Scope of Automated Agriculture in Indian Scenario

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***Abstract*- This research paper is based on the automated technologies that are been used in India. Agriculture is a primary occupation and most of the people depend upon this occupation for food. More than 60% of the population is dependent on the agriculture and one third of the nation's income depends on agriculture. There are various issues that have come up over the years which is halting the progress in agriculture. Population has increased considerably and the demands are increasing as well. Most of the Indian farmers work using traditional ways which can make a very little difference. Also they have very little knowledge about the technologies that have come up over the years. Many of the farmers leave their jobs because of no scope in agriculture but that is not the case. In order to overcome such issues there is a need to implement technologies that will benefit the farmers as well as the nation. Automated technology is the solution which can bring revolution in the realm of agriculture. There are many technologies that are been discussed which can be useful for the farmers to increase quality and quantity of the production.**

Keywords- Technologies; Yojna; GPS; platforms; irrigation robotics;

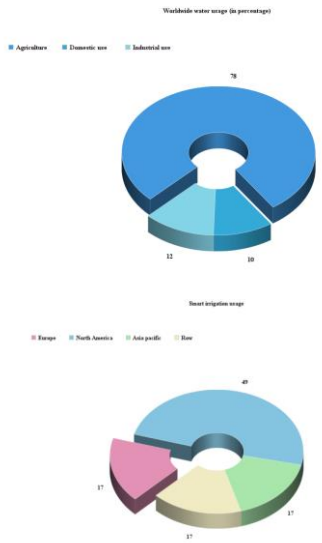
I. INTRODUCTION

India's population is increasing ever since and by the year 2040 the population may riseupto 9 billion. This in turn will be a big problem for the people to get enough and good quality food. The answer to the problem is automation which can reduce the efforts that the farmers puts in. Automation is the use of machines, control system and various information technologies to enhance agricultural activities. This will help India to become a better competitor in the world but also will help in increased production and delivery. The Indian farmers are getting the taste of automated technologies as the government is trying to make efforts to make the farmers savvy about various automated technologies. [2]Technologies like Agribots, Satellite farming, Big data, biological and many such automated technologies are used in India as per the trends for the year 2017. This has reduced the work load of the Indian farmers.

II. AUTOMATED TECHNOLOGIES USED

SMART IRRIGATION SYSTEM

In India, the availability of resources like water and land is a problem. India has vast arable lands and very limited fresh water resources. The most water-challenged country is India and to produce enough crops is a big challenge. India faces issues like water scarcity, erratic monsoon and also natural calamities. Smart irrigation involves the use of drip irrigation. Drip irrigation is a technique where the crop gets the necessary amount of water and fertilizers it needs, when it needs and where it needs. This doubles the yield with only using 50% of the water. This doubles the production and increases efficiency of the farmers like pesticides, fertilizers and labor. [3]Government has seen potential in this system and are trying to implement them. Special programmes have been created like National Mission on Micro-irrigation(NMMI) and now it is called as "per drop, more crop" under PradhanMantriKrishiSinchayeeYojna(PMKSY), this is helping farmers to be encouraged for such a big thing. If it is well implemented then it will save a lots of resources. Also government is promoting and simplifying subsidy process for the farmers.[6] This system can work around the clock and makes use of its sensors which can test ground's moisture, salinity and plant size to do the same. The data goes to the cloud along with satellite images and weather forecasts which helps the grower to do the right thing and set a proper irrigation schedule. [7] Farmers can control the smart irrigation remotely by using mobile phones. India has 140 million hectares of net cultivated land and 45% of land is irrigated. Micro irrigated area is about 9 million and drip irrigated land is about 4 hectares. Government is trying to implement many projects that will help farmers as well as the nation's economy.



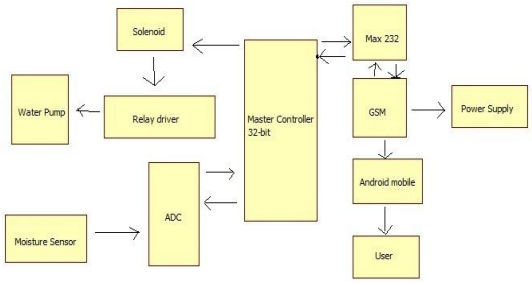


Fig.1 System overview of Smart irrigation

III. BIG DATA FOR NEXT GREEN REVOLUTION

It is very clear that the increase in population will make it a big problem for the food supply for the people around the country by 2050. Agri-businesses are subject to many regulations and consumer requirements and there is a need to record such data which can be used to analyse the future needs. Also would provide greater transparency in the processes and protect consumers. Big data can be very useful in fields of agriculture especially in India. [4] ,[8]Self-drivenvehicles can already drive themselves across fields using Global Positioning System (GPS) signals accurate to less than inch of error thus helping farmers plant more accurately, but the real potential is what happens when this data from thousands of tractors on thousands of farms is collected, grouped and analysed in real time. Precision agriculture aids farmers in tailored and effective water management, helping in production, improving economic efficiency and minimizing waste and environmental impact. [9]Recent progress in Big Data and advanced analytics capabilities and agri-robotics such as aerial imagery, sensors, and sophisticated local weather forecasts can truly transform the agri-scape and thus holds promise for increasing global agricultural productivity over the next few decades. The following bar chart shows in which aspects the big data can be useful.

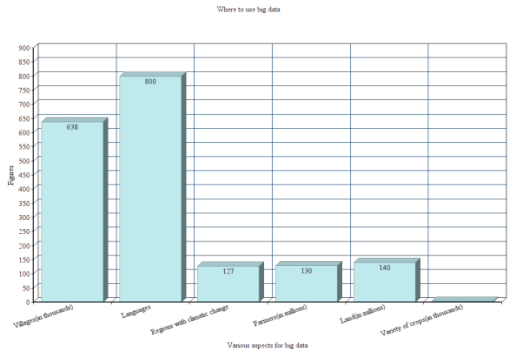


Fig. 2 Bar Chart

[5] Right information can be given to the farmers as they need accurate results regarding weather forecasts and on the inputs they use. Optimising factors such as nutrients, irrigation and pest control can help them protect the environment. The use of granular data and analytical capability to integrate various sources of information will help increase the productivity and lowers the cost. In India, climate change and weather are irregular and hence big data's information can help the farmers to make right choice at the right time. Big data can be of big use as it not only records the information about the soil, plants, pH values etc. but also it can be of use for marketing the yield.

IV. FINETECH PLATFORMS

As most of the Indian population is in agriculture but ironically they are the one's always in trouble. [6]Whenever a crisis hits, farmers are the one with suicides and debt cases. There is a boom of Finetech platforms in India now as well. The new startups now see an opportunity in agricultural sectors as well. Finetech platforms were focusing on urban areas more than primary sectors but now it has changed. [10]Farmers now can be helped in different ways via these platforms :

- Instant loans for farmers – Since long, farmers were always dependent on the middlemen or money lenders. After the demonetization, there was a shortage of cash in the country and hence, no cash for the farmers as well. With no existence of middlemen and the non-cooperation from banks, farmers are not able to go anywhere. This Finetech platforms provide farmers with help to borrow from them during such issues.
- No middlemen – Whenever a farmer needed to sell its produce they usually rely on the middlemen and middlemen in turn dupe farmers. This is a problem as well as middlemen most of the time sell them at low prices. Catalyst labs, BigHaat that works on direct contact with the buyers. Farmers are now able to directly negotiate with the buyers.
- Pay as per use – Farmers are not able to buy equipments as they are expensive and also because of financial problems. Coming to the rescue, now there are pay-per-use rent models which helps the farmers to use the equipment without buying it and can get them at affordable rates. EMI3 Agri is one startup which provides such services.
- Crop Insurance – Crops can be destroyed due to natural calamities and also wastage of crops can happen due to scarcity of water, climatic changes etc. InsurTech, Mobbisurance and many more startups are increasing which gives farmers affordable insurance to farmers while using satelite technology to insure them against weather risks. Farmers also are able to check in their phones regarding their insurances.

V. CONCLUSION

From these trending technologies that can be used to improve the agricultural sector and help become a better competitor in world market. There are many technologies that have come up which has the potential to change the primary sector and start of something that every country wants to achieve. These technologies used in agriculture not only will benefit the people but also the farmers as well.

Government is trying to make sure that the farmers get all the necessary equipments and give them the support to do better in this field. Automated technology has the potential for the next green revolution but it will take some time for farmers to fully get engaged in the using of technology. Future will be better if farmers show interest and try to learn various techniques followed by other countries as well. A country where most of the population is in agriculture, scope of automated technology seems large.

REFERENCES

[1] Shibusawa S. Precision farming approaches to small farm agriculture. Agro-Chemicals Report. 2002;2(4):13-20.

[2] Nobutaka Ito. Precision Farming and its Potentiality- Innovative Frontier Technology for Agriculture. Presentation at The International Forum of Frontier Technology for the Potential Collaboration with Kasetsart University, Thailand at the ceremony of The 60th anniversary of university foundation and presented at The 9th Tri-University International Joint Seminar & Symposium hosted by Jiangsu University: October 2002.

[3] Srinivasan A. Precision Farming in Asia: Progress and Prospects. The Haworth Press. Inc., 10, Alice Street, Binghamton, NY. 2006;13904-1580.

[4] Larscheid G, Blackmore BS. Interactions between farm managers and information systems with respect to yield mapping. In P.C. Robert et al., (ed.) Precision Agriculture. Proc. Third Int. Conf. Minneapolis, MN. (ASA, CSSA, SSSA, Madison, WI.) June 23-26, 1996;1153-1163.

[5] Iida M, Umeda M, Kaho T, Lee CK, Suguri M. Measurement of grain yield in Japanese paddy field. In Abstracts of the Fourth Int. Conf. Precision Agriculture. St. Paul, MN. July 19-22, 1998;54.

[6] AnandacoomaraswamyA, Ananthacumaraswamy S. Precision management of soil organic carbon in tea lands of Sri Lanka. In Abstracts of the Fourth Int. Conf. Precision Agriculture. St. Paul, MN. July 19-22, 1998;71.

[7] MandalSubrata Kumar, MaityAtanu. Precision farming approaches for small-farm agriculture: Scope and Prospect. In proceeding, Map India, New Delhi; 2006.

[8] Singh AK. Precision Farming. 2012. Accessed 25 June 2012.Available:http://www.iasri.res.in/ebook/EBADAT/6-Other%20Useful%20Techniques/14-Precision%20Farming%20Lecture.pdf.

[9] Mackay D. Precision Farming: connecting the pieces. 2012. Accessed 26.6.2012. Available: http://www.personal.psu.edu/pwl5119/blogs/bill_lim/assets/Limpisathian,%20P.%20GI S%20Paper.pdf.

[10] Aziz FAA, Shariff ARM, Amin BM, Mohd S, Rahim AA, Jahanshiri E, NikNorasmaChe' Ya. GIS based System for Paddy Precision Farming. IaaldAfita WCCA2008 World Conference on Agricultural Information and IT, Tokyo University of Agriculture, Tokyo, Japan, August 24 –27, 2008;417-422.