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Correltion analysis of the turmeric growers regarding knowledge and adoption of post harvest technology

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Abstract
The present study was carried out to analyze the relationship between profile of turmeric growers with their knowledge and adoption of post harvest technology (PHT). For this study, Hingoli District was selected from Marathwada region due to high area under turmeric production. In Hingoli District two Taluka *viz.*, Vasmat and Aundha were selected purposively on the basis of maximum number turmeric grower and three villages from both Talukas were selected. From each village twenty (20) members were selected constituting the sample size 120. Ex-post facto research design was used for this study. Keeping in a view the objective of this study and well structured interview schedule was designed. This includes relevant question for seeking information in respect of independent and dependent variable. The question was asked in local language (i.e. Marathi). The data collections from the turmeric growers were edited tabulated and analyzed using suitable statistical tools i.e. frequency, percentage, mean, standard deviation and Pearsons coefficient of correlation. The study was noticed that relationship between profile of turmeric growers with their knowledge and adoption of post harvest technology (PHT). It was stated that all respondents were having medium level relationship with independent variables except annual income, cropping pattern and source of irrigation shows non-significant relationship with knowledge of PHT by the turmeric grower. And other side independent variables like cropping pattern, annual income, age and source of irrigation shows non-significant relationship with adoption of PHT by the turmeric grower.

Keywords: Correction, relationship, post harvest technology, knowledge, adoption, turmeric growers

Introduction
Turmeric (*Curcuma longa* L), the ancient and sacred spice of India known as, "Indian saffron" is an important commercial spice crop grown in India. The word "turmeric" is derived from the Latin word "*terra merita"* means "meritorious earth" referring to the colour of ground turmeric. Turmeric was grown and has been under cultivation in India from times immemorial. It is a native of India and is domesticated in Southern East Asia. Nearly about 80 per cent of world turmeric production comes from India. Due to a larger area under turmeric in India, it is popularly known as 'Goldmine of India' and 'Indian Saffron'. The major turmeric producing districts in Maharashtra are Sangli, Satara, Kolhapur, Parbhani, Hingoli, Nanded and parts of Chandrapur. The Hingoli is one of the leading turmeric producing district of Maharashtra State. Turmeric contains various medicinal properties like it is act as anti-oxidant protecting against the free radicle damage, protect liver from certain toxins, improves circulation by inhibiting blood platelets from sticking together, *etc*. Turmeric contains on an average moisture 6 per cent, protein 6.5 per cent, fixed oil 3.5 per cent, volatile oil 4.5 per cent, crude starch 50.4 per cent, fiber 3 per cent and curcumin 3.1 per cent. Alleppey turmeric contains 6-8 per cent curcumin. Standard required ground turmeric to contain not more than 7 per cent total ash, 1.5 per cent insoluble ash and 60 per cent starch. The rhizomes of turmeric have been used in Ayurvedic system of medicine in India from times immemorial. It is claimed to be as stomachic tonic, blood purifier, antiseptic, antacid and carminative. Turmeric after harvest undergoes the various processing operations like cleaning, curing, boiling, drying, polishing, colouring, grading, milling, packaging, storage and marketing.

Since independence, research on turmeric crop in respect of varietal development, fertilizer and irrigation management, plant protection, processing, curing, *etc*. was done with a view to increase the per hectare production of the State as well as Country as a whole, which is not satisfactory and hence has a vast scope for increasing per hectare production of turmeric crop in the country. Turmeric can be stored well after processing for 5-10 months and marketed when prices are reasonably good. Besides, there are good prospects for increasing production of turmeric crop and also for increasing quality seed material in India.

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It was found that researchers in social science have given attention mainly towards the adoption of cultivation practices of different areas like pomology and floriculture. Scanty studies in the area of spices and condiments have been made. Also the studies in the field of post-harvest technology in turmeric crop are rare.

Materials and Methods
The present study was undertaken in Marathwada region of Maharashtra State. The investigation was carried out in purposively selected Hingoli District of Marathwada Region as it has the highest area under turmeric cultivation. Vasmat and Aundha (N) talukas from the Hingoli district was selected purposively as major area under turmeric cultivation falls in these two talukas. From each selected Taluka, three villages were selected randomly on the basis of considerable area under turmeric cultivation. From each selected village, turmeric growers were selected randomly. In this way, a total of 120 turmeric growers (Total 6 X 20 = 120) were considered as respondents for this study. These selections were done by using simple random sampling method for the purpose of the study. Ex-post facto research approach was used for the present study. A well structured interview schedule was prepared, so as to collect the information in line with the objectives of this study. Personal interview technique was used for data collection. The question was asked in local language (i.e. Marathi). The data collections from the turmeric growers were edited tabulated and analyzed using suitable statistical tools i.e. frequency, percentage, mean, standard deviation and Pearsons coefficient of correlation. The study was noticed that relationship between profile of turmeric growers with their knowledge and adoption of post harvest technology (PHT).

Results and Discussion
The findings of the present study as well as relevant the discussion have been summarized under the following heads:

Components of Profile of turmeric growers
A glance of Table 1 revealed that, the majority of the respondents 66.66 per cent were from middle age group whereas, 20.00 per cent respondents were from old age group and 13.33 per cent of the respondents belong to young group. The similar finding was reported by Shende (2019) [12].

It is seen from Table 1 indicated that majority 30.00 per cent of the respondents were educated up to primary school whereas, 19.16 per cent were educated up to collage level/ graduate/ diploma while 15.00 per cent educated up to higher secondary education and 14.16 per cent can read and write only. While 12.5 per cent of the respondents are illiterate and remaining 9.16 per cent educated up to secondary school. The similar finding is reported by Kharade (2003) [7].

The data furnished in Table 1 indicated that majority 55.83 per cent of the turmeric grower belong to category of marginal land holding whereas, 35.83 per cent belong to small land holding category while 6.66 per cent of the turmeric grower belong to semi medium land holding and 1.66 per cent of the turmeric grower belong to medium land holding category. And no one is found in big land holding category. The similar finding is reported by Kharade (2003) [7].

It is observed from Table 1 reported that majority 64.16 per cent respondents had medium family size whereas, 23.33 percent of the turmeric growers had small family size category and remaining 12.50 per cent belong to big family size category. The similar finding was reported by Shende (2019) [12].

It is seen from Table 1 found that majority of the turmeric grower 79.16 per cent had annual income of Rs. 12,097 to 2,92,071, followed by 18.33 per cent had high annual income i.e. Rs. 2,92,071 and above, rest of 2.50 per cent of the turmeric grower had annual income below Rs. 12,096. The similar finding is reported by Agalawe (2012) [2] and Patil (2014) [9].

A glance of Table 1 observed that majority 41.16 per cent of the turmeric grower had medium social participation whereas, 34.16 per cent of the turmeric grower had low social participation and remaining 21.66 per cent of the turmeric grower had high social participation. The similar finding is reported by Shende (2019) [12].

It is observed from Table 1 found that 57.50 per cent of the turmeric grower had medium sources of information whereas, followed by 21.66 per cent of the turmeric growers had low sources of information and remaining 20.83 per cent had high sources of information. The similar finding is reported by Shende (2019) [12].

The results from Table 1 revealed that majority of 40.00 per cent of the turmeric grower had medium risk bearing ability whereas, 33.33 per cent of the turmeric grower had high risk orientation and remaining 26.66 per cent turmeric grower had low risk orientation.

It is seen from Table 1 indicated that majority 73.33 per cent of the respondents belong to seasonal cropping pattern category whereas, 10.83 per cent of the respondents belong to biseasonal category while 7.50 per cent had annual category. While 5.83 per cent of the respondents belong to biannual category and only 2.5 per cent of the respondents had perennial category. The similar finding reported by Barkhade (2015) [3].

The data in Table 1 found that majority 55.83 per cent of the turmeric grower belong to medium extension contact category, whereas, 23.33 per cent belong to high extension contact category and rest of 20.83 per cent of the respondents belong to low extension contact category.

It could be seen from Table 1 that majority 68.33 per cent of the respondents had well or tube well their source of irrigation, 18.33 per cent had canal whereas 8.33 per cent of them had no source of irrigation, only 5.00 per cent had river as a source of irrigation. The similar finding reported by Gawade (2013) [5].

The results from Table 1 indicated that majority 57.50 per cent of the turmeric grower had medium market orientation whereas, 21.66 per cent of the turmeric grower had high market orientation and remaining 20.83 per cent of the respondents had low market orientation. The similar finding is reported that Chikane (2018) [4] and Shende (2017).

The data in Table 1 observed that majority 43.33 per cent of the respondents received one training, followed by 37.5 per cent do not received any training while 10.00 per cent of the respondents received two training and remaining 9.16 per cent of the respondents received three training.

Table 1: Distribution of respondents based on components of Profile of turmeric growers

Sr. No.	Profile of the turmeric growers	Respondents (n=120)	
		Frequency	Percentage
1	**Age**		
	Young (Up to 29)	16	13.33
	Middle (30 to 52)	80	66.66
	Old (53 and above)	24	20.00
2	**Education**		
	Illiterate	15	12.5
	Can read and write only	17	14.16
	Primary school (1st to 4th std.)	36	30.00
	Secondary school (5th to 10th std.)	11	9.16
	Higher secondary education (11th to 12th std.)	18	15.00
	Collage level/graduate/diploma	23	19.16
3	**Land holding**		
	Marginal (up to 1.00 ha)	67	55.83
	Small (1.01 to 2.00 ha)	43	35.83
	Semi medium (2.01 to 4.00 ha)	8	6.66
	Medium (4.01 to 10.00)	2	1.66
	Big (10.1 and above)	0	0
4	**Family size**		
	Small (up to 4)	28	23.33
	Medium (5 to 8)	77	64.16
	Big (9 and above)	15	12.50
5	**Annual Income**		
	Low (Rs. 12,096)	9	2.50
	Medium (Rs. 12,097 to Rs. 2,92,071)	95	79.16
	High (Rs. 2,92,071 and above)	22	18.33
6	**Social participation**		
	Low (up to 2)	41	34.16
	Medium (3 to 5)	53	41.16
	High (6 and above)	26	21.66
7	**Sources of information**		
	Low (up to 15)	26	21.66
	Medium (16 to 28)	69	57.50
	High (29 and above)	25	20.83
8	**Risk orientation**		
	Low (up to 15)	32	26.66
	Medium (16 to 25)	48	40.00
	High (26 and above)	40	33.33
9	**Cropping pattern**		
	Seasonal	**88**	**73.33**
	Bi-seasonal	13	10.83
	Annual	9	7.50
	Biannual	7	5.83
	Perennial	3	2.5
10	**Extension contact**		
	Low (up to 15)	25	20.83
	Medium (16 to 26)	67	55.83
	High (27 and above)	28	23.33
11	**Source of irrigation**		
	No source	10	8.33
	River	6	5
	Well/ tube well	82	68.33
	Canal	22	18.33
12	**Market orientation**		
	Low (up to 17)	25	20.83
	Medium (18 to 28)	69	57.50
	High (29 and above)	26	21.66
13	**Training received**		
	No training	45	37.5
	1 training	52	43.33
	2 training	12	10.00
	3 training	11	9.16

Relationship between Profile of turmeric growers with their knowledge and adoption of Post Harvest Technology (PHT)

A) Relationship between Profile of turmeric growers with their knowledge of Post Harvest Technology (PHT)

The Table 2 shows that results of relationship between profile turmeric growers and knowledge of post harvest technology. It was found that education, family size, social participation, sources of information, risk orientation, extension contact, market orientation and training received had positive and significant relationship with their knowledge of post harvest technology. Whereas, age and land holding had negative and significant relationship with their knowledge of post harvest technology. Independent variable annual income and cropping pattern had positive and non-significant relationship with their knowledge of post harvest technology. Whereas, source of irrigation had negative and non-significant relationship with their knowledge of post harvest technology.

Age and Knowledge

The correlation coefficient indicated that there was negative and significant relationship between age of turmeric grower and their knowledge level of post-harvest technology. It has been reported that young people tends to be more curious and receptive about new knowledge. The similar finding reported by Agalawe (2015) [1].

Education and Knowledge

The correlation coefficient indicated that there was positive and highly significant relationship between education of turmeric grower and their knowledge of post- harvest technology of turmeric. This meant that higher the education, higher was the knowledge. Education has impact on every aspect of life of individual. It broadens the knowledge base of an individual. The possible logic could be that the educated persons are always curious to know the details of any new findings. The similar finding reported by Sawale (2011) [11].

Land holding and Knowledge

The correlation coefficient indicated that there was negative and significant relationship between land holding and their knowledge about turmeric post-harvest technology. The most probable reason is that, marginal as well as small farmers also eager to have knowledge about post-harvest technology to get maximum returns.

Family size and Knowledge

The correlation coefficient indicated that there was positive and significant relationship between family size and their knowledge. The reason behind that increase the family size increase the knowledge of the respondents because all family member discusses, share their experience and knowledge with family members. The similar finding reported by Kumar (2011) [8].

Annual income and Knowledge

The correlation coefficient indicated that there was positive and non-significant relationship between annual income and their knowledge. Annual income is not influence on the knowledge of the respondent, free seminar and also training should be arranged by government authority, respondent attained that and get knowledge about post-harvest technology of turmeric.

Social participation and Knowledge

The correlation coefficient indicated that there was positive and highly significant relationship between their social participation and knowledge. It is due to the respondent had greater social participation in the organization have more knowledge as compare to other. The similar finding reported by Sawale (2011) [11].

Sources of Information and knowledge

The correlation coefficient indicated that there was positive and significant relationship between sources of information and knowledge. It is because that an individual gain variety and more amount of knowledge if he has opportunity to expose with more number of sources of information, the people who had more extension contact had greater sources of information. The similar finding reported by Sawale (2011) [11].

Risk orientation and knowledge

The correlation coefficient indicated that there was positive and significant relationship between risk orientation and knowledge. Higher the risk orientation has higher the level of knowledge of turmeric grower. Turmeric growers who had high risk orientation are psychologically prepared to try new practices with a view to make progress in farming. The similar finding reported by Sawale (2011) [11].

Cropping pattern and Knowledge

The correlation coefficient indicated that there was non-significant relationship between cropping pattern and knowledge. It means cropping pattern does not influence on the knowledge of the respondent about post-harvest technology of turmeric.

Extension contact and knowledge

The correlation coefficient indicated that there was positive and significant relationship between extension contact and knowledge. The reason behind that high extension contacts is possible due to higher the level of knowledge about the post-harvest technology of turmeric. The people who had extension contact with scientist and agricultural officer had more knowledge than other. The similar finding reported by Pole (2018) [10].

Source of irrigation and knowledge

The correlation coefficient indicated that there was negative and non-significant relationship between source of irrigation and knowledge. It indicated that source of irrigation does not influence on the knowledge of the respondent about post-harvest technology.

Market orientation and Knowledge

The correlation coefficient indicated that there was positive and significant relationship between market orientation and knowledge. The reasons behind that high level of knowledge of turmeric grower due to higher the market orientation. The similar finding reported by Pole (2018) [10].

Training received and Knowledge

The correlation coefficient indicated that there was positive and significant relationship between training received and knowledge. The reason behind that the respondent who had attended training gets more knowledge about new technology

as compare to other.

Table 2: Relationship between Profile of turmeric growers with their knowledge of Post Harvest Technology (PHT)

Sr. No.	Independent variables	Coefficient of Correlation
1	Age	- 0.439**
2	Education	0.896**
3	Land holding	- 0.439**
4	Family size	0.236*
5	Annual income	0.135^{NS}
6	Social participation	0.747**
7	Sources of information	0.797**
8	Risk orientation	0.770**
9	Cropping pattern	0.019^{NS}
10	Extension contact	0.789**
11	Source of irrigation	- 0.030^{NS}
12	Market orientation	0.850**
13	Training received	0.426**

** Significant at 0.01 per cent level. ^{NS} Non significant
* Significant at 0.05 per cent level

B) Relationship between Profile of turmeric growers with their adoption of Post Harvest Technology (PHT)

The Table 3 shows that results of relationship between profile turmeric growers and knowledge of post harvest technology. It was found that education, family size, social participation, sources of information, risk orientation, extension contact, market orientation and training received had positive and significant relationship with their adoption of post harvest technology. Whereas, age and land holding had negative and significant relationship with their adoption of post harvest technology. Independent variable annual income and cropping pattern had positive and non-significant relationship with their adoption of post harvest technology. Whereas, source of irrigation had negative and non-significant relationship with their adoption of post harvest technology.

Age and adoption
The correlation coefficient indicated that there was negative and significant relationship between turmeric grower and their adoption. It has been reported that young people tends to be more receptive and adoptive for improvements, but many research workers have shown that age is not related with adoption of the post-harvest technologies of different crops, it may due to they do not have decision making capacity in their family. Hence age does not influence on the adoption of post-harvest technology. The similar finding reported by Agalawe (2015) [1].

Education and adoption
The correlation coefficient indicated that there was positive and highly significant relationship between education and adoption. The level of education also helps to and individual to get himself acquainted with the skill that is required for understanding modern technique of agricultural. The similar finding reported by Sawale (2011) [11].

Land holding and adoption
The correlation coefficient indicated that there was negative and significant relationship between land holding and adoption. It meant that, land holding does not had influence on the adoption of post-harvest technology of turmeric, the farmer who had higher land holding as well as marginal and small land holding farmers equally eager to adopt post-harvest

technology of turmeric.

Family size and adoption
The correlation coefficient indicated that there was positive and significant relationship between family size and adoption. The reason behind that, number of family members collectively made decision regarding adoption of new technology. As family members they discuss their problem, share and guide to each other and solve problem of adoption of post-harvest technology. The similar finding reported by Sawale (2011) [11].

Annual income and adoption
The correlation coefficient indicated that there was positive and non-significant relationship between annual income and adoption. It is because of for adopting post-harvest technology of turmeric no need of more cost required for that, as like cooker, farmer used iron cauldron for boiling of turmeric and likewise other practices, so annual income does not influence on adopting post-harvest technology of turmeric. The similar finding reported by Pole (2018) [10].

Social participation and adoption
The correlation coefficient indicated that there was positive and highly significant relationship between social participation and adoption. The reason behind that the farmer who had more social participation in organization so adopt new technology as compare to other and aware about that. The similar finding reported by Sawale (2011) [11].

Sources of Information and adoption
The correlation coefficient indicated that there was positive and highly significant relationship between sources of information and adoption. Use of number of sources of information increases the level of information and develop self-confidence about ability to take up new and better practices. The similar finding reported by Khandre (2015) [6].

Risk orientation and adoption
The correlation coefficient indicated that there was positive and highly significant relationship between risk orientation and adoption. The reason behind that the grower with more risk orientation prone to take risk and faced the challenges to get maximum returns due to which there may be such type of relationship. The similar finding reported by Pole (2018) [10].

Cropping pattern and adoption
The correlation coefficient indicated that there was positive and non-significant relationship between turmeric grower and their cropping pattern. It meant that, cropping pattern does not influence on adopting new technology of post-harvest technology.

Extension contact and adoption
The correlation coefficient indicated that there was positive and highly significant relationship between extension contact and adoption. The reason behind that respondent having high degree of contact with extension person to get an opportunity to see different important practices and to adopt them. The similar finding reported by Pole (2018) [10].

Source of irrigation and adoption
The correlation coefficient indicated that there was negative

and non-significant relationship between source of irrigation and adoption. It meant that, source of irrigation does not influence on the adopting new post-harvest technology of turmeric.

Market orientation and adoption

The correlation coefficient indicated that there was positive and highly significant relationship between market orientation and adoption. With motivation to have more profit, farmer tends to adopt the recent practices. It indicates that adoption of post-harvest technology depend on market orientation. The similar finding reported by Pole (2018) [10].

Training received and adoption

The correlation coefficient indicated that there was positive and highly significant relationship between training received and adoption. The reason behind that the respondent who attained more training they get knowledge about new technology and try in the farming of own as compare to other and get more profit from the yield.

Table 3: Relationship between Profile of turmeric growers with their adoption of Post Harvest Technology (PHT)

Sr. No.	Independent variables	Coefficient of Correlation
1	Age	- 0.394**
2	Education	0.806**
3	Land holding	- 0.273**
4	Family size	0.264**
5	Annual income	0.156[NS]
6	Social participation	0.708**
7	Sources of information	0.820**
8	Risk orientation	0.731**
9	Cropping pattern	0.089[NS]
10	Extension contact	0.801**
11	Source of irrigation	- 0.081[NS]
12	Market orientation	0.840**
13	Training received	0.508**

** Significant at 0.01 per cent level. [NS] Non significant
* Significant at 0.05 per cent level

Conclusion

The results of this study shows that results of relationship between profile turmeric growers and knowledge of post harvest technology. It was found that education, family size, social participation, sources of information, risk orientation, extension contact, market orientation and training received had positive and significant relationship with their knowledge of post harvest technology. Whereas, age and land holding had negative and significant relationship with their knowledge of post harvest technology. Independent variable annual income and cropping pattern had positive and non-significant relationship with their knowledge of post harvest technology. While source of irrigation had negative and non-significant relationship with their knowledge of post harvest technology. The results of this study shows that results of relationship between profile turmeric growers and knowledge of post harvest technology. It was found that education, family size, social participation, sources of information, risk orientation, extension contact, market orientation and training received had positive and significant relationship with their adoption of post harvest technology. Whereas, age and land holding had negative and significant relationship with their adoption of post harvest technology. Independent variable annual income and cropping pattern had positive and non-significant

relationship with their adoption of post harvest technology. While source of irrigation had negative and non-significant relationship with their adoption of post harvest technology.

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