour in the country. Clearly, a majority of the Indian population is dependent on agriculture which is beset with its own challenges. Farmers across the country have to deal with issues such as soil erosion, crop failure, scarcity of capital, and even access to resources such as seeds, fertilizers, and pesticides at varying levels.

According to a report by NITI Aayog, the average income of farmers in India took 22 years to double, increasing at 3.31% from 1993 to 2015. If India is to grow to become an economic powerhouse, then it is essential to reduce this period drastically to double farmer's income.

India is also known for its thriving tech industry. It only makes sense to leverage this booming industry to alleviate the challenges in the agriculture sector and boost productivity. With the introduction of agri-tech method-ologies, not only will agricultural practices get transformed for the better, but the technology sector would also see an explosion in demand with the growth of the agri-tech marketspace.

How do drones help deliver superior agricultural results?

Drones can aid in improving per acre yield and reduce farming expenditures. By mounting powerful payloads, drones can survey very large patches of land quickly and efficiently. This can revolutionize agriculture. With a drone handy, a single pilot can remotely scan the entire farmland in a few hours. With reduced manpower and time demands, the farmer's job is far more streamlined.

Powerful imaging systems can be mounted on drones, making drone-powered multispectral analysis and precision agriculture an accessible reality. This technology gives information on crop health, harvest readiness, nitrogen levels, growth bottlenecks, crop counts, water content, chlorophyll content, etc. It can enable farmers to identify healthy and stressed areas on a farm with precision.

Hence, farmers can utilize their resources such as water, pesticides, and fertilizers more strategically. In a study, researchers optimized the variable rate application with drone-powered precision agriculture techniques which reduced the use of fertilizers by 50% while improving overall crop health. Farmers can benefit from cost savings as high as 50% and 20-30% increase in the yield of farmlands, which can result in an increase in their overall income.

Drones can help prevent the spread of weeds, pests, and fungal infestations. Often, they are present in small patches. They are difficult to identify without close inspection. The spread can be avoided by an aerial scan. Drone-based mapping and surveillance operations of agricultural land can unveil opportunities for improvement. Farmers can view their crops and the layout of water and irrigation channels, how these are affected by elevation and slope of the land, the condition of soil erosion, where the crops are crowding and where they can start newer plantations, and so on.

Benefits of drone-powered land surveys

Even today, a large number of people in rural India lack formal ownership documents of their assets, primarily land. This leads to property disputes. Since official evidence to substantiate their claims is in short supply, legal proceedings are difficult and lengthy. Farmers are not able to procure financial support from banks or established government services to meet agricultural expenditures.

This problem is further compounded by droughts, floods, and unseasonal rains. They are unable to claim crop insurance or financial assistance due lack of land ownership documents. By deploying drones, it is possible to conduct extremely accurate surveys of agricultural lands and create high-resolution maps which can help aggrieved parties resolve their land disputes. With legal documents of

ownership, farmers can apply for formal financial assistance to support agricultural activities. Accurate land records will allow government authorities to weed out fraudulent claims and increase accountability.

Major challenges

Nearly 90% of Indian farmers have relatively small landholdings of less than 2 hectares. Drones can be prohibitively expensive for them. Government and private sector organizations can use their reach to build the market, educate farmers on the benefits of drone technology and drive adoption.

We have to ensure that potential is unlocked on the demand side as well as on the supply side. Farmer cooperatives or collectives can be established under government or public-private- partnership models to cluster small landholdings and achieve economies of scale. Government can incentivize the use of drones through programs and subsidies and work closely with private organizations and agri-tech firms to ensure last-mile delivery of this technology. For example, the partnership between idea Forge and EM3 Agri services aims to provide state-of-the-art precision agriculture services to farmers on a pay-per-use basis, making it technology and accessible.

Indian agriculture has a lot to gain from drone technology and vice-versa. Once drones are deployed on a large scale in India towards boosting agricultural productivity, sectors such as agriculture, manufacturing, and allied services will become the engines of the Indian economy that will set our giant nation on the path of Atmanirbhar Bharat.

Future of drone-based precision agriculture

The rise of Artificial Intelligence (AI) is opening up a variety of applications for everyone, including agriculture professionals. Structured and suitably labelled data can make AI models accurate and efficient. An AI model needs to be trained with historical data to build optimized algorithms that can enhance productivity and curtail losses.

Finely tuned AI models can analzye raw data to empower agriculture professionals to provide recommendations to improve crop health and maximize farm yield. AI can help formulate strategies that help identify specific crop needs for diverse inputs, how to place irrigation channels more effectively etc. AI-powered drones will soon take precision agriculture to the next level and bring about operational excellence. The time is now to sow the seeds and reap the benefits.