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Artificial Intelligence 2D, 3D-Dron Image Technique for Insecticides Detection by Henry Garrett Ranking Method and the High-Density Growth

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Abstract: - The ultra high density plant has an accuracy of 91.3% to grow that is why the ultra high density is the first choice of apple growers. With 107.10 million metric tons, India stands 2nd in the world in fruit production. These apple orchards are simple for other orchardists and they attract new apple growers who are going to establish them. The producer of an ultra-high density apple should be conscious that the grower should obtain a leader of 18-24 inches in 1st year and 30-36 inches in 2nd and 3rd year, so that the apple plant will grow fast. The apple grower will reduce production in starting 4 years, so that in future he will get good returns. Out of 140 growers, in 28 pre tested was done in 2022-2023 in both districts. Through Henry Garrett Ranking method this paper explains the challenges faced by growers while growing high density apple and use of new technology like drones for the spray of pesticides, 2D and 3D photos to detect insectsides of ultra high density apple orchards in Jammu and Kashmir.

Keywords: Baramulla, Budgam, Small Drones, Establishment cost, Interests, Leader.

I. INTRODUCTION:

After China and USA, Turkey ranks third with its 6941000 metric tons apple production per year. In Turkey, Isparta ranks first with 634795 metric tons per year. The main problem in Turkey is weed that affects the quality and quantity of high density apples. Reason behind that is heavy fertilizers to get higher fruit, but weed robs the fertilizers at a good speed with that the growth of tree effects. Apple trees are poor competitors (Ustunar, T. 2017).Drones help an apple grower to increase their production in two ways, one is to spray pesticides and insecticide and second is to take 3D photos .With the help of 3D photos the apple grower will check the insects on apple trees (Valente, J., et al, 2019)The weed effects different regions differently depend upon their altitude, climate, soil structure, irrigation system etc. Himachal Pradesh ranks 2nd after Jammu and Kashmir in terms of apple production in India. Apple contributes 4000 crores to the economy and it provides livelihood to 1.5 lakh families in the state of Himachal Pradesh. Apple is produced in three districts, namely Kullu, Kinnaur and Shimla. Out of these three districts, Shimla contributes 70% of apple production in the state. It is because of an ultra-high density apple .Ultra-high density is the best quality with high production and also gives high benefits in less time (Kumar et al., 2022). Pollination is an important to grow high density apples in a straight line. Pollination also affects the productivity of commercial apples. Traditional apples orchardists do not bother about the straight rows. But in modern high density apple orchardists they first plant the apple trees in straight lines. It helps not only in p-pollination but saves branches from any type of damages. Organic Fertilizers play a significant role in developing the growth of ultra-high density apples. There is a technique-of beds of soil for high density apple plants. They provide good nutrients for the plants and, with the help of organic fertilizers, these beds provide sufficient nutrients for the plant and the growth and production also increases (Nielsen, G. j., et al, 2004).Ultra high density is an advanced technique that has not only improved fruit quality but productivity per unit area. Nitrogen, potassium and phosphors show improvement in fruit quality. Nitrogen (N) improves sugar level, potassium (P) helps to grow quality (colour and size) and phosphorus directly influence the physical and chemical characterises of apple. Government should establish a mechanism whereby the Financing agencies and Banks shall be provided target of providing atleast 25% of their total loan allocations to the Apple growers for the execution of Ultra High Density Scheme.

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II. LITERATURE REVIEW:

China needs to improve the quantity and quality of apple. China stands dominant rank for that they have to improve their apple production to adopt high density apple varieties. China has ability to produce good quality apple. All qualities are in high density apple (Wang, N.A., et al). India stands 5th rank in the production of apples in the world. In high density Super Chief Sandidge is an important exotic variety because it is planted 3906 plants per hectare. With this high rate of planting profitability rate is very high. In present scenario apples with higher sugar content refreshing taste and high fresh juiciness are acceptable. These all qualities are in high density apple (Mushtaq. et al., 2018). In Dambovita fruit basin high density plants are grown. The fruit growers show keen interest to adopt the new high density apple. It not only socially helps the farmers but economically manage to capitalise, that is the reason people of Dambovita have good standard of living. With the passage of time high density apple plants demand is increasing in Dambovita (Romanian)(Hassan, B. ., et al 2020).The success of High density plants depend on proper spacing, rootstocks, branch cutting and tree training system. The popular variety of high density is tall spindle mainly because tree will give fruit in between 2-3 years. Training system is important for high density trees. Which branch will give fruit to next year; a good branch cutting trainer will know (Fallahi, E., et al, 2020). Drones for Agriculture purpose was started in 1998 our entire world. Drones has simplifies the work of apple growers to find insect on apple tree, which a man cannot found. In 2022 for the use of agricultural use small drones costs about 500 million (Filho, I ., et al ,2019) The Jammu and Kashmir Government brought High density apple root stock imported from Netherland. Lots of issues have to be addressed such as establishing laboratories, testing of pesticides and insecticides and fungicides. Subsidy should be given to consumers through direct benefit scheme, so that farmers cannot be exploited by the middleman (Kashmir 0bserver, 2020).With a 376.30 sq. km. district, Shimla ranks 1st in terms of area of apple production in Himachal Pradesh. That is why the National horticulture mission was launched and continued till date in Himachal Pradesh by the government of India. The aim of this project is to increase employment opportunities and ecological sustainability with the help of modern tools and technology. (Sharma A., & Panigrahy S.,).Himachal Pradesh ranks 2nd after Jammu and Kashmir in terms of apple production in India. Apple contributes 4000 crores to the economy and it provides livelihood to 1.5 lakh families in the state of Himachal Pradesh. Apple is produced in three districts, namely Kullu, Kinnaur and Shimla. Out of these three districts, Shimla contributes 70% of apple production in the state. It is because of an ultra-high density apple .Ultra-high density is the best quality with high production and also gives high benefits in less time. (Kumar et al., 2022).M26 is a semi dwarf rootstock which is helpful for the Apple growers of the world. World needs more intensive dwarf rootstock that replaces M26 rootstock. The Ultra high density variety (M26) help the farmers to get more productivity, reduce juvenile period, increase flower density and efficient mechanized management (Zheng, X. et al, 2017). The daily consumption of apple helps a person to control plasma cholesterol level, which is an important risk factor in cardiovascular diseases. A trail was conducted in cardiovascular diseases patients, which has found that high density apple is an essential food to reduce cholesterol level (Tenore, G.C., et al, 2017). The high density plant has more productivity, maintaining plant diversity, long term tree rows and long term sustainability. Weed growth is a repeated process and tillage is the only solution for eradicating weeds. Fruit size will remain small if we do not eradicate weeds (Mai, M., J., et al, 2020). 1/3th population of the world will face absolute scarcity of water by the year 2025. High density apple plants need water in drought or normal years. The productivity of fruit is low in our country because water is not available in the early years of plant growth. First few years are the crucial period for the growth of plant (Robinson, T. L., et al).Drones Help a farmer to monitor their plant stage wise growth, growing flower buds, plant growth and detect insects. Drones will spray water in dry season, so that the production, size and color will improve (Yaun, W., & Choi, D., 2021).

Objectives:

To study that the establishment cost is a major hurdle in growing ultra high density apple in the districts of Baramulla and Budgam.

To examine the use of drones for better production in future in Jammu and Kashmir.

Data Collection:

Primary data was collected from total populations, which are 140 growers of ultra high density apple in district Baramulla and Budgam. Pre-testing survey has been done on 20% which are 28 growers.31 growers of District Baramulla and 109 growers from Budgam of Ultra high density Apple were studied. Secondary Data was collected from Horticulture board of J&K, National Horticulture Board, Chief Horticulture Officer Baramulla and Budgam, SUAST Kashmir and Economic Survey 2020-2021.

III. RESEARCH METHODOLOGY:

The Henry Garrett Ranking method was used to rank the challenges faced by ultra high density apples (Decisions, I. S. P., 2019).

Percentage position = 28 (Rij-0.5)/NJ

Where

Table.1: Challenges faced by ultra-high density apple growers.

Challenges No.	Challenges
C1	High Establishment Cost
C2	High Interest Rate
C3	Subsidy not being Received on regular basis
C4	Road/ Electricity not available to the common orchardist
C5	Original pesticides not available
C6	National highway remains closed regularly during transportation time of the fruit
C7	MSP not available

Source : survey done by in 2022-2023

Table 2: Challenges Rank wise given by Ultra High Density apple growers

Challenges	1st	2nd	3rd	4th	5th	6th	7th
C1	16	2	2	2	2	2	2
C2	2	4	4	4	4	6	4
C3	2	10	2	2	8	2	2
C4	2	2	6	2	4	4	8
C5	2	2	0	6	6	12	0
C6	2	2	4	8	2	0	10
C7	2	6	10	4	2	2	2

Source : survey done in 2022-2023

Table 3: Calculate value and Garret value.

Rank	**28(Rij-0.5)/Nj**	**Calculated Value**	**Garret Value**
1	28(1-0.5)/7	2	93
2	28(2-0.5)/7	6	80
3	28(3-0.5)/7	10	75
4	28(4-0.5)/7	14	71
5	28(5-0.5)/7	18	68
6	28(6-0.5)/7	22	65
7	28(7-0.5)/7	26	63

IV. RESULTS AND DISCUSSIONS:

Table 4: Calculations.

Description	Rank wise after Calculations							**Total**	Average	Rank
	1st	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**			
High Establishment Cost	1488	186	186	186	186	186	186	2604	18.6	IST
High Interest Rate	160	320	320	320	320	480	320	2240	16	2ND
Subsidy not Received	150	750	150	150	600	150	150	2100	15	3RD
Road/ Electricity not connected to orchardist	142	142	426	142	284	284	568	1988	14.2	4TH
Original pesticides not available	136	136	0	408	408	816	0	1904	13.6	5TH
National highway closed	130	130	260	520	130	0	650	1820	13	6TH
MSP not available	126	378	630	252	126	126	126	1764	12.6	7TH

From the above data we find that High Establishment Cost is the main hurdle in establish Ultra high density apple. District Baramulla and Budgam have been the area/ field of study for compilation of the report. District Baramulla has been the largest producer of apple in Jammu and Kashmir with respect to the old varieties of the apple. Presently none of the apple growers use drones to spray pest sides on ultra high density apples.

Area of study:

District Baramulla and Budgam have been the area/ field of study for compilation of the report. District Baramulla has been the largest producer of apple in Jammu and Kashmir with respect to the old varieties of the apple. At present, 140 Growers are associated with the Ultra High Density Apple cultivation in district Baramulla and district Budgam.

Suggestions:

There is need to support farmers particularly small farmers through subsidies and loans.

The Loans shall be made available for the growers without asking for Loan Guarantor from them.

Further, the interest rate of the subsidy schemes must be reduced from 12% to 5% to encourage the growers.

Subsidy should be given on time to ensure that more and more people will benefit from these schemes.

First few years are important for the growth of plant growers should think about growth of plant instated of production or profit.

The government should provide permission for the use of drones for the ultra-high density apple growers to spray pesticides.

V. CONCLUSION:

High Density Apple Scheme is a revolutionary step that can change the living standard of the people of Jammu and Kashmir. Traditional Apple varieties are facing huge market competition from Apples of Himachal and Iran. In view of this issue, High Density Apple Variety can be the solution. It, therefore, helps the people of Jammu and Kashmir to

earn a huge amount of money which is not possible from old varieties (tradition) apple. Government of India and government of Jammu and Kashmir play a significant role to help the high density apple growers with the permission of drones for spraying pesticides. Drones not only help the farmers to reduce insects also shows the growth of apples through 3D photos. But lot of challenges have yet to be unsolved e.g. establishment cost is high, interest rate is high, highway is closed during the peak season ,Minimum support price should be given to apple growers ,so that they can earn good returns.

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