



Precision Farming Management through Telecommunication Tools

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Advances in telecommunications technologies continue to help make farm life easier and to improve production efficiencies. The convergence of sensing, computing and communication technologies for agricultural applications has led to the creation of a new technology — Agricultural Infotronics Systems (AIS) which is a framework of wirelessly networked on-farm production data management systems to collect, process, and transmit the “ready-to-use” site-specific production data to the user on the machinery while performing the field operation. Thus, telecommunication technology is the backbone of precision agriculture. This article describes shortly about precision farming and its management.

Precision Agriculture

Lowering the resolution size in order to be more precise with soil and nutrient management to enhance input use efficiency with reduction in cost of production and environmental degradation, is may be called as precision agriculture or the practice of managing specific field areas based on variability within the field (SS Toolbox) or Managing each crop production input (seed, fertilizer, insecticide, herbicide, limestone, etc.) on a site-specific basis to reduce loss, increase profits, and maintain the quality of the environment.

Precision Agriculture is an environment friendly system solution that optimizes product quality and quantity while minimising cost, human intervention and the variation caused by unpredictable nature. So why we concern about precision agriculture is mainly because profit margin has decreased steadily with current production

methods and environmental degradation has risen notably.

Basic Steps of Precision Agriculture

- 1. Data Collection:** Data on different aspects are collected by using precise tools and processes like Boundary Mapping, Remote Sensing, Weather Data recording, Soil Sampling, Yield Monitoring, Irrigation Testing, Pest Scouting, and information on soil moisture and crop condition are collected.
- 2. Analysis:** In this step, determination of variability in different characters and possible causes of variability, and how much do the variations affect crop yield and/or crop quality are analysed.
- 3. Management Decisions:** It is mainly for taking decisions like, is it possible to change/mitigate the variability? Will the change increase yield, increase quality with decreasing inputs? Will the change

be profitable? And how to implement this change, are taken under consideration.

4. **Farming:** Purpose of all above steps is to successfully practice this step. This step is performed mainly by applying the decisions like, variable rate irrigation, variable rate pesticide application, variable rate fertilizer application and variable rate seeding/planting.

Building Blocks of Precision Agriculture

Building blocks of precision agriculture are Yield Monitors, Direct and Remote Sensors, Precision Navigation, Variable Rate Technology, Global Positioning System(GPS) and Geographical Information System(GIS).

The Scope of Precision Farming and Telecommunication Tools

1. **Soil sampling:** GPS can be used to locate soils, soil properties, soil nutrients and type of soils etc.
2. **Tillage:** Tools are used to maintain a varying depth of tillage implement and incorporation of plant residues etc.
3. **Planting:** The use of precision implements in agriculture becomes important in terms of a varying seeding rate, seeding depth, seed count and mainly seed to seed distance is maintained.
4. **Fertilizing:** The precision fertilizing machineries are worked at based on precision technology like, using of GPS, sensors, solenoid valves etc. These

maintain properly a varying fertilizer and application rate.

5. **Spraying:** The use of precision canopy sprayers will maintain varying rate of pesticides application in agricultural crops.
6. **Crop scouting:** Using GPS receivers, and sensors to collect the information regarding affected crop areas and apply the required treatment to the remotely sensed areas that would affect crop yield.
7. **Harvesting:** Now a days harvesting of crops is mainly done using a large scale machinery i.e combine harvester. At the time of harvesting, yield monitoring is one of the important issues in a advanced technology. Therefore, yield monitoring of a harvester is done by use of different types of sensors.

Practical Feasibility of Tools

- **Must be immediately beneficial to the farmer:** The most of the farmers cannot afford to wait for the long term benefits. Therefore a tool must be easy to use and not time restraining.
- **Risk:** The farmers practising precision farming must be having minimum risk in terms of safety and finance involved in use of tools.
- **Basic machine functions:** one of the most important functions in advanced mechanization in agriculture is giving guidance systems to farmers, because all most all farmers are less skilled and illiterate. So, imparting of trainings, giving user manuals are most important in precision farming.

Important Benefits and Changing Farm Environment by Precision Agriculture

- **Merging and consolidation of farm:** Having precision farming tools by every farmer is quite expensive therefore a group of farmers need merging of their farm units and thus a larger area is maintained under precision agriculture.
- **Increasing global competition:** Profits would be higher from quality as well as quantity of produce and thus, competitiveness would emerge among farming community doing precision farming.
- **More sophisticated machinery and equipment per farmer:** There would be advanced mechanization in agriculture due to precision agriculture.

- **Environmental concerns:** Precised use of agricultural inputs definitely will take care of land and environment conservation, pollution reduction and natural resource management.

Conclusion

Using of telecommunication tools in agriculture, our farmers do not need to worry about tomorrow's farming. With the use of advanced machinery in farm, labor requirement will be less, crop quality, soil health, growth and yield of plants will be more and thus, productivity as well as production and consequently profit would be higher. There will be an accuracy of work that would complete in comparatively lesser time.