Calender of Crop operations:

Day	:	Particulars
Pre planting	:	Soil is ploughed for 4 to 5 times till get fine tilth Apply 10 tonnes of FYM & 10 tonnes of tank silt.
1st. Day of planting	:	Apply 5 bags of neem cake, 6 bags of SSP, 1 bag of MOP, 20 kgs of ZnSo4 and mix it by ploughing. Disease free seed rhizomes are selected and make into 10 gram pieces. Each piece should have two
2nd day	:	sound buds. The seed rhizomes are treated with Ridomyl MZ + Monocrotophos for 45 min. Prepare the land into raised beds and light irrigation planting is given
3rd day planting	:	The herbicide like simazine or Fluchloralin is sprayed as Pre-emergence
10, 20, 30th	:	Irrigation is given (If no rains) & hand weeding is taken up
40th Day	:	Apply 5 bags of Neem Cake & 2 bags of Urea. Carbofuran 3G @ 10kg/acre is applied.
50, 60, 70 thday	:	Weekly Irrigation & Weeding (If necessary) is taken up. Micro nutrient mixture specific to turmeric @ 5 grms / ltr. of water. Propiconazole + Monocrophos is sprayed.
80th day	:	Apply 2 bags of urea one bag of MOP.
90,100,	:	Regular irrigation, periodical weeding.
110th day	:	Micronutrient mixer spray.
120th day	:	Apply 2 bags of urea & one bag of MOP.
130, 140, 150th days	: :	Regular irrigation & pesticides spray (dimethoate @ 0.1 % + carbendazim @ 1%). Carbofuran 3G @ 10 kgs / acre is applied.
160th day	:	Weekly irrigation & pesticides spray (Propiconazole @ 0.1 %)
170th day	:	Weekly irrigation & Micro nutrient Spray.
180, 190, 200th	:	Regular irrigation
210 to 270th day	:	Oberserve the Signs of Harvest (Yellowing, Lodging & Drying. Harvesting initiated.

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PACKAGE OF PRACTICES OF TURMERIC

SKLTSHU

बागवानी मिशन
Horticulture Mission

भाकृअनुप
ICAR

Turmeric Research Station

Sri Konda Laxman Telangana State Horticultural University

Kammarpally-503308, Nizamabad- Dist, Telangana.

2017

Text compiled from the literature published by the State Agricultural Universities, IISR, Kozhikode, Other Research Institutes.

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Package of Practices of Turmeric crop

The exact origin of turmeric is unidentified but it is said that it originated in the parts of western India. It has been used in India for 5000 years now. Initially it was cultivated as a dye as its bright yellow color works as a coloring agent. Then with time people came to know about its developed uses and they started using it for cosmetic purposes and then as a medicine. Turmeric reached China by 700AD, East Africa by 800AD and West Africa by 1200AD and started becoming popular throughout the world.

The Arab traders took turmeric to Europe in 13th century. Marco Polo was so impressed by turmeric that he mentioned it as a vegetable that has properties of saffron, but it is not really saffron. Ancient Indian medical literature, Ayurveda also mentions about turmeric being an extremely effective herb for stomach disorders and food poisoning

Production particulars (2015-16)

Turmeric producing is about 8-9 lakh tones annually in the world. India is the largest producer consumer and exporter of turmeric in the world and production contributes of 70% followed by China (8%), Myanmar (3.5%), Bangladesh (3%), Nigeria (3%), Ethiopia (3%), Vietnam (2%) Thailand (2%), Indonesia, Australia, Africa, Peru , West Indies, Taiwan, Jamaica, Haiti, Costa Rica and etc

The main growing states in India are Telangana (24%), Andhra Pradesh (22%), Tamil Nadu (15%), Karnataka (3%), Maharashtra (4%), Orissa (13%), Assam (6%) Gujarath (1%), Kerala (4%), Sikkim and others

Tab:1. Turmeric area and production in india

Year	Area (000 ha)	Production (000 tonnes)	Yield (Kg/ha
2012-13	210.51	981.58	4663
2013-14	188.84	853.09	4518
2014-15	188.02	844.47	4491
2015-16	150.00	660.00	4400

The turmeric growing districts in the Telangana state are Karimnagar (17034 ha), Warangal (16266 ha), Nizamabad (12592 ha), Adilabad (6110 ha), Rangareddy (5440 ha), Medak (2645 ha) and Khammam (821 ha).

Tab:2. T.S area, production and yield (2015-16)

Area (Ha.)	Production (MTs/Ha.)	Productivity (Tons/Ha.)
60906	377616	6.2

Climate: Turmeric requires a warm and humid climate. It can be grown in diverse tropical conditions from sea level to 1500mm above mean sea level within a temperature range of 18-35oC with a rainfall rages from 800 to1500 mm or more per annum or under irrigated conditions

Soils: Turmeric crop can be grow in different types of soils, ranging from light black loam, red soils to clayey loams, rich loamy soils having natural drainage and irrigation facilities are the best. Turmeric cannot stand water stagnation or alkalinity or salinity.

Varieties: The turmeric varieties grouped into three groups based on the duration. Long duration types (9 months) are Mydukur, Tekurpet, Duggirala Red, Armur and KTS-3. Medium Duration types (8 months) are Kothapet, Krishna and Kesar, where as short duration types (7 months) are Kasturi, Suguna, Sudharshana, Amalapuram and Dindigram. The mostly grown varieties of Telangana state are Duggirala Red, Armoor, IISR Prathibha, Mana Pasupu,Chennur Local, PTS-10, Salem and etc. The popular state wise varieties grown in India are given tables

Table: 3. State wise popular varieties in India

1	Telangana	Duggirala red, Salem, Prathibha, Armoor
2	A.P	Duggirala red, Salem, Prathibha, Amalapuram, Kodur, Tekurpet
3	Karnataka	Tekkurpet, Sugandham,Prathibha
4	Kerala	Allepy, Wynadu
5	Maharashtra	Rajapore, Sangli, Karhadi,Waigan
6	Tamilnadu	Moovattupuzha, Erode local, BSR-1, Roma, Suguna, Sudarsana and Salem local, Perianadan
7	N.E. states	Lakadong, Megha turmeric, Pattant

The suitable varieties of this state are Duggirala Red, IISR Prathibha, IISR-Pragathi (ACC.No-48), ACC.No.79, NDH-8, NDH-98, CO-1, Rajapuri, Rajendra Sonia, BSR-2, Kasturi and etc

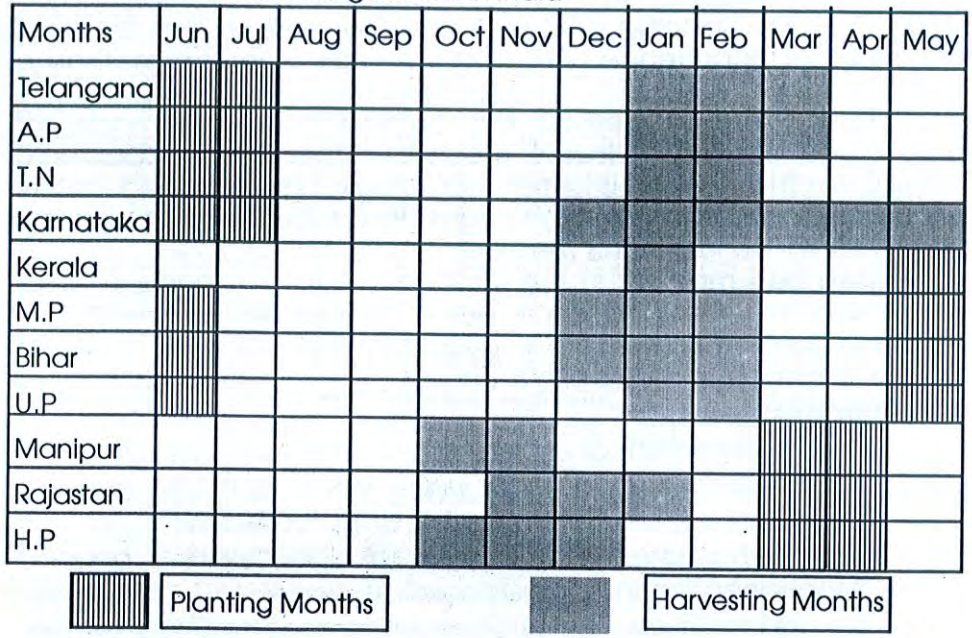
Tab: 4.important varieties of turmeric and their characters

S.N	Variety	Yield t/ha)	Crop Duration (Days)	Dry recovery (%)	Curcumin (%)	Oleoresin (%)	Essential oil (%)
1	ACC.No.48	31.94	200	20.04	5.3	12.75	7.0
2	SLP-387/7	22.84	220	20.88	5.2	11.61	6.9
3	NDH-1	25.6	230	21.80	4.2	12.87	6.9
4	NDH-8	29.60	240	21.58	4.9	13.15	7.3
5	NDH-79	24.4	230	18.59	5.3	12.97	7.0
6	NDH-98	24.3	240	19.15	5.2	12.97	7.0
7	TCP-64	32.3	240	20.37	5.4	12.52	6.7
8	PTS-8	31.3	240	23.31	4.9	11.93	6.5
9	PTS-12	30.1	220	21.46	4.7	10.69	6.8
10	PTS-55	30.0	210	22.06	4.5	12.45	6.7
11	Suvarna	17.4	200	20.0	4.3	13.5	7.0
12	Suguna	29.3	190	12.0	7.3	13.5	6.0
13	Sudharshan	28.8	190	12.0	5.3	15.0	7.0
14	IISR Prabha	37.5	195	19.5	6.5	15.0	6.5
15	IISR Prathibha	39.1	188	18.5	6.2	16.2	6.2
16	Roma	20.7	250	31.0	9.3	13.2	4.2
17	Suroma	20.0	255	26.0	9.3	13.1	4.4
18	Ranga	29.0	250	24.8	6.3	13.5	4.4
19	Rasmi	31.3	240	23.0	6.4	13.4	4.4
20	Rajendra Sonia	42.0	225	18.0	8.4	12.5	5.0
21	IISR Alleppey Supreme	35.4	210	19.3	6.0	16.0	4.0
22	IISR Kedaram	34.5	210	18.9	5.5	13.6	3.0
23	Duggirala red	32.0	240	17.6	4.5	14.6	4.0
24	Salem	30.0	210	19	6.2	12.6	4.8
25	Erode local	30.0	210	16.8	3.9	12.6	6.3
26	Vontimitta	20.0	210	18	5.4	10.5	6.5
27	Co-1	30.7	270	19.5	3.2	6.7	3.8
28	BSR-1	30.7	285	20.5	4.2	4.0	3.7
29	BSR-2	32.7	245	19.6	4.2	5.8	4.2
30	Krishna	09.2	240	16.4	2.8	3.8	2.0
31	Sugandham	15.0	210	23.3	3.1	11.0	2.7

32	Srujana	20.1	235	21.1	5.7	10.9	4.1
33	Megha turmeric	20.0	300	16.37	6.8	9.3	5.2
34	Kanthi	37.6	240	20.15	7.18	8.25	5.15
35	Sobha	36.0	240	19.3	7.3	9.6	4.2
36	Sona	16.0	240	18.8	7.12	10.2	4.4
37	Varna	16.0	240	19.0	7.87	10.8	4.5
38	Tekurpeta	16.0	180	17.8	1.8	9.3	2.5
39	Amalapuram	18.0	210	20.2	6.0	16.0	4.6
40	Moovattupuzh	19.0	200	20.1	7.0	11.5	6.2
41	Mundakkayam	20.0	210	23.4	7.0	10.5	8.5
42	Wynad Local	21.0	210	17.5	6.0	15.3	7.0
43	Kokkayam Local	20.0	200	20.5	7.0	14.5	9.0
44	Mananthody	18.0	200	22.5	9.1	16.5	8.5
45	Ernad	21.0	210	30.5	5.2	12.9	12.9
46	Iddukki	21.0	210	21.6	9.0	13.7	4.0
47	Kothamangala	17.0	200	23.5	4.2	10.7	5.0
48	GL Puram	27.6	240	18.2	6.7	10.6	5.2
49	Lakadong	19.7	240	21.1	7.4	12.6	5.4
50	Megha turmeric	30.0	230	16.37	6.8	12.6	7.4
51	Manipur Local	18.6	240	14.7	4.2	13.4	8.1
52	Nagaland Local	18.8	250	16.5	4.5	13.6	6.3
53	Dehredan Local	23.0	220	15.5	4.9	12.6	7.2
54	Pantpeetabhi	29.0	220	18.5	7.5	12.8	2.4

Planting Time: Planting season is mainly depends on onset of south west monsoons. Planting is done during the June to July moths in different tracts. In A.P and Telangana states, short duration varieties like Kasturi, planting is done during second fortnight of May, Medium duration varieties like Kesari planting is done during 1st fortnight of June. Long duration varieties like Mydukur, planting is in 2nd fortnight of June to 2nd fortnight of July. However, June month is suitable for planting of turmeric in Telangana conditions.

Tab:5. State wise harvesting season in India



Seed material: Mother rhizomes are better yielders than finger rhizomes. Good quality disease and pest free rhizomes of previous crop preserved for next used for planting. The seed rhizomes are needed to be stored for 2-3 months from harvesting to planting. The mother rhizome can be used for seed material by splitting into two or three pieces with one or two sound bunds. The fingers can also be used by making the 10 grams pieces and each piece should have two sound buds.

Seed Rate:

Mother Rhizomes	700-900 kg/acre as a sole crop
Primary fingers	600-800 kg/acre as a sole crop
Fruit gardens	300-400 kg/acre as a inter crop

Land Preparation: The land is ploughed with disc plough, cultivator plough and then rotovator for two times each. As basal, 10 tones of FYM and 10 tonnes of tank silt per acre is incorporated in the soil.

Seed Treatment: The seed Rhizomes (Pieces of Mother and fingers rhizomes) are essentially treated with Ridomyl M.Z (3 g/lit) + Monocrotophos (2ml/lit) for 45 minutes to 60 minutes and dry in shade. The above rhizomes are treated with *Trichoderma viride* (5g/lit) for 30 minutes for protecting from fungus.

Planting Methods: The planting is done on three types viz., Flat bed method, Ridges & furrows method and Raised bed method.

a. Flat bed: Planting is done by dibbling rhizome in furrows behind the country plough. The seeds are then covered with loose soil from the ridge. The spacing is 30 x 15 cm. This method has the more chances of occurrence pest and diseases. Flooding method of irrigation is adopted

b. Ridges & furrows method: This method the field is made into ridges and furrows with tractor mounted ridger with the spacing of 45 x20 cm.The method is better than the Flat bed method and irrigation can be made through ridges. The occurrence of pest and diseases will be less in this method

c. Raised bed method: In this method the field is made in raised beds with 1m width and 15 cm height. The spacing between bed to bed is 30 cm. Ech bed have the four rows of crop and spacing is is 30 X15 cm. One lateral drip is enough with minimum discharge

Advantages:

1. The enlargement and bulging of rhizomes will be good
2. Occurrence of rhizome rot and rhizome fly is also less
3. The mulching practices can be adopted easily.
4. This method gives 20 to 30 percent higher yield
5. Mechanization in harvesting will be easier

Manures and fertilizers: The fertilizer usage is compulsory for the turmeric crop. The organic fertilizers are essential for getting the higher yield in turmeric.

Tab: 6. Fertilizer dosage of turmeric crop

Application time	Fertilizer	Sole crop (Turmeric)	Inter crop with Maize
Basal Application	FYM	10 tones	10tones
	Tank silt	10 tones	10 tones
	Neem cake	200 kgs	250 kgs
	Zinc sulphate	10 kgs	20 kgs
	S.S.P	150 kgs	300 kgs
	M.O.P	25 kgs	60 kgs
40 DAP	Neem cake	200 kgs	250 kgs
	Urea	50 kgs	90 kgs
80 DAP	Urea	50 kgs	90 kgs
	M.O.P	25 kgs	30 kgs
120 DAP	Urea	50 kgs	90 kgs
	M.O.P	25 kgs	30 kgs

Note: The fertilizers should apply at base of the plant and cover with soil.

Micronutrient mixture specific to turmeric is also recommended (dosage @ 5 g/L) twice, 60 and 90 DAP, for higher yield. Apply 375 g each of Boron, Iron and Zinc, at rhizome development stage, as Borax, Ferrous sulphate, Zinc sulphate + 375 g of Urea in 250 lit of water/ha. Spray twice at 25 days interval

Mulching The crop is to be mulched immediately after planting with green leaves @ 12-15 t/ha. Mulching may be repeated @ 7.5 t/ha at 40 and 90 days after planting after weeding, application of fertilizers and earthing up

Intercrops: Turmeric can be grown as an intercrop in orchards like mango & coconut. It is rarely cultivated in pure stand, but is usually grown mixed with crops like castor, chilli, maize, finger millet, onions, brinjal and tomato. Turmeric onion combination recorded an average yield of 16 to 20 tonnes of turmeric and 2,945 kilograms of onion, fetching the highest net income against net income obtained from monocropping of turmeric.

Crop rotation: Turmeric crop has to be rotated with other crops for two years. In wetlands, it is grown in rotation with rice, sugarcane, banana or vegetables. In garden lands, it is often in rotation with rainfed rice mixed with Pigionpea, maize, yam or minor millets or pulses. Turmeric can be rotated with crops such as finger millet, rice and sugarcane or pulses.

Inter Cultivation: Turmeric is inter cropped with maize, castor, chilli, and redgram. Two to three rows of turmeric and one row of maize, ten rows of turmeric and one row of chilli and castor are popular intercropping in Telangana..

Irrigation: As turmeric requires assured water supply almost throughout the year, it is mainly grown in bore wells irrigated, canals and wells in Telangana. The productivity of turmeric declines during water scarcity period, since turmeric requires frequent irrigations during the cropping period. light irrigations at weekly intervals are essential during the sprouting. During the rainy season water logging and excess water should be drained out, otherwise it may cause rhizome rot. Depending on the type of soil and climatic conditions, irrigated crop requires 15 to 20 irrigations in medium heavy soils and 35 to 40 in light textured red soils. Moisture stress affects the growth and development of the plant especially during the rhizome bulking stage.

Drip irrigation

Drip irrigation daily at 80 per cent PE for 30 minutes has recorded highest yield. Drip irrigation with 75 per cent recommended level of nitrogen through fertigation was found to be the most economical.

60 per cent of drip irrigation water and 25 per cent nitrogen through fertigation was increase the yield of 25 per cent compared to the conventional method of irrigation.
Drip irrigation, not only ensures the highest economy in water use owing to reduced evaporation and seepage losses, but also provides ideal moisture regime for higher yield in turmeric.

Weed management: Weeds cause greater losses of crops than either insect pests or plant diseases. They cause 20 to 33 per cent reduction in the yield of rhizomes. They often suppress the growth of turmeric plants and at the same time encourage the growth of many pathogens and pests. Herbicides like Simazine 50% WP or Atrazine 50% WP at 500- 800 grams in 200 lit for one acre on one day old planted field found effectively in controlling the weeds. The highest gross returns were obtained with fluchloralin 45 EC at 2 lit/ha + hand weeding followed by Atrazine 50% WP at 2kg/ha + hand weeding in turmeric + maize intercropping system. The hand weeding has taken up for 5-8 times as per the intensity of weed.

Pest and Diseases

Leaf blotch: It is caused by *Taphrina maculans* and appears as small, oval, rectangular or irregular brown spots on either side of the leaves which soon become dirty yellow or dark brown. The leaves also turn yellow. In severe cases the plants present a scorched appearance and the rhizome yield is reduced.
The disease can be controlled by spraying Propiconazole (0.1%) or Mancozeb (0.25%) + Carbendazim (0.1%) or Thiophanate methyl (0.1%)

Leaf spot : it is caused by *Colletotrichum capsici* and appears as brown spots of various sizes on the upper surface of the young leaves. The spots are irregular in shape and white or grey in the centre. Later, two or more spots may coalesce and form an irregular patch covering almost the whole leaf. The affected leaves eventually dry up. The rhizomes do not develop well. The disease can be controlled by spraying zineb 0.3% or Bordeaux mixture1percent or Propiconazole @ 0.1% or Thiophanate methyl

Rhizome rot : The disease is caused by *Pythium graminicolum* or *P.aphanidermatum.* The collar region of the pseudostem becomes soft and water soaked, resulting in collapse of the plant and decay of rhizomes.
Treating the seed rhizomes with Ridomyl MZ @o.3% for 45 minutes prior to storage and at the time of sowing prevents the disease. When the disease is noticed in the field, the beds should be drenched with Ridomyl MZ @ o.3% or COC @ 0.25% or Carbendazim @ 0.1%

Nematode pests : Root knot nematodes *(Meloidogyne spp.)* and burrowing nematode *(Radopholus similis)* are the two important nematodes causing damage to turmeric. Root lesion nematodes *(Pratylenchus spp.)* are of common occurrence in Andhra Pradesh. Wherever nematode problems are common, use only healthy, nematode- free planting material. Increasing the organic content of the soil also checks the multiplication of nematodes. Carbofuran 3G granules @ 10 kg per acre is advisable. Pochonia chlamydosporia can be applied to the beds at the time of sowing @ 20 g/bed (at 106 cfu/g) for management of nematode problems.

Shoot borer :The shoot borer *(Conogethes punctiferalis)* is the most serious pest of turmeric. The larvae bore into pseudostems and feed on internal tissues. The presence of a bore-hole on the pseudostem through which frass is extruded and the withered central shoot is a characteristic symptom of pest infestation. The adult is a medium sized moth with a wingspan of about 20 mm; the wings are orange-yellow with minute black spots. Fully-grown larvae are light brown with sparse hairs. Spraying Malathion (0.1%) or Dimethioate @ 0.2% or Profenofos @ o.2% spray or Carbofuran 3G @ 10 kg per acre or Neem cake @ 100 kgs per acre are effective in controlles the pest infestation.

Rhizome scale : The rhizome scale *(Aspidiella hartii)* infests rhizomes in the field (at later stages of the crop) and in storage. Adult (female) scales are circular (about 1mm diameter) and light brown to grey and appear as encrustations on the rhizomes. They feed on sap and when the rhizomes are severely infested, they become shrivelled and desiccated affecting its germination.
Treat seed material with quinalphos (2ml/lit of water (for 20-30 minutes) before storage and also before sowing in case the infestation persists. Discard and do not store severely infested rhizomes.

Minor pests: Adults and larvae of **leaf feeding beetles** such as *Lema spp.* feed on leaves especially during the monsoon season and form elongated parallel feeding marks on them. The spraying of Malathion (0.1%) undertaken for the management of shoot borer is sufficient to manage this pest.The **lacewing bug** *(Stephanitis typicus)* infests the foliage causing them to turn pale and dry up. The pest infestation is more common during the post monsoon period especially in drier regions of the country. Spraying Dimethoate (0.05%) is effective in managing the pest.

The turmeric thrips *(Panchaetothrips indicus)* infests the leaves causing them to roll, turn pale and gradually dry up. The pest infestation is more common during the post monsoon period especially in drier regions of the country. Spraying Dimethioate (0.05%) is effective for the management of the pest.

Harvesting

Symptoms of maturity:

The crop is ready for harvest when the leaves turn yellow and start drying up. Usually harvesting begins from January-February and continues till March. The crop becomes ready for harvest in seven to nine months after sowing depending upon variety, fertility status of soil and moisture availability. Early varieties mature in seven to eight months, medium varieties in eight to nine months and late varieties after nine months.

Conventional method of harvesting:

The general practice in conventional method of harvesting is to wet the crop after removal of the cut foliage and the turmeric rhizomes are dug out after a week by skilled labour with a special fork type of spade/pick axe. Normally turmeric digging is done by contract labour who demands very high wages during peak season. The damage caused to rhizome (5-10%) by fork type spade is more because the labourer (6-8 men labor) has to dig out the clump all around and in doing so, the fork bruises the rhizomes every time it hits the rhizome. The left over rhizomes is more than 10% in the field.

A power tiller operated turmeric harvester:

This has been developed by TNAU for harvesting turmeric rhizomes to avoid several losses due to delayed harvesting. This type of harvester has more advantage over convention method. This type of harvester is applicable to ridges and furrow method of planted field. The damage rhizome is 1-2% and left over rhizomes is 5-6% in the field. This type of harvester can dig the rhizomes easily 1 to 1.5 acres per day.

Tractor Drawn Turmeric Harvester:

This harvester can fix to the 35-45hp tractor, which consists of a blade with five bar points for easy penetration into the soil. For digging, the bar points with the blade penetrate into the soil, lift the turmeric rhizomes from the soil. The soil slip back to the ground and the dug-out rhizomes deposited at the centre of the unit. This type of harvester can save 70 per cent cost and 90 per cent in time when compared to manual digging. The rhizome damage is may upto 2-3%, left over rhizomes 1-2% and can be harvester easily 4-5 acres per day. The tractor mounted harvester is well suitable to raised bed method.

Processing

It involves three stages viz., curing, polishing and colouring

Curing (Boiling): After harvesting, fingers and mother rhizomes are separated from bunch. The rhizomes are cleaned from soil and roots. The fresh turmeric is cured for obtaining dry turmeric before marketing. Curing involves boiling of fresh rhizomes in water and drying in the sun.

In traditional method of boiling, the cleaned rhizomes are boiled in galvanised iron vessels, with water just enough to soak them. The rhizomes are boiled for 45 to 60 minutes till froth comes out and white fumes appear giving out a typical odour. Overcooking spoils the colour of final product while undercooking renders the dried product brittle.

Steam boiling and electric boilers are the advance methods for boilers, which cook the rhizomes accurately. It will boil the turmeric rhizomes under hygienic condition. Rhizomes are boiled by the steam liberated from the boiling water. Sodium bicarbonate is added in the boiling water to add colour.

The inside containers which hold turmeric can easily be taken out without wasting boiling water, which can be reused and thereby fuel requirement can be considerably reduced.

Polishing: Dried turmeric has poor appearance and a rough dull outer surface with scales and root bits. The appearance is improved by smoothening and polishing outer surface by manual or mechanical rubbing. The hand operated polisher or drum mounted on a central axis, the sides of which are made of expanded metal mesh. When the drum filled with turmeric is rotated at 30 rpm, polishing is effected by abrasion of surface against the mesh as well as by mutual rubbing against each other as they roll inside the drum.

The turmeric is also polished in power operated drums. The yield of polished turmeric from the raw materials varies from 15 to 25 per cent.

Colouring: It is done to give appearance and better finish to the product, since the colour of the turmeric always attracts buyers. This is done to half polished rhizomes in two ways, known as dry and wet colouring. In dry process, turmeric powder is added to the polishing drum in the last 10 minutes. In wet process, turmeric powder is suspended in water and mixed by sprinkling inside the polishing basket. For giving a brighter colour, the boiled, dried and half polished fingers are taken in baskets which are shaken continuously when an emulsion is poured in. When the fingers are uniformly coated with the emulsion, they may be dried in the sun.

In Improved methods of curing, rhizomes are boiled in lime water or sodium carbonate. A water solution containing 20 g of sodium bisulphite and 20 g of hydrochloric acid per 45.3 kg of tubers is recommended to give them the desired yellow tint.

Cleaning, grading, packing and Storage: Indian turmeric is considered to be the best in the world, about 90% of the total produce is consumed internally and only a small portion of the production is exported. Turmeric of commerce is described in three ways:

Fingers: These are the lateral branches or secondary 'daughter' rhizomes which are detached from the central rhizome before curing. Fingers usually range in size from 2.5 to 7.5 cm in length and may be over 1 cm in diameter.

Bulbs: These are central 'mother' rhizomes, which are ovate in shape and are of shorter length and having larger diameter than the fingers.

Splits: Splits are the bulbs that have been split into halves or quarters to facilitate curing and subsequent drying.

Cleaning and grading: Turmeric being a natural produce, is bound to gather contaminants during various stages of processing. The spice is also cleaned to remove such foreign materials. A sifter, destoner, and an air screen separator will help remove materials such as stones, dead insects, excreta, and other extraneous matter.

Packing: Turmeric rhizomes are packed in new double burlap gunny bags and stored over wooden pallets in a cool, dry place protected from light. The stores should be clean and free from infestation of pests and harborage of rodents. It is not recommended to apply pesticides on the dried/polished turmeric to prevent storage pests.

Preservation of seed rhizomes

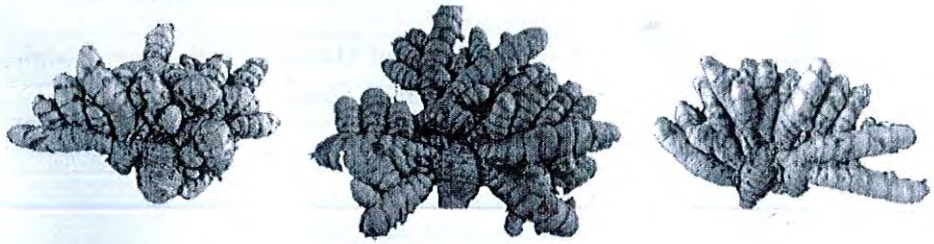
Preservation of seed rhizomes in good health condition for next cropping season is highly essential. Generally the seed rhizomes are stored in heap under shade of tree with covering with turmeric leaves. In improvement to the above method, the heap of seed rhizome is stored on sand base. The sand is also mixed with folidal dust, as to prevent termites and stored pest. The heap is sprayed with Malathion (0.2%) or Dimethiate (0.1%) + Dithane M-45(0.25%) and covered with turmeric leaves or saw dust. The rhizomes can also be stored in pits coved with saw dust. The wooden planks can be kept on top of the pits and aeration is given

Turmeric varieties suitable to telangana state

Duggirala Red NDH-98 NDH-8

IISR-Pragathi-48 ACC.No.79 Roma

Rajapuri PTS-10 Rajendra Sonia



Kasturi Salem C0.1