# ENVIRONMENTAL STUDIES & LIFE SCIENCES

**Dr. Sasmita Sabat**
Faculty, Department of Biotechnology
PES University, Bangalore - 560085

# SMART FARMING

Smart farming - International Science Council

Dr. Sasmita Sabat
Department of Biotechnology

# ENVIRONMENTAL STUDIES & LIFE SCIENCES

## SMART FARMING

**Agriculture Years Ahead: Smart Farming with IoT Technology:**

- Farming has been the oldest sign of human civilization. Through times, we as a human find several damaging effects of our ways in growing crops to the environment including the flora and fauna.

- To restore the damages, people nowadays develop **smart farming with IoT**.

- Not only to revive nature but smart farming is designed to bring more benefits also like higher profit, efficient planting process, premium harvest and others.

*Image source: Reserach*- International Science Council

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## SMART FARMING

- **Use of IoT in Smart Farming:**
- Internet of Things (IOT) includes enhanced objects with technology in processing, sensors, and more that can send and receiving data to other networks.
- There have been examples of IoT in daily activities like home automation to save energy, traffic control, NFC tag, etc.
- In agriculture, technologies also have been involved and developed for years. This is called smart farming.

*Image source:* **innovateindia.mygov.in/agriindia**

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## SMART FARMING

- **Use of IoT in Smart Farming:**
- The integration between technology and farmers' skills is aimed to produce the best quality and quantity of the commodity.
- Humans used to take all the roles in farming from planting, growing, harvesting, checking, and so on.
- Yet, with smart farming, some jobs are taken over by technology including sensors, drones, Artificial intelligence (AI) and robotics to optimize the process and especially to ease the farmers.

https://www.sciencedirect.com/computers-and-electronics-in-agriculture

# SMART FARMING

- **Use of IoT in Smart Farming:**

Technologies in farming have been utilized in numerous ways. Each kind is installed for a different purpose.

Based on the functions, here are some techniques in using technology for smart farming.

# SMART FARMING

- **Smart Farming Techniques:**

**1. Field mapping or data collection:**

Sensor technology is set up to measure environmental aspects such as humidity, temperature, light intensity, wind, water/rainfall, soil composition, and more.
Then GPS and GIS support the bigger picture of the map by providing the geospatial data.

*https://www.sciencedirect.com/journal/bioresource-technology*

- **Smart Farming Techniques:**

- **2. Predictive analytics**

Based on data required from field mapping, several types of analytic software can predict and suggest the needed actions. Some even are equipped with alert systems of discrepancies or pest attacks.

*https://www.sciencedirect.com/journal/bioresource-technology*

- **Smart Farming Techniques:**

**3. Data Saving:** Using cloud-based, the regularly obtained data are uploaded as a record for future decision making. They are also shareable for wider area analytics.

**4. Tracking and monitoring:**
This technique might require cameras, drones, tags, and GPS. Drones and cameras provide a visual of the field. Then, tags and GPS supply precise coordinate location of livestock.

## Smart Farming Techniques:

### 7. Saving energy:

Also using automation, a system could be built in the farm to cut down energy consumption. Smart irrigation could automatically turn the machine off when a sufficient amount of water in the soil is reached. Drone-spraying only on the necessary spots could prevent polluting the land.

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# Smart Farming Techniques:

**5. Labour work:** Similar to automation, drones, and robotics are helpful to do labour work such as planting seeds, watering the plant, harvesting, spraying the pesticides, milking the cows, picking fruits, irrigating, and more.

**6. Warehousing**: In tropical areas like India, farmers are utilizing solar-powered refrigerators to store the fruits and vegetables right on the farm. Since greens and fruits are prone to get withered, storing them in fridges directly is a smart way to provide fresh commodities.

*https://www.sciencedirect.com/journal/bioresource-technology*

# SMART FARMING

## •Application of smart farming:

- Generally, smart farming with IoT is set up to overcome certain problems or to reach some goals.
- As there are various techniques, it is essential to identify the gap and the proper technologies demanded.
- Many parts of farming could be enhanced with technology like tags in cows, the sensor in soil, picking robots, and more.
- After setting up the technology, a regular check is needed to see the technology performance and the result.

*https://www.agristudoc.com/farm-mechanization*

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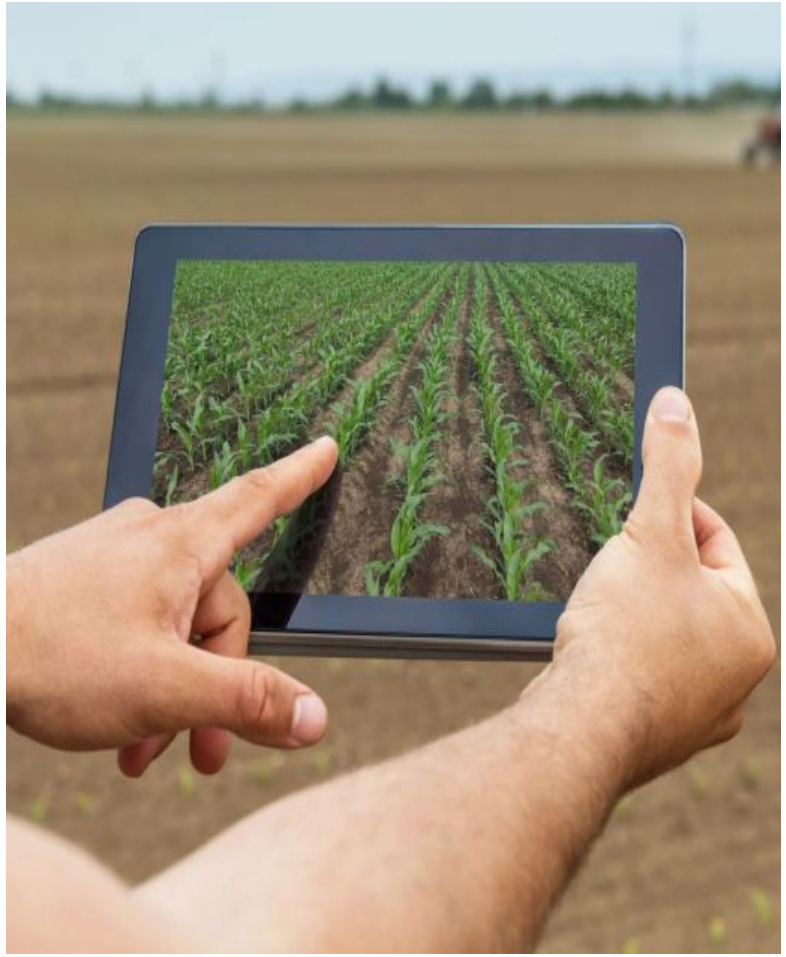
## Merits of smart farming:

**Improved products:**
With high-quality control and experiments, nowadays many farming ‘companies' produce vegetables with a certain taste that is different from other vegetables. The greens mostly are categorized as organic and pesticide free.

**Precise data:**
Assisted with tools, predictions or actions can be made of accurate data. Because certain plants are better in high temperatures, crops rotation is easier to decide. The data can be saved and used as a reference in the future if there is a similar condition coming up.



*https://www.agristudoc.com/farm-mechanization*

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## SMART FARMING

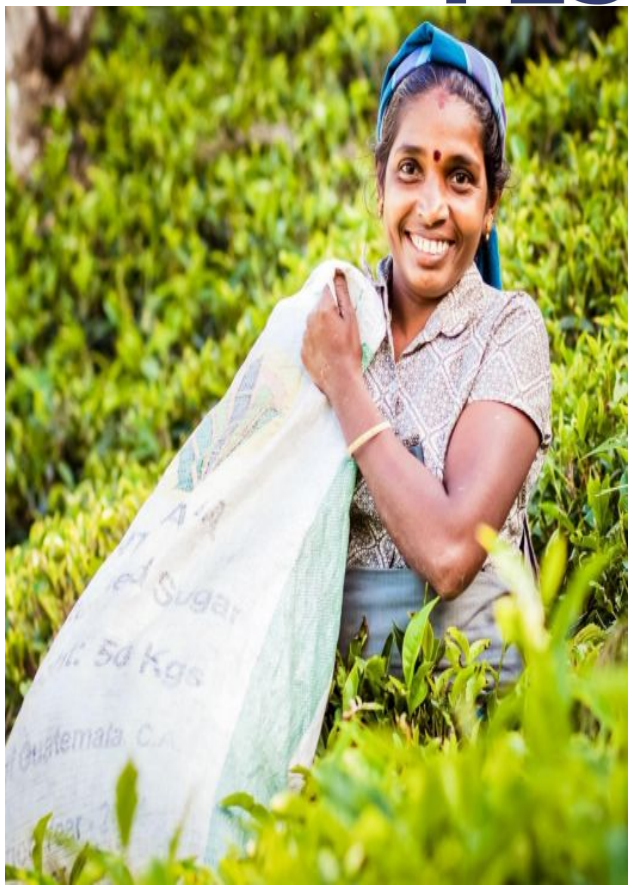
- **Merits of smart farming:**

- Indeed technology brings positive impacts to farm management.
- As the products increase, more profit could be generated.

- Smart farming also helps farmers to distribute their commodities to the most rewarding markets or buyers.

- Some software connects the farmers to connect with the nearest potential buyers. Despite the gained earnings, farmers should be aware also of the maintenance and installation costs.

- Hence, profit is relative and may differ for each farmer.



*https://www.agristudoc.com/farm-mechanization*

# SMART FARMING

- **Merits of smart farming:**

**Environmental friendly:**
As farmers could minimize pesticide use, irrigate water sufficiently, manage waste efficiency, current farming damages are slowly getting revived. It is predicted that years from now, farmers could build a farm with varied commodities without removing the endemic flora and fauna.

- **Efficient management and cost-effective:**

As many labor works are done by the technology, the management costs can be reduced or allocated to maintain the technology. The farmers could also be away, but keep controlling the farm from far away.

*https://www.agristudoc.com/farm-mechanization*

# SMART FARMING

- **Limitations of smart farming:**

Despite the benefits above, smart farming also carries several potential risks.

The biggest of them is prone to be damaged.

Without any regular care, technology is prone to get broken by natural factors like heavy rain, strong wind, thunder strikes, and more. It could be a big loss for the farmer.

Moreover, the maintenance cost is not cheap with updates and further research.

- **Entrepreneurial opportunities of smart farming:**

As mentioned before, you could start by identifying the goals and what aspect you are focusing on.

Then prepare the money and choose the suitable technology.
If your finances do not support it, you can try to collaborate with researchers.

So extensive research in this area leads to get the best crops.
Another way to find potential investors to expand the technology
To filed level.

# SMART FARMING

- **Entrepreneurial opportunities of smart farming:**

After the technology is already set, maintaining smart farming is not an intermittent process.

More research regarding the actions to be taken and possible future technology must be carried.

# SMART FARMING

## Awareness among farmers on smart farming:

Smart farming with IoT is a growing business nowadays.

The number of farmers using IoT is increasing and it is projected by the agriculture market in the U.S. that annual growth rate of 19.3%. a survey shows that technology installation in farming also has a similar growth rate that is 20%. In India an average of 10 percent farmers are employed smart farming practices to get better yield and returns.

# SMART FARMING

**Awareness among farmers on smart farming:**

This happens globally as many countries come up with modern innovations likeIndia, Japan, Canada, Columbia, Mexico, Brazil, Chile, and Argentina.

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# THANK YOU

**Dr. Sasmita Sabat**

Department of Biotechnology

sasmitasabat@pes.edu

+91 80 26721983 Extn 347