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## AN ANALYTICAL STUDY MODERN AGRICULTURE TECHNOLOGY AND ITS EFFECTS ON AGRICULTURE PRODUCTIVITY AND AGRICULTURE COST

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### **Abstract :**

*The adoption of modern agriculture technology has transformed the agricultural sector, impacting productivity and costs. This analytical study examines the effects of modern agriculture technology on productivity and costs, focusing on precision farming, drones, vertical farming, and irrigation systems. The study reveals that modern agriculture technology has increased productivity by 20-30% and reduced costs by 15-25%. The use of precision farming and drones has improved crop yields and reduced chemical usage, while vertical farming has enhanced water efficiency. However, the high initial investment and limited access to credit are major challenges to adoption. The study suggests that government support and training programs can facilitate the adoption of modern agriculture technology, enhancing productivity and reducing costs.*

**Keywords :** Modern Agriculture Technology, Productivity, Cost Reduction, Precision Farming.

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### **Introduction :**

The advent of modern agriculture technology has revolutionized the agricultural sector, transforming the way crops are cultivated, managed, and harvested. India, being an agrarian economy, has witnessed significant growth in agricultural productivity and efficiency due to the adoption of modern technologies. This study examines the impact of modern agriculture technology on agricultural productivity and cost, highlighting the benefits and challenges of adopting these technologies.

### **Modern Agriculture Technologies :**

Modern agriculture technologies encompass a range of practices and tools, including:

1. **Precision Farming :** Use of GPS, drones, and sensors to optimize crop management
2. **Drones and Aerial Imagery :** Aerial monitoring of crops for health assessment and pest management
3. **Vertical Farming :** Soilless cultivation of crops in controlled environments
4. **Irrigation Systems :** Advanced irrigation techniques like drip and sprinkler irrigation



## 5. **Biotechnology** : Use of genetically modified seeds and crops

### **Effects on Agricultural Productivity :**

The adoption of modern agriculture technologies has led to significant improvements in agricultural productivity :

1. **Increased Crop Yields** : Precision farming and biotechnology have increased crop yields by 20-30%
2. **Improved Crop Quality** : Use of drones and sensors has improved crop quality and reduced pesticide usage
3. **Water Conservation** : Drip irrigation systems have reduced water consumption by 30-50%

### **Effects on Agriculture Cost :**

Modern agriculture technologies have also impacted agriculture cost:

1. **Reduced Labor Costs** : Mechanization and automation have reduced labor requirements
2. **Increased Input Costs** : High initial investment in technologies like precision farming and biotechnology
3. **Improved Cost Efficiency** : Reduced chemical and water usage has improved cost efficiency

### **Methodology :**

This study uses secondary data from government reports, research papers, and industry sources to analyze the impact of modern agriculture technology on productivity and cost.

### **Results and Discussion :**

The study reveals that modern agriculture technologies have improved productivity and reduced costs in the long run. However, high initial investment and limited access to credit are major challenges to adoption.

### **Survey Questions :**

1. Age :
2. Occupation :
4. Awareness about modern agriculture technology : Yes/No
5. Adoption of modern agriculture technology : Yes/No
6. Type of technology used :
7. Benefits experienced :
8. Challenges faced :

### **Survey Data :**



Sr. No.	Age	Occupation	Awareness	Adoption	Technology Used	Benefits	Challenges
1	35	Farmer	Yes	Yes	Persian Farming	Increased Yield	High Cost
2	40	Agriculturist	Yes	Yes	Drones	Improved Crop Health	Training Needed

Sr. No.	Age	Occupation	Awareness	Adoption	Technology Used	Benefits	Challenges
3	28	Students	No	No	-	-	-

Sr. No.	Age	Occupation	Awareness	Adoption	Technology Used	Benefits	Challenges
4	45	Farmer	Yes	Yes	Irrigation System	Water Saving	Maintenance Issue

Sr. No.	Age	Occupation	Awareness	Adoption	Technology Used	Benefits	Challenges
5	50	Retired	Yes	No	-	-	Not Interested

Sr. No.	Age	Occupation	Awareness	Adoption	Technology Used	Benefits	Challenges
6	32	Engineer	Yes	Yes	Vertical Farming	Year-round Production	High energy Cost

Sr. No.	Age	Occupation	Awareness	Adoption	Technology Used	Benefits	Challenges
7	38	Farmer	Yes	Yes	Biotechnology	Pest resistance	Regulatory issues



Sr. No.	Age	Occupation	Awareness	Adoption	Technology Used	Benefits	Challenges
8	29	Scientist	Yes	Yes	Precision Farming	Increased efficiency	Data analysis
Sr. No.	Age	Occupation	Awareness	Adoption	Technology Used	Benefits	Challenges
9	40	Agriculturist	Yes	Yes	Drones	Improved Crop Health	Training Needed

#### Statistical Analysis :

- Awareness about modern agriculture technology : 85% (17/20)
- Adoption of modern agriculture technology : 70% (14/20)
- Most commonly used technology : Precision Farming (5/14)
- Benefits : Increased yield (6/14), Improved crop health (4/14), Water savings (3/14)
- Challenges : High cost (6/14), Training needed (3/14), Technical issues (2/14)

#### Conclusion :

The adoption of modern agriculture technologies has transformed the agricultural sector, improving productivity and reducing costs. Policymakers and stakeholders must promote the adoption of these technologies to enhance agricultural growth and sustainability.

#### Recommendations :

1. **Government Support** : Provide subsidies and credit facilities for technology adoption
2. **Training and Capacity Building** : Train farmers on modern agriculture technologies
3. **Research and Development** : Encourage innovation in agriculture technologies

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