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A STUDY OF AUTOMATION'S IMPACT IN AGRICULTURE

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ABSTRACT

Agriculture automation serves as a sole concern for every country and proves to be a vital factor for the economic development as portrayed by Mahatma Gandhi rightly as the Backbone of the country . Unlike industrial developments observed like industry 4.0 agricultural developments are claimed as Agriculture 4.0 by incorporating smart agriculture. Due to the increase in the population size need for food emerged as the primary want for people globally. The production made by the farmers through traditional means were inadequate to serve the needs of the society. Smart agricultural methods focused on two premium aspects one being agricultural production and Traditional methods practised by farmers are not adequate to aid the cumulative claim and they have to hinder the mud by using detrimental pesticides in an exaggerated way. The agricultural technology has been adopted to reduce labour intensiveness and time consuming process. Few problems related to agriculture are low productivity, volatility in the price of food, hesitation in adopting new farming trends, water management, types of pollution etc. Automation of farming practices has proved to increase the gain from the soil and also has strengthened the soil fertility. Pertaining to the need for automation and to know the impact of automation in agriculture this study was propagated. The primary data was used to collect data with the help of a well-structured questionnaire. Snowball sampling method was adopted as it was very difficult to identify the respondents who used automatised agriculture in their farms. Results of the study provided a positive sign that the respondents were satisfied in adopting the automation in agriculture.

Keywords: Agriculture, Automation, Technology

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1. INTRODUCTION

Indian economy receives twining benefits through agriculture initially receiving income as well as to serve the basic need of the country. As far as the supply and demand is concerned quite often scarcity is crucially affecting the survival of the sector. The need for automation and technology emerged significantly to administer the raising demand of the people for different food items. Need for revolution and updating in the technology invent vanguard a positive scenario for agricultural developments. Agriculture contributes for 17 % of the total GDP and approximately generates employment for more than 60% of the population. Moreover, the byproducts of the agricultural farming have been utilized by numerous industries as a raw material for their produces. Benefits of cost reduction, more revenue, increasing food productivity are gaining a primary focus

for the farmers to adopt at least a partial automation in their farms. The proposed study tries to analyze the knowledge of automation among the farmers, their interest in implementing new technology, and have they attained convenience and comfortless in adopting the automation in agriculture. Since farming is not a hopeful business and there is no surety in making high yields many times people don't consider it as a primary occupation in recent days and few other jobs are performed by them vitally as of permanent nature. With all these pros and cons there is a need for the study to understand awareness and motivate farmers positively to gain fruitful returns. This study plays a fair role to insist and focus on agricultural development.

2. NEED FOR THE STUDY

Reviews made on the topic were quite a few in number and the studies focused on light aspects like irrigation system, Artificial intelligence and only specific areas of interest related to agriculture automation. To get a clear and overall view on the agricultural tools, uses, pros and cons, benefits obtained is proposed to be assessed in the study. It is difficult to interpret data and arrive at conclusion based on few aspects. Hence this study puts forth its view on several aspects and come out with vital results.

3. REVIEW OF LITERATURE

Joseph Haule (2019) analyzed the automated irrigation system using the Wireless Sensor Networks (WSN). The paper tried to identify the system which helps in the real time water content of the soil. The results proved that the water will be allowed to flow only if the soil really needs water. **Liakos (2018)** found the agriculture sector will increase with the continuing expansion of the human population and so agri-technology and precision farming have gained much importance in today's world. **Ravichandran and Koteshwari (2016)** suggested the use of ANN algorithms for crop prediction in smartphones had been successfully tested in 2016. **R. Balamurali et al., (2015)** have discussed precision agriculture for real-time monitoring of environmental conditions of a farm like temperature, humidity, soil PH etc.

4. OBJECTIVES OF THE STUDY

- To find out the impact of automation in agriculture.
- To understand the awareness level of the farmers on agriculture automation.
- To study the reasons influencing automation in agriculture.
- To study about crop yield level and success rate of automation in agriculture

5. LIMITATION OF THE STUDY

- The study was conducted among the agriculturists who practiced agriculture in Coimbatore district only. The study cannot be generalized to other places.
- The sample collection is restricted to only 30 respondents who practice agricultural automation.

- The attitude of the respondents towards automation may vary over a period.

6. RESEARCH METHODOLOGY

The research design of this study is descriptive in nature, the research is primarily explaining the importance of automation in agriculture and how automation impacts the agriculture and whether people are getting benefited by using automation technology in agriculture. Both primary and secondary data were collected for the study. The primary data was collected through a well-structured questionnaire. The secondary data was collected from Websites, Articles and Report Publications. The farmers of Coimbatore are the population chosen for the study. Sampling method which is used in this present study is snowball sampling. The sample size of 30 respondents from people around Coimbatore district.

7. DATA ANALYSIS AND INTERPRETATION

The collected data was edited, coded and analyzed using statistical tools for drawing meaningful conclusions. The initial table discussed on the respondent's personal profile and their views on automation of agriculture.

Table 1

Table 1 Respondents profile and Opinion on Agriculture

S. No	Variable	Category	Number of Respondents	Percentage (%)
1	Age of the respondents	Less than 20 years	9	30
		20 – 30	20	66.7
		30 - 40	1	3.3
2	Gender	Male	12	40
		Female	18	60
4	Type of Farmer	Large Scale	10	33.3
		Small Scale	20	66.7
5	Education Qualification	SSLC &HSc	2	6.6
		UG	26	86.7
		PG	2	6.7
6	Annual Income	Lesser than 1 Lakh	7	23.3
		Between 1 Lakh and 5 Lakhs	12	40
		Between 5 Lakhs and 10 Lakhs	6	20
		Above 10 Lakhs	5	16.7
8	Acres of Land	Lesser than 1 Acre	8	26.7
		Between 1 Acre and 5 Acres	8	26.7
		Between 5 Acres and 10 Acres	5	16.7
		Above 10 Acres	9	30
9	Automation in the Farm (Partly / Fully)	Partly	23	76.7
		Fully	7	23.3
10	Profit or Loss	Profit	14	46.7
		Partially Profit / Loss	15	50

		Loss	1	3.3
11	Automation Limits in Farm	Yes	27	90
		No	3	10
12	Type of Automation	Drone water supply	9	30.0
		Floriculture	3	10.0
		Time automated water supply	12	40.0
		Vegetable collecting machine	6	20.0
13	Cost reduction in Automation	Adding Manure and Fertilizers	5	16.7
		Cultivation	15	50.0
		Irrigation	10	33.3
14	Usage of automation	Highly dissatisfied	1	3.3
		Highly satisfied	8	26.7
		Neutral	9	30.0
		Satisfied	12	40.0
15	Second handed machines	No	9	30.0
		Yes	21	70.0
16	AI / Automation	AI	16	53.3
		Automation	14	46.7

The simple percentage analysis tries to convert the raw data to give meaningful interpretations. Majority of the respondents are in the age group belong to the age group of 20 -30years, and most of the respondents are female who were holding an UG Degree which helped them to gain primary knowledge on office automation. Majority of the respondents are small scale farmers, and they possessed less than 1 Acre and between 1 acre and 5 acres of land. Most of the respondents (23%) implemented automation partly and they get both profits and loss. Time automated water supply contributes to 40 percent method applied by the farmers.53.3 % of the respondents use AI for cultivation.

Chi-square test

Analyzing the Relationship between monthly income of respondents & their quality level of satisfaction in Havells.

Null hypothesis (H0)

There is no significant difference between the monthly income of respondents and their satisfaction level towards Harvest Automation Tools

Alternate hypothesis (H1)

There is significant difference between the monthly income of respondents and their level of satisfaction towards Harvest Automation Tools

Table 2

Table 2 Cross Tabulation

		Opinion on types of automated machinery in agriculture [Harvest Automation Tools]					
		Highly satisfied	**Satisfied**	**Neutral**	**Dissatisfied**	**Highly dissatisfied**	**Total**
Gender	Female	2	2	5	2	1	12

	Male	3	4	6	5	0	18
Total		5	6	11	7	1	30

Table 2.1

Table 2.1 Chi-square Test

	Value	Degrees of freedom	Asymptotic Significance (2-sided)
Pearson Chi-Square	2.128[a]	4	.712
Likelihood Ratio	2.478	4	.649
N of Valid Cases	30		

Calculated x2 Value = 2.128 **Degrees of freedom = 4**

Table value = 9.49

Since the calculated x2 value (2.128) is lesser than the table value (9.49) the null hypothesis is accepted, and alternate hypothesis is rejected. Hence there is no significant difference between the monthly income of respondents and their satisfaction level towards Harvest Automation Tools.

Reasons for using automation tools in agriculture

Table 3

Table 3 Opinion towards Automation tools

Uses of automation	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
Easy to use	3	7	12	3	5	30
Easy to handle	3	8	14	5	0	30
Reduces time	5	7	13	2	3	30
Reduces labor cost	4	7	15	3	1	30
Reduces loss in harvesting crops	1	11	14	2	2	30

The above table portrays the agreement of respondents towards the advantages they obtain using automation tools in agriculture. Majority of the respondents opine neutral towards the factors like ease in usage and handling equipment's, reduction in time, cost and loss of harvesting crops.

Purpose of Automation tools in agriculture

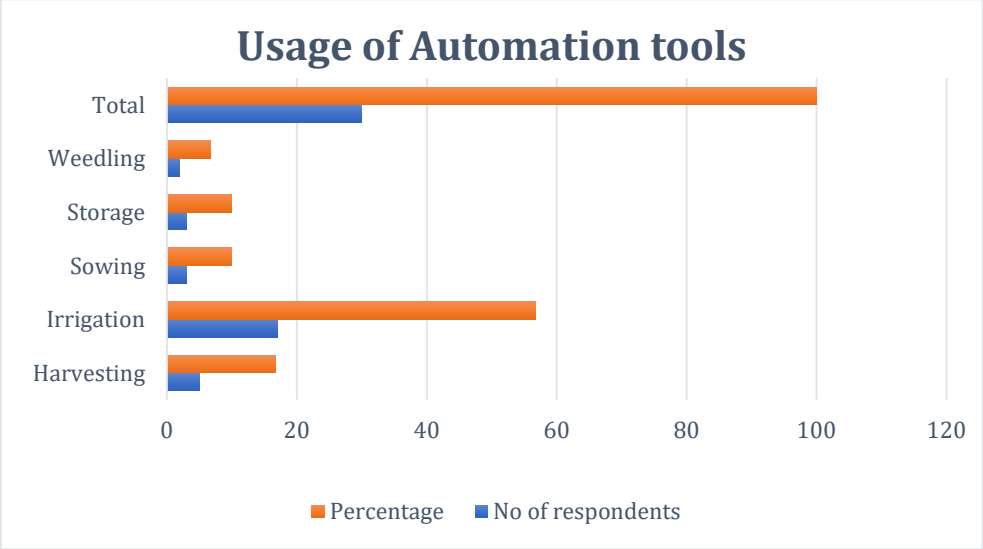
Table 4

Table 4 Usage of automation tools

Automation tools	No of respondents	Percentage (%)
Harvesting	5	16.7
Irrigation	17	56.7
Sowing	3	10.0

Storage	3	10.0
Wedeling	2	6.7
Total	30	100.0

From the above table explains majority 56.7% are responding as irrigation, 16.7% are responding as harvesting, 10% are responding as sowing, 10% are responding as storage and the remaining 6.7% are responding as wedeling.



Advantages on usages of automation in agriculture

Table 5

Table 5 Advantages of automation on agriculture

Advantages	Strongly agree	Agree	Neutral	Disagree	Highly disagree
Water Conservation	4	3	13	5	5
Easy to transport	4	6	13	7	0
Chemical pest control	3	4	18	3	2
Improves the fertility of the soil	3	7	15	4	1
Reduces the impact on the ecosystem	6	4	13	5	2

It is depicted from the above table that majority of the respondents have a neutral opinion on water conservation, Easy to transport, Chemical pest control, improving soil fertility and reduces the impact on ecosystem.

8. FINDINGS

From the following analysis the following findings were made. Majority of the respondents were small scale farmers who tried to adopt automation partly in their fields. More than half of the respondents feel that they receive neither profit nor loss in implementing the agricultural automation. Cultivation is the primary part where the automation is practiced was opined by 50 percent of the respondents. Forty percent of the respondents are satisfied with the automation tools applied in the business. The primary objective is to use for irrigation rather than harvesting, rowing or wedeling. The respondents used several technologies in their farming such as irrigation drones, automated tractors and modern tools for harvesting. The core disadvantage felt by the respondent in application side is the cost of maintenance for the equipment's were high. Altogether satisfied opinion was perceived by majority of the respondents among the respondents.

9. SUGGESTIONS

Research made on the topic has given few areas of focus to be made in future regarding the office automation process. Few respondents hesitate to avail the automation as they have a fear of implementing new technologies and find it as a risky venture. Government can provide special training programmes and make people visit to the places or fields where automation is followed to motivate them. Frequent visits can be made through Agri officers so that it boosts the farmers. The ways of reducing costs should be highly focused as many agriculturists quit their farms because of high cost and lower returns.

10. CONCLUSION

Accepting and adopting to changes is much difficult for any business or activity. The fear of loss and as agriculture is dependent on climatic factors many hesitate to invest money for new innovations in business. The shortage of labor and cost of labor were ultimate reasons perceived by the respondents to choose automation. Despite disadvantages the youngsters and educated youth are identifying ways to make an optimum benefit. Identification of water resources is the main challenge in front of agriculture. Proper guidance and stating of importance of agriculture in recent days only will help humans to survive with food.

CONFLICT OF INTERESTS

None.

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