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Adoption level of marigold growers regarding production technology in western Uttar Pradesh

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Abstract
Floriculture is a subset of horticulture that deals with the commercial production of cut flowers, loose flowers, seeds, cut greens, bulbs, and landscape plants, as well as the manufacture and marketing of value-added goods generated from them. Floricultural product production has increased steadily over the previous 20 years, with an average annual increase of 6.00 to 9.00 percent. India is experiencing remarkable expansion in terms of acreage, production, and consumption has roughly 318000 hectares of floriculture land in (2020-21), decrease from 323000 hectares in the previous year (2019-20). The production of flowers was around 300000 Mt in (2019-20) which decrease to 279300 Mt in (2020-21). So, keeping in view the above fact the present study was conceptualized with the objective of assessing the adoption level of marigold growers regarding production technology. The present study was conducted in Meerut and Muzaffarnagar district of Uttar Pradesh state by taking interview of 160 marigold respondents. The result revealed that majority 55.63 percent of the flower growers were having medium adoption level of marigold followed by 31.25 percent were low adoption level and remaining only 13.12 percent respondents were high adoption level. The result of the correlation analysis revealed that the adoption of Marigold production technology was found to be positively and significantly correlated with their education, social participation, size of land holding and mass media exposure at one percent level of significance. Annual income, extension agency contact, economic motivation and scientific motivation were found to have positive and significant correlation at five percent level of significance.

Keywords: Marigold, correlation, floriculture, adoption, production technology

Introduction
Floriculture is a subset of horticulture that deals with the commercial production of cut flowers, loose flowers, seeds, cut greens, bulbs, and landscape plants, as well as the manufacture and marketing of value-added goods generated from them. Floricultural product production has increased steadily over the previous 20 years, with an average annual increase of 6.00 to 9.00 percent. The top ten major flower producing countries in the world during 2018-19 are The Netherland (52.00 percent), Columbia (15.00 percent), Ecuador (9.00 percent), Kenya (7.00 percent), Belgium (3.00 percent), Ethiopia (2.00 percent), Malaysia, Italy, Germany, Israel (1.00 percent) of global market share. According to the interactive system productivity facility, Asia has the largest area under floriculture, at 7, 39,125 hectares, but Europe has the highest output value, at 11,191 million Euros. The floriculture has gained a great deal of commercialization rather than subsistence farming on account of varied agro climatic zones and specific production technologies. The international commerce and consumption of decorative items has expanded. The flower industry's competition appears to be heating up. For high-cost farmers looking to stay competitive in the global floriculture market, rapid innovation is a viable route. (Anonymous (2020) [2] *Horticulture Statistics Division)* Recently, drastic changes took place in Indian floriculture because of liberalization in Indian economy, globalization of trade and privatization, resulted many corporate people have entered in protected cultivation and export of floriculture produces has increased. In terms of floriculture, India is experiencing remarkable expansion in terms of acreage, production, and consumption has roughly 318000 hectares of floriculture land in (2020-21), decrease from 323000 hectares in the previous year (2019-20). The production of flowers was around 300000 Mt in (2019-20) which decrease to 279300 Mt in (2020-21).Tradition of growing flowers is observed in the whole country, however, major states leading in commercial cultivation of flowers and their share percents are Tamil Nadu (19.00 percent),

Karnataka (13.00 percent), West Bengal (12.00 percent), Madhya Pradesh (10.00 percent) Gujarat (8.00 percent) Andhra Pradesh (6.00 percent), Uttar Pradesh (5.6 percent), and Maharashtra (5.00percent). Traditional flowers such as Marigold, Roses, Jasmine, chrysanthemum, Tuberose, and others still account for more than two-thirds of the land under floricultures today. (Ministry of Agriculture and Farmers Welfare 2020-2021). So, keeping in view the above fact the present study was conceptualized with the objective of assessing the adoption level of marigold growers regarding production technology in western Uttar Pradesh.

Methodology
The present study was conducted in Meerut and Muzaffarnagar districts of Western Uttar Pradesh. These two districts were selected for the study because the farmers of these districts are cultivating flowers and marketing to the nearest of the national capital region for earning higher profit. These regions have good transport facility for better transportation and marketing. From each district two blocks were selected, named Daurala and Kharkhoda of Meerut and Khatauli and Jaansath bolocks of Muzaffarnagar district which has the maximum area and production of flowers, thus the total four blocks were finally selected for the study. From each block five villages were selected randomly. Thus, a total twenty (20) villages were selected from four blocks of two districts for this study. From each village 8 respondents were chosen purposively thus making the total sample size of 160 respondents. The investigator himself had collected the data from the respondents with the help of pre-tested interview schedule. The analysis was done with the help of various statistical tool like frequency, percentage, mean and standard deviation as well as the correlation coefficient was used to find out the relationship between different variables and adoption level with respect to improved cultivation practices in flowers.

Result and Discussion
Adoption level of marigold growers regarding production technology-
1. Recommended type of soil
It is indicated from the table-1 that most of the 44.38 percent marigold growers had no adoption remaining 41.25 percent had partial adoption and 15.62 percent marigold growers were reported to have full adoption level of the recommended type of soil of marigold and the mean value 1.73, respectively.

2. Improved varieties
The table-1 presents that the maximum 45.00 percent of the marigold growers were at no adoption level remaining 41.88 percent had partial adoption and 13.12 percent had full adoption of improved varieties of marigold and the mean value 1.68, respectively.

3. Recommended seed rate
It is observed from the table-1 that most of the 37.50 percent marigold growers were at partial adoption level remaining 35.00 percent had no adoption and 27.50 percent marigold growers were reported to be at full adoption level of recommended seed rate of marigold and the mean value 1.92, respectively.

4. Sowing time
It is presents from the table-1 that most of the 70.00 percent marigold growers were fully adoption level remaining 16.25 percent partial adoption and 13.75 percent marigold growers were reported to be not adoption level of sowing time of marigold and the mean value 2.56, respectively.

5. Seed treatment
The table-1 shows that most of the 60.00 percent marigold growers were not adoption level 21.25 percent fully adoption and 18.75 percent marigold growers were reported to be partially adoption level of seed treatment of marigold and the mean value 1.61, respectively.

6. Nursery management
It is clear from the table 1 that most of the 58.12 percent marigold growers were fully adoption level remaining 28.13 percent not adoption and 13.75 percent, marigold growers were reported to be partially adoption level of nursery management of marigold and the mean value 2.30, respectively.

7. Field preparation
It is indicated from the table-1 that most of the 76.25 percent marigold growers were fully adoption level remaining 16.25 percent partially adoption and 7.50 percent of marigold growers were reported to be not adoption level of field preparation for marigold crop and the mean value 2.60, respectively.

8. Transplanting of seedling
It is presents from the given table-1 that most of the 65.00 percent marigold growers had full adoption level remaining 17.50 percent had partial adoption and 17.50 percent marigold growers were reported to have no adoption level of transplanting of seedling of marigold and the mean value 1.91, respectively.

9. Planting distance
From the given table-1 it is stated that most of the 46.25 percent marigold growers were having partial adoption remaining 28.12 percent had no adoption and 25.63 percent, marigold growers were reported to have full adoption level of planting distance of marigold and the mean value 1.97, respectively.

10. Irrigation management
The data of the table-1 presents that most of the 43.13 percent marigold grower were fully adoption level remaining, 32.50 percent partial adoption and 24.37 percent marigold growers were reported to have no adoption level of the irrigation management of marigold and the mean value2.18, respectively.

11. Manure and fertilizer application
It is presents from the given table-1 that 57.50 percent of the marigold growers were having partial adoption level remaining 23.12 percent had full adoption and 19.38 percent marigold growers were reported to have no adoption level of the manure and fertilizer application of marigold and the mean value 2.03, respectively.

12. Interculture and weed control
The data of the table-1 presents that most of the 51.88 percent of the marigold growers were fully adoption level remaining 30.62 percent had no adoption and 17.50 marigold growers were reported to have partial adoption level of the Interculture and weed control of marigold and the mean value 2.21, respectively.

13. Insect pest control
In the given table-1 presents that most of the 41.25 percent of the marigold growers were partially adoption level remaining 31.25 percent not adoption and 27.50 percent marigold growers were reported to be fully adoption level of the insect pest control of marigold and the mean value 1.96, respectively.

14. Disease control
The table-1 presents that most of the 43.75 percent of the marigold growers were having no adoption level remaining 30.62 percent had partial adoption and 25.63 percent marigold growers were reported to have full adoption level of the disease control of marigold and the mean value 1.81, respectively.

15. Physiological disorder
From the given table-1 it is stated that most of the 42.50 percent of the marigold growers were having no adoption level remaining 33.12 percent partial adoption and 24.38 percent marigold growers were reported to be fully adoption level of the physiological disorder of marigold and the mean value 1.40, respectively.

16. Harvesting time of crop
It is presents from the table-1 presents that most of the 86.87 percent of the marigold growers were fully adoption level remaining 34.37 percent marigold growers were reported to be partial adoption level of the harvesting time of marigold and the mean value 2.86, respectively.

17. Recommended yield
It is presents from the given table-1 that most of the 56.25 percent marigold growers were partially adoption level remaining 30.00 percent not adoption and 13.75 percent marigold growers were reported to have no adoption level of the recommended yield of marigold and the mean value 1.77, respectively.

18. Packing
It is presents from the table-1 that 62.50 percent of the respondents were fully adoption level remaining 25.00 percent had partial adoption and 12.50 percent marigold growers were reported to had no adoption level of the packing of marigold production technology and the mean value 2.50, respectively.

19. Marketing
The data of the table-1 presents that the 81.25 percent of the marigold growers were having full adoption level remaining 18.75 percent marigold growers were reported to have partial adoption level of the marketing of and the mean, value, 2.841, respectively.

Table 1: Adoption level of marigold growers regarding production technology.

N=160

Sr. No.	Particulars	Fully Adoption		Partial Adoption		Not Adoption		Mean value
		F	P	F	P	F	P	
1.	Recommended type of soil	25	15.62	66	41.25	71	44.38	1.73
2.	Improved varieties	21	13.12	67	41.88	72	45.00	1.68
3.	Recommended seed rate	44	27.50	60	37.50	56	35.00	1.92
4.	Sowing time	112	70.00	26	16.25	22	13.75	2.56
5.	Seed treatment	34	21.25	30	18.75	96	60.00	1.61
6.	Nursery management	93	58.12	22	13.75	45	28.13	2.30
7.	Field preparation	122	76.25	26	16.25	12	07.50	2.68
8.	Transplanting of seedling	104	65.00	28	17.50	28	17.50	2.47
9.	Planting distance	41	25.63	74	46.25	45	28.12	1.97
10.	Irrigation management	69	43.13	52	32.50	39	24.37	2.18
11.	Manure & Fertilizer	37	23.12	92	57.50	31	19.38	2.03
12.	Interculture and weed control	83	51.88	28	17.50	49	30.62	2.21
13.	Insect pest control	44	27.50	66	41.25	50	31.25	1.96
14.	Disease control	41	25.63	49	30.62	70	43.75	1.81
15.	Physiological disorder	39	24.38	53	33.12	68	42.50	1.81
16.	Harvesting	139	86.87	21	13.13	00	00.00	2.86
17.	Recommended yield	22	13.75	90	56.25	48	30.00	1.77
18.	Packing	100	62.50	40	25.00	20	12.50	2.50
19.	Marketing	130	81.25	30	18.75	00	00.00	2.81

F = Frequency and P = Percentage

Table- 2 reveals that the majority 55.63 percent of the flower growers were having medium adoption level of marigold followed by 31.25 percent were low adoption level and remaining only 13.12 percent respondents were high adoption level. Therefore, it can be concluded that majority of the respondent were having medium adoption level of marigold in study area. This finding was in accordance with similar trends in Singh *et al.* (2019) [9].

Table 2: Over all adoption level of marigold growers regarding production technology.

N=160

S. No.	Particulars	Frequency	Percentage
1.	Low (Below 32)	50	31.25
2.	Medium (32 to 45)	89	55.63
3.	High (above 45)	21	13.12
	Total	160	100

Correlation analysis between adoption of marigold production technology and selected variables of the flower cultivators
The result of the correlation analysis revealed that the adoption of Marigold production technology was found to be positively and significantly correlated with their education, social participation, size of land holding and mass media exposure at one percent level of significance. Annual income, extension agency contact, economic motivation and scientific motivation were found to have positive and significant correlation at five percent level of significance. The variable age was found to have negative correlation with adoption. However, the rest of the variables, namely, caste, marital status, occupation, types of family, size of family, housing pattern, irrigation facility and material possession were found to be positive but non-significantly correlated with the adoption of marigold production technology.

Education was found highly significantly correlated with adoption of marigold cultivation practices. This means that more educated flower cultivators had greater adoption of marigold production technology. Similar is the case with social participation and mass media exposure as these were also having positive correlation with adoption. So social participation needs to be further improved by mobilizing flower cultivators towards forming the self-help groups and to form co-operative associations. Also size of land holding and annual income have positive and significant correlation which means that flower cultivators having large size of land holding and high annual income have better rate of adoption as they can take risk of adopting new production technologies. Also greater economic motivation and scientific motivation leads to greater adoption of production technology among flower cultivators. On other hand Age has negative correlation with adoption of marigold production technology, which means younger farmers have greater adoption rate then older farmers.

Table 3: Correlation analysis between adoption of Marigold production technology and selected variables of the flower cultivators:

N=160

S. No	Variables	Correlation co-efficient (r)
1	Age	-0.195
2	Education	0.309**
3	Caste	0.178
4	Marital status	0.124
5	Occupation	0.069
6	Type of family	0.075
7	Size of family	0.084
8	Social participation	0.401**
9	Housing pattern	0.089
10	Size of land holding	0.318**
11	Irrigation facility	0.082
12	Material possession	0.067
13	Annual income	0.271*
14	Extension agency contact	0.227*
15	Mass media exposure	0.301**
16	Economic motivation	0.232*
17	Scientific motivation	0.248*

** Significant at 0.01 level of probability.
* Significant at 0.05 level of probability.

Conclusion
It may be concluded that the most of the flower growers were fully adopted sowing time, nursery management, field preparation, transplanting of seedling, irrigation management, intercultural weed management, harvesting time, packaging of flowers and the marketing system of marigold in production technology. The correlation analysis revealed that the adoption of Marigold production technology was found to be positively and significantly correlated with their education, social participation, size of land holding and mass media exposure at one percent level of significance. Annual income, extension agency contact, economic motivation and scientific motivation were found to have positive and significant correlation at five percent level of significance. The variable age was found to have negative correlation with adoption. However, the rest of the variables, namely, caste, marital status, occupation, types of family, size of family, housing pattern, irrigation facility and material possession were found to be positive but non-significantly correlated with the

adoption of marigold production technology. Findings of this study will also benefit other flowers sub-sector stakeholders like extension service providers, consultants, researchers, input suppliers, traders, and policy makers, who will be able to make more informed decisions.

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