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ACCEPTABILITY OF IoT DEVICE IN POMEGRANATE CROP

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Introduction

Data-driven technologies in general are quickly advancing with development of the Internet of Things (IoT), and may become an important part of the future for Smart Farming, is developing beyond the modern concept of precision Farming. IoT in agriculture is advantageous because of the possibility of monitor and control many different parameters in a scalable, interoperable and open context with an increasing use of heterogeneous automated components. Horticulture is most valuable in India because it is increasing from some years. The percentage share of horticulture output in agriculture has become 33%. Production of fruits is to be 103 million tonnes, compared to 102.1 million tonnes in 2019-20 (PIB, Delhi). India is largest producer of pomegranate with around 50% share globally. According to APEDA, India in 2018-19, occupies an area of 2.62 lakh hectares with production of 30.34 lakh tonnes. The other countries after India are China (1.2 lakh ha and 12.0 lakh MT), Iran (0.75 lakh ha and 11.0 lakh MT), Turkey (0.35 lakh ha and 2.2 lakh MT). At present, Maharashtra is the leading state in acreage and accounts for 68.7 per cent of the total area under pomegranate in the country. Other major pomegranate growing states are Karnataka, Gujarat and Andhra Pradesh. The study was conducted to find out problems in pomegranate farming and to identify helpful features of IoT devices in farmers' perception.

Methodology

The study was carried out in Morbi district. Primary data were gathered with the help of a semi-structured schedule from 68 farmers. Chi square test was used to understand the acceptability of the IoT device-based precision farming. Frequency table and percentages were used to identify the problems in the pomegranate farming. Helpfulness of features of device was measured through five-point Likert Scale and analysed by Weighted Average Mean.

Results and Discussion

Bahar taken by the Farmers

About 57% of farmers only choose Mrig Bahar because it yields fruits of excellent size and colour, Pest and disease infestation is more during this season.

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Table 1: Bahar taken by the Farmers

Bahar	Frequency	percentage
Ambe	02	2.94
Hast	05	7.35
Hast & Ambe	02	2.94
Mrig	39	57.35
Mrig & Ambe	05	7.35
Mrig & Hast	09	13.23
Mrig, Hast & Ambe	06	8.82
Total	68	100.00

Hast bahar is the second most popular bahar among farmers because it produces high-quality produce and experiences less pest attacks than Mrig bahar. Ambe bahar is the least preferred because of its poor quality (Colour and size) during this season due to high temperatures and heavy sunshine.

Acceptability of IoT device

According to the report, 58.8% of farmers intend to utilise this type of device if it becomes accessible in the market at reasonable price.

Table 2 Desire to use

	Frequency	Percent
Yes	40	58.82
No	28	41.18
Total	68	100.0

A few farmers are also interested to see this type of device in operation. A few farmers are interested, but they must first check to see if the demo was given at any other farms. Because there is very little knowledge of this type of device in the Morbi district, it is important to show it first and monitor the results.

Problems of farmers

Table 3: Irrigation related problems

Problems	Count
High pH of water	04
High TDS	03
Salty water	06
Low salinity of water	14
Amount of Irrigation	25
No idea	24

Efficient irrigation process have become very important over the years (Gracia et al., 2020). The amount of irrigation (25 respondents) was discovered to be one of the significant issues in farming by the problem analysis. Farmers struggle to understand when and how much water is given to the orchard. Farmers sometimes worry of excess irrigation because excessive irrigation causes flowers to wither. According to study it was found that more no. of farmers having a no idea about the problems in irrigation.

Insect problems

Fifty-seven farmers said that thrips problems were highest in pomegranate farming. It hampers the quality of the produce by scratching on the fruits and because of the scratches, fruit cracking is also higher. Fruit price also reduces due to thrips attack. In the month of Bhadarva, thrips attack is more due to frequent Hot and Rainy days.

Table 4: Insects infestation problems

Insect	Count
Thrips	57
Whtie fly	02
Aphid	02
Fruit borer	33
Fruit sucking moth	06
Fruit fly	05
Castor semilooper	01
Mite	02
Termite	01

Secondly, farmers have a problem of fruit borer. It totally destroys the fruit from inside. Larve of the Insect are Feed aril of the fruit from inside and hole are seen from outside of the fruits.

Disease problems

Table 5 Diseases

Disease	Count
Fruit rot	43
Wilt	22
Anthracnose	09
Bacterial blight	05
No idea	12

From the survey it is found that major diseases in pomegranate are Fruit rot fungi and Wilt Diseases are area specific like wilt was observed in Eastern side of gokuliya, southern side of juna devaliya, zinkiyali, halvad proper, western part of tikar village and some other areas. Singh *et al.*, 2020 found that the problem of fruit cracking in pomegranate is a complex phenomenon with a large number of factors playing a contributory role.

Weather related problem

Table 6: Weather related problems

Problem	Count
Uneven rainfall	26
Sun burn	04
Temp fluctuation	10
Fruit cracking	07
No idea	24

Based on weather conditions the crucial problem of the farmers was the uneven rainfall. Farmers faced difficulty in spraying and fertigation due to uneven rainfall. Temperature fluctuation was next major problem because when temperature is too high or too low it can result in flower dropping and less fruit setting. Pomegranates are also prone to sunburn.

Helpful features of IoT devices in farmers' perception

Features	WAM	Rank
Forewarning of pest and diseases	4.69	1
Precision irrigation scheduling	4.46	2
Weather advisory	4.40	3
Nutrition advisory	4.26	4
Query management	3.50	5
Activity management	3.18	6
Farming related videos	3.15	7
Package of practices	3.03	8
Government schemes	2.99	9
Crop calendar	2.96	10
News and articles	2.84	11

Result from the analysis revealed that Forewarning of pest and diseases was belived to be most useful feature by the farmers as

they were unaware about stages and time more sensitive for pest and diseases. Highest loss of the fruits is found due to the Insects and diseases. Second most useful feature according to farmers is precision irrigation schedule because proper irrigation is required for flowering and flower setting followed by weather advisory or weather alert feature.

CONCLUSIONS

Novel use of technology in agriculture has a major role to play. In order to survive, a farmer must fulfil a few obligations while practising smart farming, which will produce the best results in terms of wealth and health. In order to deal with issues like harsh weather, rising temperatures, and environmental effects of intensive farming practises, the agriculture business needs embrace IoT. Major problems of farmers in pomegranate cultivation includes thrips and fruit borer in insects, fruit rot and wilt, rainfall variability, irrigation amount given to the crop etc. IoT devices have the capability of alerting farmers to the majority of their difficulties which can solve number of issues. Most helpful features of the device were forewarning of pest and diseases, precision irrigation scheduling and weather advisory. The study's findings will be valuable in determining the needs of framers and will pave the way for the development of a product that is best suited to farmers' demand.

References

1. Agricultural and Processed Food Products Export Development Authority. Six head product. Retrieved from https://apeda.gov.in/apedawebsite/six_head_product/
2. Garcia, L., Parra, L., Jimenez, J. M., Lloret, J., & Lorenz, P. (2020). IoT-based smart irrigation systems: An overview on the recent trends on sensors and IoT systems for irrigation in precision agriculture. *Sensors*, 20(4), 1042.
3. Singh, A., Shukla, A. K., & Meghwal, P. R. (2020). Fruit cracking in pomegranate: extent, cause, and management–A Review. *International Journal of Fruit Science*, 20(3), 1234-1253.
4. Press Information Bureau. *PressRelease*. Retrieved from https://pib.gov.in/PressRelease