Sustainable Agriculture and Smart Technologies

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Introduction:

Sustainability is a complex idea with many aspects which includes the economics (a sustainable farm should be a profitable), social (deals fairly with its workers and should have beneficial relationship with community) and environmental (proper use of natural resources). It involves the maintaining of soil healthy, reduce water lose, air, water, and climate pollution, Promoting biodiversity. The living organisms are dependent on the nature of biodiversity. This has been emitted on daily basis by emitting wastes, use of fertilizers and pesticides etc. Emission of greenhouse gases actually effect the plants, animals, and as well as human beings. So, it is very important to sustain and make a better environment for plants and human beings. Thus the smart farming is the primary key to meet better agriculture systems and make better sustainable agriculture for the future.

Is Sustainable = Organic farming?

Organic is not equal to sustainability. In sustainability there is no need for certification as a organic farming. There are no strict rules set up to ensure that the organic farmers or organic food production operations follow eco-minded practices. For the organic industries members, it's important to be realistic about the limits of organic certification.

Sustainable agriculture practices:

Rotating crops and embracing diversity, Planting cover crops, Reducing tillage, Applying integrated pest management (IPM), Integrating livestock and crops, Adopting agroforestry practices.

Today we all seen that there is demand for food is increase day by day which become a challenge to agriculture sector (farmers). There is need for a resource efficient global food system that help to maintain sustainability. With the increase demand and need for

sustainable agriculture it is necessary for farmers and stakeholders to invest lot in knowledge & more sophisticated machines and devices. As we all know that in today there is lot of advanced technologies introduced in agriculture sector. There is a term Smart farming, it is a modern farming concept in which we use technology to improve agricultural production and lowering the inputs. Smart farming is information driven farming approach. This approach applies measuring that are economically and ecologically meaningful to achieve improved output in production. It runs on the principle of precision farming in which we use GPS guidance in the application of measure that are site specific. Precision farming not only focus on spatial precision but to smartest treatment by adopting certain technologies of farming , implementation of auto piloted harvesters & tractors , among other devices and farm machinery ,shifts the approach to an holistic . Smart farming targeting to solve the problems related to farm like fertilizers need in crop, time of application, specific area to be applied, which resources are needed for plant protection etc. Complex or a proper information needed for better results where smart farming is used.

Is smart farming promote sustainable agriculture?

Both smart farming and sustainable agriculture are rely on availability of data. Smart farming is bone of sustainability as well as cost effective agriculture with combination satellite and observations make it easy for farmers to take decision when doing farming. Smart farming is a farming management theory using modern technologies to increase the quality and quantity of agriculture products. Example, use of sensors helps the farmers to make decision on how, where and when to allocate certain resources to improved ecological and economic inputs. Smart farming involves the use of networked technology to achieve certain production goals. A smart farming technologies represent the function of modern Information and Communication technologies (ICT) into agriculture & leading a new green revolution i.e (3rd green revolution) in which innovative farming techniques and tools use to make agriculture more sustainable. Sustainability in agriculture can be achieved through proper use of data in decision making. Unlike in past, nowdays farmers can use smart farming techniques to collect data and make informed decision from it. For example , through smart technologies farmers can know the fertility of their land through analysis and comparison of satellite images and at end by using data know the yield potential of given land. With Smart farming

techniques farmers can improve monitor the needs of individual animals and adjust their nutrition correspondingly ,thereby preventing diseases and enhancing head health.

Benefits of smart farming:

Crop management and waste decrease ,mitigate the risk of losing yield, Increase business efficiency through development automation, automate multiple processes , improve product quality and quantity, high crop productivity, decrease in use of pesticide & fertilizers, reduce strain on environment .

Smart farming technologies:

Smart farming involves use of technologies are:

- Sensors - for soil scanning ,water, light, humidity, and temperature
- GPS - Site specific information ,geographic area information
- Robotics and Automation -
- Data analytical tools for decision making and predications -
- Satellites and drones -

Opportunities of smart farming:

Smart farming aim is to reduce the ecological footprints. Use of site specific inputs, help to reduce the leaching problems, reduce the release of greenhouse harmful gases and reduce the use of pesticide and fertilizers.

Achieve profitable agriculture: By using techniques reduce resource inputs and reduce cost of labour. Smart farming techniques encouraging the use of techniques in site specific weather forecast, measuring of disaster and diseases and yield projection. Smart farming has a potential to making the agriculture profitable and sustainable and reducing resource inputs and costs.

Challenges of smart farming:

- In India farmers have Small land holdings.
- Installation of these sensors and tying sensor data to analytical driving automation.
- Expensive networking.
- Connectivity in rural areas.
- No proper knowledge about technologies.
- Loss of manual employment.