

# THE ROLE OF WSN IN AGRICULTURE

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## ABSTRACT

*In this paper we discuss about the agriculture and the need of technology in agriculture and how the revolution of technology enters in agriculture. In this we have also seen the various type of technologies and their benefits in agriculture and the main focus is on limiting the man power by using technology and the ways so we can cultivate more and more crops on a small land and by using minimum water so that it can be save for future needs.*

**Keywords:-precision agriculture, aerial vehicles, quadrotor , wsn , sensors.**

## I.INTRODUCTION

Agriculture the first need of an human being and the general views of people in modern world is to utilise the minimum part of land and cultivate crops on this as much as we can or we can say cultivating the land in a precise way as much as it is possible and this type of agriculture is termed as precision agriculture[1].This kind of demands can only be fulfilled by using wireless sensor networks. As wireless sensor networks (wsn) consists of spatially distributed autonomous sensors connected via a (wireless) Communications infrastructure to cooperatively monitor, record

and store physical or environmental conditions, such as temperature, sound, vibration, pressure, motion, or pollutants. As precision agriculture also involves few steps for its adoption of this operation and in its evaluation: The first and priority including condition is that it needs to be fulfil is its significant spatial and temporal variability in soil as it means the level of soil can be checked that what's its fertility level. Ability to identify and quantify such variability and to determine the state and conditions of a crop. The environment degradation should be minimum rather than this technique more tools are introduced today known as sensors like anemometers or thermometers and many more.

**RANGE OF WSN:** As for short distance we use wired sensor network but for long distance we prefer wireless sensor networks .The wsn are also used to check the humidity before farming as it is suitable or not for cultivating the land and for growing crops as the technology for spraying purposes was UAN (unnamed aerial vehicles) in 80's as the helicopters were also used later on for crop spraying purposes but they were unable to

fulfil the requirements of agriculture so the UAN were introduced these work for finding irregularities in the fertilization delivery system, to analyze variable soil, pest problems ,differences in fruit maturity and it is also used to monitor night time for the temperature for frost relief. Then later on precision viticulture was introduced this is done for the agricultural practise for growing grapes. To meet our demands we must work in an imminent manner so we can fulfil global food - demand through science based innovations and creations that can reach farmers, specially smallholder farmers all around the world .through this innovation and creation in the agricultural industry there will be a hope of improving lives of farmers and growing needs of our population and as consequently it will improve the political, ecological and economic stability of our world.

## II.BACKGROUND

As to remove many barriers like impending of such tools that are used according to weather conditions as incapability of smallholder farmers to access financing and capital to invest in technology and as well it will also lack of understanding in that farmers the positive aspects of science and technology can play in agriculture and food.

The farming that was practised before was breeding and hybridization of crops. In past years the agricultural biotechnology was also used by plant breeders as a source of genetic variation to grow crops with improved and better quality .this technology was used for a longer time to do the

cropping of varieties as corn, cotton, soybeans, and canola. Biotechnology also change the genes from a smaller size to a larger one those are available for the sake of betterment of crop and so that crops can also tolerate insects ,pesticides , viral diseases and resist stresses caused by extreme weather as well.

### **PROBLEMS IN AGRICULTURE LIKE PESTS AND THEIR SOLUTIONS:**

The increase in pests and diseases of plants the tools come up with a result of killing these species of weeds ,nematodes, and plant eating insects. As even by this crop protection products the the part of crops that is 20 to 40 percent is lost each year due to pests. As well as these losses also occur at the time of storage in the home due to which the farmers experience a great loss after a proper yield of crops. These crop protection includes the tools such as chemical (e.g, insecticides, fungicides and herbicides) and non-chemical tools (e.g., biological pest control and barrier-based approaches) as by this tools farmers get relieved and these tools enable them to produce more crops within a small land and best food supply. Specially, these farmers must know that the science based agricultural tools hold greawith them for the feeding of growing population and their demands for food.

as the technology for agriculture comprises of modern crop protection solutions ,to mobile technology for them in the field so that they can grow food much more fresher and healthier than before.[2]

**NEED FOR TECHNOLOGY:** The other tools of technology that help farmers to increase the productivity of crops, those are modern irrigation practices, mobile technology, fertilizer and mechanization as though the estimation says that by the year 2025 the 1.8 billion of people will live in the region where the water scarcity will be the issue as we can see the need of technology here to improve agriculture practices and yield more crops on a small land so that there should be no scarcity in near by future. [3]

**GPS:** As a result the mobile technology can make possible to increase the productivity by connecting them through text messages and let them know the information of agricultural market and can also meet to their localized needs as the fertilizers also contributed in doubling and tripling of crop farming as it supply crop the essential nutrients for crops that are missing in soil and s well the efficient use of land as well as water and by this technology the farmers can yield more crops with less manpower and the best technology which is used by farmers today is precision farming solution that is global positioning system(gps) technology, to improve the yield while using lower input, and results into gain of 10 percent an average input saving of 15 percent and as a result it also produce more environment friendly farm. The gps based

applications farming are being used for farm planning field mapping ,soil sampling, tractor guidance, crop scouting and yield mappinhg.gps also help farmers to work at the time of storms as well at the time of dark, fog dust as it guide the direction to the tractor[4].



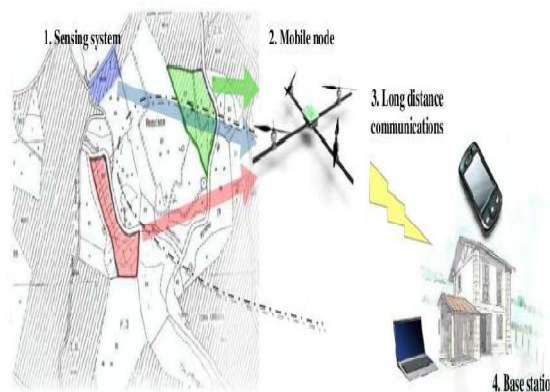
**Fig 1. GPS system in tractors**

Though some people think that such technologies can also be useful for larger fields and greater investments so is the fact that is not true there are inexpensive and easy to use methods and techniques that can be developed for the beneficial of farmers by using this techniques the farmers can also protect the natural resources for the future use.

**SENSORS:** There are many limitations of conventional WSN, such as the capacity is limited, the shortest communication range, limited processing and one biggest issue is its storage capacity, a system that is known to be hybrid system is introduced which includes three different elements:

1. Popularly known sensing system. it consists of split ground static WSN, it controls the information of crops in an efficient manner as by routing methods also.
2. Another one is mobile node. in this technology the stationary nodes are combined with the mobile nodes which is carried by a mini aerial vehicles, it is known to be as data collector.
3. The third one is long distance communication, as at this stage the system is enriching with a mobile data service communication which is packet oriented.

As we have discussed above the process WSN for specific data gain the one which is responsible for acquiring the directly related information and as well it also communicates the data with the base station by using WSN nodes. these nodes are the small devices comprises of communication resources, various sensors. These nodes are helpful for giving the information about soil, weather conditions and also about the status of crops.



**Fig 2. Remote sensing structure.**

the technologies as where the nodes works at discrete and punctual time the furthermore technologies that are used here are mesh routing and other routing protocols. The robots which are used in mobile nodes are aerial robots. The aerial vehicle setup includes mobile base station in which the quadrotor is operated by the mobile station as shown in the figure below:-



**Fig 3. Aerial vehicle setup.**

As in this quadrotor setup the graphical operator interface is done where we can see the results provided by the quadrotor as in this data link is also done and when at the time of emergency the pilot remote control x-bee is used . These x-bee are used with quadrotor and these are based on ZigBee as these are mainly used for long distance communication. These can be possible within 10 km but the condition is that the antenna should have the gain of 14dB.[5]

### III.CONCLUSION

By the all above practices we conclude to work further on such techniques or making of seeds that can be more drought friendly because our 70 percent of water is used in irrigation purposes so we must work on this issue and by using the technology as well we already improved our irrigation practices by which our country is growing more crops on very small land which is today's need and to research deeply on the technologies ads quadrotor range and its farming practices and many more researches on various sensors as by this the manpower will be decreased as well as the farmers can cultivate the land in higher grade than before .so by all above conclusion the technology is must to maintain our farmings.

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