



## Research Article

# A STUDY ON KNOWLEDGE OF TURMERIC GROWERS ABOUT IMPROVED CULTIVATION PRACTICES IN BELAGAVI DISTRICT OF KARNATAKA

MUTTEPPA CHIGADOLLI<sup>1\*</sup>, KRISHNAMURTHY B.<sup>1</sup> AND MALLIKARJUNA GOWDA A.P.<sup>2</sup>

<sup>1</sup>Department of Agricultural Extension, University of Agricultural Sciences, GKVK, Bengaluru, 560 065, India

<sup>2</sup>Principal Scientist-ICAR-Krishi Vigyan Kendra, Hadonahalli, 561205, University of Agricultural Sciences, GKVK, Bengaluru, 560 065, India

\*Corresponding Author: Email - [mhchigadolli782@yahoo.com](mailto:mhchigadolli782@yahoo.com)

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**Abstract:** The present study was conducted during 2017-18 in Belagavi district of Karnataka to understand the knowledge level of farmers about improved cultivation practices in turmeric. A total of 120 respondents were selected randomly which includes 60 respondents from Gokak and Raibag taluks because production, productivity and area under turmeric was found to be maximum. The findings of the study revealed that, nearly half (48.33 %) of the turmeric farmers had high level of knowledge about improved cultivation practices followed by medium (30.00 %) level of knowledge and low (21.67 %) level of knowledge about improved turmeric cultivation practices. With respect to adoption of individual improved turmeric cultivation practices, More than 85 percent of turmeric growing farmers had thorough knowledge about land preparation practice, rhizome selection and its treatment, method of planting, recommended variety, planting season, inter-cropping with suggested crops, recommended rhizome rate per acre, FYM application, recommended method of irrigation, pests and disease management, manual weeding timings, maturity & its indicators, harvesting methods, preservation of rhizomes for seed purpose, grading, polishing and yield per acre. Further, more than 70 percent of farmers had correct knowledge about recommended dose of NPK, spreading of rhizomes after boiling, Neem cake or coir pith application, application of phosphorous and nitrogen and time required for boiling. Further, 43.33 percent correctly know about the bio-fertilizers application, only 34.17 percent of farmers know about recommended crop rotation and only one farmer knows the technique of mulching in turmeric.

**Keywords:** Knowledge, Turmeric growers, Improved cultivation practices, Mulching

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## Introduction

India is known as 'Land of Spices'. India is the largest producer, consumer and exporter of spices in the world followed by China. India utilizes 90 percent of its production for domestic consumption. About 109 spices are notified all over world where India as single country grows 63 among them. Share of spices in total agricultural export of India is about six percent. India's share of world spice trade is about 45 to 50 percent by volume and 25 to 30 percent by value [1]. In India turmeric is growing in as many as 25 states and among them Telangana, Andhra Pradesh, Karnataka, Tamil Nadu and Gujarat are the leading producers of turmeric. India had nearly 1.94 lakh hectares under cultivation of turmeric with a total production of 10.52 lakh tons during the year 2016-17. Telangana topped both in area and production with 50,000 hectares and 2,55,000 tons production during the year 2016-17 followed by Tamil Nadu in area with 29,306 hectares and Andhra Pradesh in production with 134,122 tons [2]. In Karnataka, turmeric was cultivated in an area of 14,994 hectares with a production of 76,490 tons during the year 2016-17. Belagavi district is second largest turmeric producing district with an area of 3,498 hectares and production of 33,861 tons of turmeric only after Chamarajanagar district with an area of 8,230 hectares and production of 36,031 metric tons turmeric. Mysuru (3,130 ha & 22,065 metric tons) Bagalkot (2,585 ha & 12,912 metric tons) districts stood in third and fourth rank both in area and production of turmeric in the state during the year 2015-16 [3]. Knowledge about the improved practices in turmeric cultivation and their adoption is need of hour, since turmeric is an input intensive crop and it drains the nutrients more readily. Adoption of these improved practices are important to sustain the fertility soil and to increase the potentiality of turmeric production. The improved practices in turmeric cultivation are land preparation, rhizomes selection and treatment, planting of rhizomes, mulching, integrated nutrient management, water

management, pest and disease management, weed management, maturity and harvesting, post-harvest management and processing needs to be adopted to get better productivity. Even though, there are number of improved turmeric cultivation practices were identified and recommended to maximize production, the growers are not adopting the improved and recommended cultivation practices. Thus, the cultivation practices vary from farmer to farmer based on their personal and socio-economic characteristics, perceived training needs, lack of technical knowledge and problems in adoption of improved turmeric cultivation practices. Hence, the current study is taken up with the following specific objective: To assess the knowledge level of turmeric growers about improved cultivation practices in turmeric crop

## Methodology

The existing study was conducted using the "Ex-post facto" research design. This design was found suitable and appropriate for this research study as the phenomenon/event has already been occurred or happened. This research study was carried out in the Belagavi district of Karnataka as it stands in the second position in both area under turmeric and production of turmeric and first in productivity of turmeric. Among ten taluks in Belagavi district Raibag and Gokak are the two leading taluks in both area and production of turmeric. Hence these two taluks are purposively selected for the study. From each taluk three villages were selected randomly which have maximum area under turmeric cultivation which were identified by consulting with the Raitha Sampark Kendra (RSK). From each village, 20 turmeric growing farmers were selected randomly for the study. Data collection was made through personal interview method using structured schedule. Thus, the final sample comprises of 120 respondents spread over in three different villages from each taluk.

The "Teacher made test" suggested by Anastasi [4] was employed to measure the knowledge level of respondents with slight modifications. The data collected was analyzed using Mean, Standard deviation, frequency and percentage which were found appropriate.

## Results and Discussion

### Overall knowledge level of turmeric growers about improved cultivation practices

It is observed from the [Table-1], that nearly half (48.33 %) of the turmeric farmers had high level of knowledge about improved cultivation practices followed by medium (30.00 %) level and low (21.67 %) level of knowledge about improved turmeric cultivation practices. The gain in higher knowledge is due to the fact that majority of the turmeric growers were educated, high economic motivation, more extension contacts, frequent participation in extension educational activities and they could be able to gain information regarding improved cultivation practices in turmeric with the support from horticulture and other related institutions, private consultancies were also providing information on regular basis. The high returns of turmeric made the farmers to seek the information on improved practices. Therefore, the farmers who were intending to take up turmeric crop will seek latest and up to date information about turmeric production as much as possible from all available resources. The findings are in correspondence with the findings of Chethan[5] and Umale *et al.* [6].

Table-1 Overall knowledge of turmeric growers about improved cultivation practices, (N = 120)

SN	Knowledge level	Turmeric growers	
		No.	%
1	Low	26	21.67
2	Medium	36	30.00
3	High	58	48.33
Total		120	100.00

Mean = 40.23, Standard deviation = 3.26

### Practice-wise knowledge level of turmeric growers about improved turmeric cultivation practices

#### Land preparation

From [Table-2] it is clear that cent percent of the turmeric farmers had complete knowledge about timing and number of ploughings given to field in order to bring fine tilth and almost all (99.17 %) farmers had correctly know about the clean and deep tillage practice. Further it is also observed that about 96.67 percent among the turmeric farmers had correctly know about suitable soil for turmeric cultivation. This kind of results was due to the fact that, farmers might have gathered knowledge about improved cultivation practices since the respondents had high farming experience, better education level, larger land holdings, better extension functionaries contacts and participation in extension activities.

#### Rhizome selection and its treatment

The data in the [Table-2] showed that majority (91.67%, 87.50% and 85.83 %) of the turmeric cultivating farmers had accurate knowledge about treatment of rhizomes, rhizomes preferred for seed purpose and recommended chemical for rhizomes treatment respectively. Correct knowledge about the rhizomes selection and rhizomes treatment by the farmers was due to their interaction with experienced and progressive farmers, more extension contacts and frequent contacts with horticulture assistant's consultations and also their experience in farming.

#### Planting of rhizomes

From the [Table-2] it was found that majority (98.33%, 97.50%, 95.83%, 93.33%, 88.30% and 84.17%) of the turmeric growers possessed the exact knowledge about recommended planting method, correct time/season of planting, optimum duration of turmeric, recommended varieties, intercropping, and recommended seed/rhizome rate respectively. Further, only 34.17 percent of turmeric cultivators possesses the accurate knowledge about crop rotation. The results might be because of their much experience in farming, better educational status, possession of larger sized landholding, good extension contacts with horticultural

officers, horticulture assistants & private consultants in the prescription format of the seed material. Most of them does not know about crop rotation in turmeric with recommended crops since the turmeric growers never come across the nutrients shortage as they use the fertilizers more than recommended quantity therefore they were rotating with the sugarcane crop by two to three years interval.

#### Mulching

It's quite interesting to observe that only one farmer has the knowledge about use of mulching in turmeric whereas remaining turmeric growers does not have knowledge about mulching practice in turmeric cultivation. This is due to the fact that they were not aware and informed about mulching practice in turmeric. Other reason might be the large-scale availability of the irrigation facilities from river basin, canals and bore-wells.

#### Integrated Nutrient Management

It was observed that cent percent of turmeric farmers know about farm yard manure (FYM) application, almost all (99.17%) the turmeric growers had correct knowledge about the time of application of farm yard manure, 89.17 percent of turmeric growers correctly know about the recommended quantity of the FYM. Equal (76.67 %) number of turmeric growers correctly know about the recommended dosage/quantity and time of application of neem cake/coir pith and micro-nutrients and exactly three fourth (75.00 %) of the turmeric growers correctly know the recommended quantity of NPK and time of application of phosphorous. Nearly three fourth (71.67%) of turmeric growers correctly know about the split application of nitrogen & basal application of potassium and only 43.33 percent of them correctly know about the use of recommended bio-fertilizers. This trend of results was because of their rich experience in farming, hereditary knowledge about farm yard manure (FYM) application, consulting the horticulture related functionaries to seek improved and recent information, education level, extension contact and economic motivation and affiliation to improve their standard of living.

#### Water management

From Table 2 it was found that 98.33 percent of the turmeric farmers know about recommended and modern methods of irrigation whereas 89.17 percent of turmeric growers know the correct number of irrigations recommended for turmeric crop. The probable reason was due to the better experience in farming, their awareness about the practices with the help of progressive farmers advise to avoid root rot problem farmers critically followed recommended irrigations.

#### Pest and disease management

From Table 2 it was observed that cent percent of the turmeric growers know about the shoot and root borer pest and its management, 90 percent of farmers correctly know the rhizome scale and its management whereas 60.83 percent of farmers were correctly aware about the thrips disease and only 5 percent of them know correctly about other diseases like sucking pest or come across this pest. It is also observed that almost all (99.17 %) turmeric growers know about leaf blotch disease & its control/management whereas 94.17 percent of farmers correctly know about the rhizome rot disease & its management and about 86.67 percent of farmers correctly know about the leaf blotch disease & its control/management. This trend of phenomenon was due to the high experience in turmeric farming, good education, better extension contacts with concerned field officers. The other reason was that the farmers were instructed by private pesticide and insecticide dealers who inspect the specimen of disease and pest brought by farmers to dealers' shops, they identify the disease and pest specify the chemical for its control & they use the same.

#### Weed management

From [Table-2] it was observed that 97.50 percent were correctly known about the numbers and timings of manual weeding and only 66.67 percent of them know correctly about the chemical weed control. This was due to their rich experience in farming considerable percent of farmers know about the chemical weed control practices due to their exposure with dealer shops, better education and exposure to progressive farmers field.

Table-2 Practice-wise Knowledge of turmeric growers about improved farming practices, (N= 120)

SN	Components of improved cultivation practices	Knowledge level			
		Correct Knowledge		Incorrect Knowledge	
		No.	%	No.	%
I	Land preparation				
1	Clean and deep tillage practice	119	99.17	1	0.93
2	Number of ploughing to bring fine tilth	120	100.00	0	0
3	Soil suitable for turmeric cultivation	116	96.67	4	3.33
II	Rhizome selection and treatment				
4	Treatment of rhizomes	110	91.67	10	8.33
5	Recommended chemical for treatment of rhizomes	103	85.83	17	14.27
6	Rhizomes preferred for seed purpose	105	87.50	15	12.50
III	Planting rhizomes/sets				
7	Recommended seed rate per acre	101	84.17	19	15.83
8	Variety recommended to your locality	112	93.33	8	7.67
9	Correct time/season of planting	117	97.50	3	2.50
10	Recommended method of planting	118	98.33	2	1.67
11	Optimum duration of crop	115	95.83	5	4.17
12	Intercropping	106	88.30	14	11.70
13	Crop rotation	41	34.17	79	65.83
IV	Mulching				
14	Material used for mulching in turmeric	1	0.83	119	99.17
15	Purpose of Mulching	1	0.83	119	99.17
16	Recommended quantity for mulching per acre	1	0.83	119	99.17
17	Time of mulching	1	0.83	119	99.17
V	Integrated Nutrient Management				
18	Application of FYM	120	100.00	0	0
19	Recommended Quantity of FYM	107	89.17	13	10.83
20	Time of application of FYM	119	99.17	1	0.83
21	Recommended biofertilizers	52	43.33	68	56.67
22	Neem cake and Coir pith application Recommended quantity	92	76.67	28	23.33
23	Recommended quantity of NPK for application	90	75.00	30	25.00
24	Time of application of Phosphorous	90	75.00	30	25.00
25	Time of N & K application	86	71.67	34	28.33
26	Micronutrients application	92	76.67	28	23.33
VI	Water management				
27	Recommended irrigations for turmeric	107	89.17	13	10.83
28	Method of irrigation	118	98.33	2	1.67
VII	Pest and disease management				
29	Major pests and their management in turmeric	120	100.00	0	0
	a) Shoot and Root borer (Neem cake@100kg/acre or Carbofuron 3G granules @25kg/ha at planting time)				
	b) Rhizome scale (Melathion@2ml/lit or Quinolpos / Posolin@2ml/lit)	108	90.00	12	10.00
	c) Thrips (Dimethioate@1.7ml/lit or Phosphomidan@0.5ml / lit)	73	60.83	47	39.17
	d) Sucking pest	6	5.00	114	95.00
30	Important diseases of turmeric & their management	119	99.17	1	0.83
	a) Leaf blotch (Mancozeb@2gm/lit or Spray Carbendizem@0.1%)				
	b) Rhizome rot (Dip rhizomes in 0.3% Captan or spray bordeaux mixture)	113	94.17	7	5.83
	c) Leaf spot (Spray Mancozeb@2gm/ lit)	104	86.67	16	13.33
VIII	Weed management				
31	Manual weeding	117	97.50	3	2.50
32	Chemical weed control methods	80	66.67	40	33.33
IX	Maturity and Harvesting				
33	Optimum time required for maturity of turmeric	120	100.00	0	0
34	Indication of maturity of turmeric	118	98.33	2	1.67
35	Different methods of harvesting	119	99.17	1	0.83
36	Rhizomes left in field after cutting leaves & before boiling	71	59.17	39	40.83
X	Preservation of seed rhizomes				
37	Purpose of preservation of rhizomes	120	100.00	0	0
38	Recommended methods of seed preservation	116	96.67	4	3.33
	a) Traditional method				
	b) Modern method	0	0	0	0
XI	Post-harvest Management/Processing				
39	Boiling of finger and mother rhizomes separately	112	93.33	8	6.67
40	Optimum time required for boiling	95	79.17	15	20.83
41	Thickness of Spreading of rhizomes for drying	97	80.83	13	19.17
42	Optimum time required for complete drying under sun	115	95.83	5	4.17
43	Polishing the turmeric	120	100.00	0	0
44	Grading of turmeric	120	100.00	0	0
XII	Yield				
45	Yield (28 quintals/acre)	103	85.83	17	14.17

Most of them were not ready to use and not using the chemicals to control the weeds because they were practicing inter-cropping like vegetables, coriander, maize etc.

### Maturity and harvesting

It is observed that almost all (100, 99.17 and 98.33 %) the turmeric growers had correct knowledge about maturity of turmeric, different methods of harvesting and indicators of turmeric maturity respectively. It is also remarked that about 59.17 percent had corrected knowledge about leaving of turmeric rhizomes in field after cutting of the pseudo-stems. This was because of these were the major common practices that are being practiced in turmeric crop as it is the stage which decides the quality of the turmeric. Other reason might be their good education level, experience in farming, extension contact and economic motivation.

### Preservation of seed rhizomes

From Table it was clearly found that cent percent of turmeric growers know the purpose of the seed/rhizome's preservation and 96.67 percent of them know about the traditional method of seed preservation. This kind of result is because of fact that preservation of rhizomes cuts down the cost of cultivation and it also enhances the production quality, if preserved properly and also the traditional method of preservation is easy and cost-effective as it can be maintained in the shade of tree.

### Post-harvest management/processing

From the [Table-2] it is clear that all (100.00 %) the turmeric growers correctly know about both polishing and grading of turmeric. Majority of farmers had correctly known about drying of boiled turmeric tubers under sunlight (95.83 %) and separate boiling of mother and finger rhizomes (93.33 %). Further, also observed that 80.83 percent among them had correct awareness and knowledge about thickness of spreading boiled rhizomes for drying and 79.17 percent of them know correctly about the time required for boiling of rhizomes. This is because of fact that, these are the essentially basic and major practices in turmeric production which fetches higher prices for their produce and determines the rate of the turmeric, hence the farmers know these practices with their experience in farming, better education and their desire to get higher prices for their produce.

### Yield

Majority (85.83 %) of the turmeric growing farmers had correct knowledge about the average yield of turmeric per acre. The farmers are getting more than the average yield of turmeric which was due to their rich sources of irrigation and soil type. Another observation made that the actual yield is more than the average yield of state and also there is a potential to increase yield by 10-12 quintals.

### Conclusion

Nearly half (48.33 %) of turmeric farmers were in high category of knowledge level. Therefore, it was a necessary for keeping the farmers updated about new improved practices and there is a scope for improving the knowledge level of the farmers, who have low and medium level of knowledge about improved cultivation practices in turmeric by providing updated and recent information. Hence farmers need to be convinced about the positive consequences and benefits of knowing and using improved turmeric cultivation practices in order to enhance the knowledge level of turmeric farmers.

**Application of research:** The present study was useful for the extensionists and field workers to develop the strategies and new methods for enhancing the knowledge level of the farmers and also to develop innovative ways to convince the farmers.

**Research Category:** Turmeric growers; Improved Cultivation Practices

### Abbreviations:

RSK: Raitha Samparka Kendra

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**Sample Collection:** 120 respondents (Turmeric growers)

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