

# A Modern Agriculture Using Technology and Machinery in Modern Science

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**ABSTRACT:** The main purpose of this paper is to introduce the fashionable technology adoption its importance, usage and role in agriculture improvement. Within the last century, the essential agriculture technology like machines has changed slightly. Though the fashionable technology, planters and harvesters do a much better job or are slightly tweaked from their predecessors. The RS19024375.00 combine of today still cuts, threshes and separates grain within the same way it's always been done. However, the fashionable technology is changing the way of that humans operates the machines, GPS locators, as computer monitoring systems allow the foremost advanced tractors and implements to be more precise and fewer wasteful within the utilization of fuel, fertilizer or seed. In future, there could even be production of driverless tractors and other agriculture machinery which use electronic sensors and GPS maps.

**KEYWORDS:** Modern Technology, Gross Domestic Product, Pesticides Crop Sensors Biotechnology, Inorganic Fertilizers, and GPS

## I. INTRODUCTION

In developing countries like India, agriculture not only contributes to the economy but also shapes the social fabric of the society. In the 1960s, with the onset of the Green Revolution (adoption of high- yielding cereal varieties, chemical inputs and mechanization), agricultural systems in developing countries have achieved remarkable improvements in crop production. Increased productivity successively has fed millions who otherwise would have gone hungry. However, much of such improvements were based upon over-exploitation of natural resources (Brar, 1999; Wood et al., 2000; Tilman et al., 2002; World Bank, 2003; (MEA(Millennium Ecosystem Assessment)), 2005; Bhullar et al., 2006 and International Food Policy Research Institute (IFPRI), 2007) During the initial phases of the Green Revolution, land area under cultivation increased along with cropping intensity and subsequently reliance upon chemical fertilizers a common situation for many agricultural systems in across the world. Tilman et al. (2002) analysed the data on agricultural production and inputs at a global scale and questioned the sustainability of modern agricultural systems. Certainly, with the new technologies, in the Green Revolution has clearly led to enormous increases in agricultural output that in turn have supported the growing world population. However, with current levels of utilization of available area under cropping and maximization of chemical inputs, it seems unrealistic in the future to maintain the high levels of production.

About half the worldwide usable land is already under pastoral or intensive agriculture and lots of the natural resources like soil and water are exploited to their maximum potential. Increasing or even sustaining current levels of production while preventing degradation of available soil and water resources is a major challenge. Moreover the higher levels of external inputs of fertilizers have degraded the natural as well as agro-ecosystems, leading to problems for changes in climate and natural environment.

## II. RELATED WORK

INDIAN JOURNAL OF AGRICULTURAL RESEARCH:

Following graph shows agricultural trends over the past 40 years. Total global cereal production, Total global use of nitrogen and phosphorus fertilizers and area of global irrigated land.

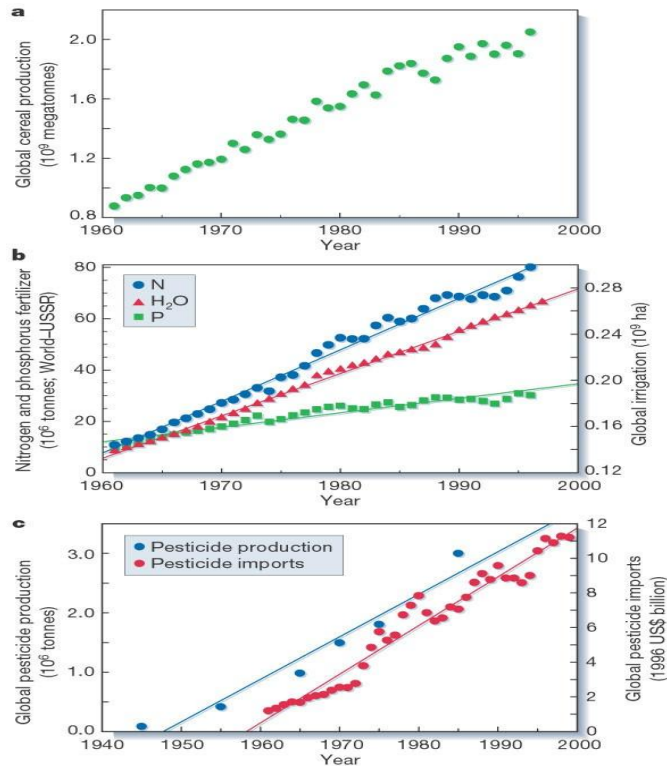


Fig 1: Agricultural trends over the past 40 years. Total global cereal production, Total global use of nitrogen and phosphorus fertilizers and area of global irrigated land.

III. METHODOLOGY

Existing Literature Review of Agriculture Modern Technology Adoption:

For years, within the industrialized world scientific and technological advancements have benefited farmers by driving agriculture production. However, in the developing countries of the world smallholder farmers who are responsible for 80 percent of the food have yet to see similar gains. The majority of those farmers containing women, lack to access of the many modern tools needed to achieve success, like crop management products, modern irrigation practices, management products, modern irrigation practices, mobile technology, as well as access to information and extension services.

IV. EXPERIMENTAL RESULTS

Modern Agricultural Technology and Machinery Usage in Agriculture:

Modern technology and machinery in agricultural employed today is below with details;

**1. Autopilot tractor:** While the use of tractors has transformed the way plowing is done, the tractors still need a human driver to control them. While people are migrating to cities, there is a dearth of human labour in these remote farm locations. Progressive tractor manufacturers are already working on driverless tractors to help farmers meet the increasing global food demand. For an autopilot to regulate a tractor, it must accurately know its position, its speed and therefore the direction of travel. INS technology which has been used for guidance of aircraft and UAVs for several years are often used for autonomously driven tractors.

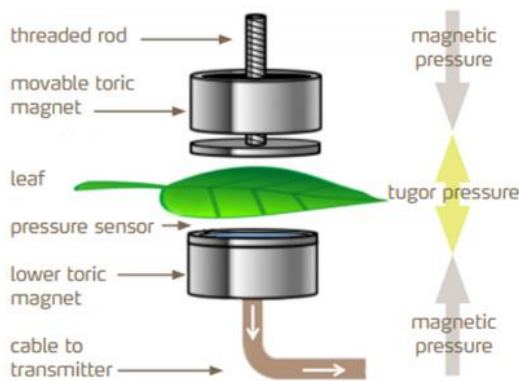


Fig2: Driverless Tractors

**2. Crop sensors:** Today, farming is sustainable without implementing modern farm technologies. With the rapid development of precision technology supported sensors, farmers are able to do successful crop production. Digital information regarding weather, soil conditions, and crop health has the potential to help modern farmers optimize their yields and achieve a high level of farm productivity. As a result, farming is becoming modernized and is increasingly becoming completely based on data. The most important tools in modern agriculture management are sensors. These range from sensors for soil condition analysis to sensors for real-time application of nitrogen, growth regulators and water. Sensors help farmers quickly and simply determine various soil and crop factors crucial for farming. In striving to manage successful farm production, care should be taken in regards to crop characteristics too. Using crop sensing technology, the farmer is able to improve crop conditions by measuring plant water potential, yield quality, stage of development (ripeness), nutrient levels, pest and disease infections, and various morphology factors such as biomass, leaf area, and distribution of plants and organs.

Crop sensing technology works using one among three principles of measurement:

- Mechanical
- Acoustic
- Optical



The work principle of water potential sensor



Water potential sensor installed on lemon tree



Fig3: agricultural sensors

**3. VRT and Swath Control Technology:** Build on GPS technology are swath control and VRT. This is often where guidance really begins to mean a return on investment. Swath control is simply what it seems like. The farmer is controlling the size of the swath a given piece of kit takes through the world. This video could also be an excellent visual representation of how swath control works. The savings come from using less input like seed, fertilizer, herbicides, etc. Since the size and shapes of fields are irregular you're bound to overlap to some extent in every application. Because of GPS mapping the equipment within the sector already knows where it has been. Swath control shuts off sections of the applicator because it enters the overlapped area, saving the farmer from applying twice the inputs on the same piece of ground. VRT works during a similar fashion. Supported production history and soil tests a farmer can build a prescription GPS map for an input. By knowing what areas of a field are most and least productive the appliance rate of an input like fertilizer are often tailored to increase or decrease automatically at the acceptable time. This is often an enormous benefit for farms. Rather than applying a gaggle rate of fertilizer over the entire field (many times a high rate to help those low producing areas) an operator can now apply a rate best for a selected section of ground.

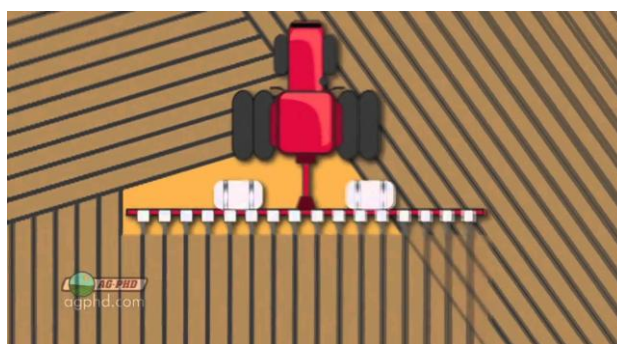


Fig4: VRT and Swath Control Technology

**4. Monitoring and Controlling Crop Irrigation Systems via Smartphone:** Mobile technology is playing a crucial role in monitoring and controlling crop irrigation systems. With this contemporary technology, a farmer can control his irrigation systems from a phone or computer rather than driving to every field. Moisture sensors within the ground are ready to communicate information about the extent of moisture present at certain depths within the soil. This increasing the flexibility allows for more precise control of water and other inputs like fertilizer that are applied by irrigation pivots. Farmers also can combine this with other tech like VRT mentioned earlier to regulate the speed of water applied. It's all about more effective and efficient use of resources.



Fig5: Monitoring and Controlling Crop Irrigation Systems via Smartphone

**5. Documentation of Fields via GPS:** Today, many farmers use GPS-derived products to reinforce operations in their farming businesses. Location information is collected by GPS receiver is for mapping field boundaries, roads, irrigation systems, and areas of problems in crops like disease. The accuracy of GPS allows farmers to make farm maps with precise acreage for field areas, road locations and distances between points of interest. GPS allows farmers to accurately navigate to specific locations within the field, year after year, to gather soil samples or monitor crop conditions. Crop advisors use rugged data collection devices with GPS for accurate positioning to map pest, insect, and weed infestations within the field. Pest problem areas in crops are often pinpointed and mapped for future management decisions and input recommendations. The same field data also can be employed by aircraft sprayers, enabling accurate swathing of fields without use of human "flaggers" to guide them. Crop dusters equipped with GPS are able to fly accurate over the world, apply the chemicals only where needed, minimizing chemical drift, reducing the number of chemicals needed, thereby benefiting the environment. GPS also allows pilots to supply farmers with accurate maps.



Fig6:GPS Steering Tops Readers' Poll of Best Farm Technology

### 6.Usage of Mobile Technology and Cameras:

The built-in camera on the smartphone has been used for various applications. However, the measurement are often suffering from surrounding lighting conditions, especially when the developed system must be operated outdoors. There are some cases using optical accessories attached ahead of smartphone cameras to regulate optical conditions or adding optical tools when collecting image data



Fig7:Usage of Mobile Technology and Cameras.

## V. CONCLUSION

Modern agricultural technology has been developed with keeping two important things in mind: very first thing is to urge the very best yields possible and second thing is to get the very best economic profit possible. To achieve these goals, six basic and important practices have come to form the backbone of production in agriculture: application of inorganic fertilizer, irrigation, intensive tillage, monoculture, chemical pest control and enatic manipulation of crop plants. Autopilot tractors, crop sensors, VRT technology, monitoring and controlling crop irrigation systems via smartphone, documentation of fields via GPS.

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