

Turmeric Cultivation

By

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Introduction: Turmeric is one of the important commercial crops in Madras Province cultivated for the underground rhizomes. The cured rhizomes commonly known as turmeric is used for culinary purposes in Indian house-holds. It is also used for toilet purposes by Hindu women in South India, more particularly in Andhra-Desa. It is exported to foreign countries to some extent for the manufacture of dyes. Turmeric is an exhausting crop and responds very well to manuring and irrigation. Under ideal soil conditions and intensive cultivation, it is a highly remunerative crop. It comes up well in rich loamy soils that are friable and have a good natural drainage. Turmeric cultivation is therefore confined to certain favoured localities, where the cultivation of the crop, the processing of the rhizomes and marketing tend to get specialised.

Distribution: Turmeric is grown in Malabar, Guntur, Krishna, Cuddapah and Coimbatore Districts. The area under this crop in other districts is negligible.

Acreage as Per Season and Crop report 1946 — '47.

Districts				Acres
Malabar	...	...	...	7,105
Guntur	...	...	...	7,686
Krishna	...	...	...	2,976
Cuddapah	...	...	...	2,739
Coimbatore	...	...	...	2,262
All other districts	...	...	...	4,999
Total	...	...	...	27,767

In the three districts where the survey was conducted, the cultivation of the crop is restricted to a few taluks, as shown below:—

<i>Guntur District</i>				Acres
Tenali taluk	...	...	...	4,474
Guntur taluk	...	...	...	2,771
Repalli Taluk	...	...	...	321
<i>Krishna District</i>				Acres
Bezwada taluk	...	...	...	1,646
Gannavaram taluk	...	...	...	1,000
Divi taluk	...	...	...	188

<i>Cuddapah District</i>			<i>Acres</i>
Proddatur taluk ...	...	...	961
Cuddapah taluk ...	...	...	638
Sidhout ...	...	...	485
Rajāmpet ...	...	...	376

Soils: Turmeric is grown generally in the black clay loams called "Regada" lands in the districts surveyed, excepting in parts of Cuddapah. In Rajampet, Cuddapah and Proddatur taluks, turmeric soils are light black or grey in colour, and they are called "Tuvva" lands. Turmeric is also grown in red soils in the Kodur tract of Cuddapah district. Turmeric crop is raised in wet lands that are in a high level, from which water could be drained during the rainy months. In a few places turmeric is also grown in dry lands having good irrigation facilities.

Rotation: The crop is largely cultivated in high level wetlands where it is rotated with other wetland crops such as paddy, sugarcane, plantain, yam, dioscorea, betel-vine and vegetables. In garden lands, it is rotated with other dry and garden land crops such as dry paddy, maize, redgram, gogu, gingelly, ragi, korra and sajja. A two or three-course rotation is the general practice depending upon the size of the holding. However, the ryots believe that the longer the interval between successive crops of turmeric, the better it would be for the soil and for the crop.

The following are the rotations followed in general:

Wet lands

- | | | | |
|-----|-----------|-----|---|
| (1) | I. Crop | ... | Turmeric. |
| | II. Crop | ... | Paddy followed by a pulse. |
| | III. Crop | ... | Plantain, sugarcane, root crops, vegetables, or betel-vine. |
| | VI. Crop | ... | Turmeric, or Ratoon crops of sugarcane, plantain or betel-vine. |

Garden lands

- | | | | |
|-----|-----------|-----|--|
| (2) | I. Crop | ... | Turmeric. |
| | II. Crop | ... | Redgram mixed with dry paddy, maize or groundnut. |
| | III. Crop | ... | Turmeric. |
| (3) | I. Crop | ... | Turmeric. |
| | II. Crop | ... | Early gingelly followed by horse-gram, or a fodder crop. |
| | III. Crop | ... | Redgram mixed with dry paddy, gogu or maize. |
| | IV. Crop | ... | Turmeric. |

- I. Crop ... Turmeric.
 II. Crop ... Ragi, Korra, Sajja, or paddy.
 III. Crop ... do do do do
 IV. Turmeric.

*NOTE: *This rotation is followed in Rajampet taluk and all the crops are irrigated.*

Mixtures: Turmeric is grown only as a pure crop as a rule as mixing it with any other crop is said to reduce the yield of turmeric. However, castor and vegetables may be seen as a light mixture here and there, intended mainly for household purposes.

Cultivation: (1) *General:* Methods of cultivation are more and less the same in Guntur and Krishna districts. The furnace, the curing appliances and method of curing in Guntur District especially in Duggirala area, are somewhat modernized. Cultivation in Cuddapah is slightly different especially in respect of after-cultivation, harvest and curing. In Guntur and Krishna the spacing is 18 inches and inter-spaces are ploughed after the crop is on. The crop is harvested with the aid of the country plough. Curing is done in a water-bath, holding 4 cubical troughs filled with rhizomes. The troughs have perforations on the sides, so that when removed from the bath, the water is drained into the water bath. At Cuddapah the spacing is 12 inches between the rows and it does not permit of interploughing and so hand-weeding is resorted to. The crop is lifted with pick-axes. The furnace is too big, consuming large quantities of fuel and the pan is similar to a jaggery boiling pan. The curing methods of Guntur might possibly be introduced in Cuddapah. The average yields, and the quality of the produce are almost the same in all these districts ranging from 10 to 12 candies per acre. The yields appear to be the highest in the Kodur area. The area under turmeric in individual holdings no doubt varies widely, but on an average it is half to one acre per holding. In a few villages in Tenali and Gannavaram taluks, some ryots cultivate from 10 to 20 acres, at the same time maintaining the normal intensity of cultivation.

(2) *Preparatory Cultivation:* Preparation of the land varies widely from tract to tract, the minimum being two ploughings in Mydukur area of Cuddapah district to 16 ploughings in Rajampet arer of the same district. In Guntur and Krishna 4 to 10 ploughings are given, the average being seven. The land is ploughed with the country-plough, commencing from the harvest of the previous crop or from the commencement of early rains. In the former case the period of preparation extends over 5 to 6 months and in the latter over 1½ to 2 months.

(3) *Manuring*: The crop is very heavily manured and all available manurial resources are tapped to the full.

(i) *Green Manuring*: Green manuring is believed to be advantageous for the crop but is not followed regularly, due to limitations in raising green manure crops during the fallow period. In Reppalli taluk of Guntur district green gram is sometimes raised and ploughed in as green manure with good results.

(ii) *Application of clay and silt*: Carting top soil from wet lands is largely followed in Guntur and Krishna districts. 30 to 100 cart loads per acre are applied. In Cuddapah district silt from tanks and canals is carted wherever possible.

(iii) *Cattle penning*: Cattle penning is a regular practice throughout Guntur and Krishna. This is done during summer from March till June using their own cattle. It works out to 800 to 1000 per acre. This practice is unknown in Cuddapah district.

(iv) *Cattle manure*: Cattle manure is invariably applied in all the places and heavy doses ranging from 20 to 50 carts (each cart-weighting about half a ton) are given. The cost of a cartload of cattle manure is Rs. 3/- to 4/- in the Circars and Rs. 5/- to 6/- in the Cuddapah district.

(v) *Sheep-penning*: Sheep-penning is also extensively adopted in all these districts. 2,000 to 4,000 sheep are penned per acre, costing about Rs 12—8—0 per 1,000 sheep.

The following would represent in general, the quantity of manure an acre would receive.

	Guntur & Krishna	Cuddapah
1. Clay or silt	30 cart loads	50 cartloads
2. Cattle-penning	800 head loads	...
3. Sheep-penning	2,000 per acre	3,000 per acre
4. Cattle-manure	50 cartloads	50 cart loads.

(b) *Top dressing*: Generally groundnut cake is used as a top dressing, at an average rate of 8 bags per acre in two equal doses in September and October with an interval of 1 to 1½ months in between. The cake is powdered and applied along the lines near the base of the plants. Broadcasting the cake over the field and applying it to individual plants are also done, but line application is more common. In Guntur and Krishna the top dressing is followed by ploughing the interspaces for incorporation of the manure. In Cuddapah it is done by hand-weeding and hoeing. In this district leaf-mulching is a common practice. Due to the nearness of forests, leaf is available in plenty, free of cost. Soon after planting, about 20 cartloads of leaf are evenly spread over the surface of an acre. By the time the germination is completed (in about 40 days), the

leaves decay and are littered over the surface. The twigs are then easily shaken and removed. The leaf would gradually gets mixed up with the soil during the weeding operations. This practice is followed in Kodur, Rajampet and Prodatur tracts.

(4) *Planting*: Planting season commences from first week of June and continues up to first week of August. Early planting commencing from June (*Mrigasira*) is favoured in Cuddapah. In Guntur, the main season is July (*Arudra and Punarvasu*) and in Krishna, it is in early August (*Aslesha*).

Mother rhizomes which are round are used throughout Guntur and Krishna districts as seed material. They are cut into two pieces longitudinally each having one round bud. Fingers are used in Cuddapah without cutting, the long pieces being merely broken into two before planting.

The seed rhizomes are dibbled behind the country plough and covered by the next furrow slice. In Guntur and Krishna the spacing is 18" between rows and 9" between plants in the rows. In Cuddapah the spacing is 12" and 6" respectively. The depth of sowing is about 3". The seed rate ranges from 4 candies in Guntur and Krishna to 5 candies in Cuddapah. In Cuddapah tract the land is levelled with a levelling board after planting and laid out in beds and channels with a country plough. The size of beds is about 10 x 6 feet. The seed material which comes up during the layout is pressed into the soil during the time of rectification of beds and channels. In Guntur and Krishna, ridges and furrows are formed with the country plough at planting time and rectified later by interploughing during the period of crop growth.

(5) *After cultivation*: Four weedings are given commencing from a month after planting at intervals of 1 to 1½ months. Total labour required for this operation is about 100 women per acre. The interspaces are also ploughed four times in Krishna and Guntur districts.

(6) *Irrigation*: Major area is under flow irrigation chiefly from canals and to some extent from tanks. In some places where the level of the land is high, swing baskets are used for lifting water, from irrigation channels. Throughout the Kodur area, water is lifted from wells by double mhotas. In parts of Guntur, Bezawada and Cannavaram taluks, lift irrigation by mhotas is common. In some villages of Bezawada taluk electric motors are used for lifting water. Irrigation are given as and when necessary. The total number of irrigations varies with the retentivity of the soils. The total number of irrigations given to the crop is 12 in Guntur and Krishna districts, 16 in Kodur and 20 in Rajampet, Cuddapah and Prodatur tracts. When water is taken from canals or tanks, water rate is charged as for double cropped paddy lands.

(7) *Harvest*: March to April is the main harvest season. Drying of the leaves and stem is the sign of maturity. Dried stems and leaves are picked and reserved for use as fuel. A country plough is worked carefully just by the side of the rows. The rhizomes are neatly lifted and thrown to a side without injury. Women coolies pick the rhizomes. One pair can lift rhizomes from an acre in a day, 50 women can pick and gather the rhizomes, and 10 women can separate the rounds and fingers. This is the practice in Krishna and Guntur. In Cuddapah, lifting is done using a tool called "*Karu*" or "*Pasupu Karu*" resembling a pick axe. 15 men are required per acre for digging the outcrop with this tool. Fresh rhizomes from one plant weight from one to three lbs., the maximum weight being about 6 lbs. The average number of fingers produced per plant is about 10, the maximum being about 40.

(8) *Curing*: Curing is taken up soon after harvest, normally within 4 or 5 days. The rhizomes are boiled in water till frothing takes place and white fumes appear, emitting a characteristic odour when the rhizomes are removed and dried. The stage at which the rhizomes are removed influences the colour and fragrance of the produce. Experienced curers are therefore engaged for this purpose. The furnace resembles the Sindewahi furnace except for the square sides and the absence of the baffle wall and the chimney. The boiling appliances consist of an iron boiling pan 5' x 5' x 2½' to take in four cubical immersion buckets or troughs of iron with perforated sides. A lid is put on, at the time of commencing the boiling.

Boiling: The furnace is lighted and fuel is fed uniformly. After an hour's boiling, frothing commences, and in a few minutes white fumes appear to be pushing out the lid. At this stage the lid is removed. The characteristic smell of cured turmeric develops in a short time and then the boiling is stopped. The troughs holding the turmeric are removed from the pan, while the boiling water flows back into the pan through the holes on the sides of the troughs. The boiled rhizomes are spread on a clean floor for drying. The troughs are again kept inside the boiling pan or tank and charged with another batch of fresh rhizomes. When fresh produce is put in, the temperature is slightly lowered. The water in the tank lost by evaporation is made up and boiling is continued. Each trough takes one bag of 168 pounds of rhizomes and each pan holds 4 troughs at a time. Each boiling takes one hour on an average. The produce from one acre can be cured in 20 boilings and it takes one day if non-stop curing is taken up, as is usually done. Eight men are required for attending to this work. Rounds and fingers are cured separately, as the former takes a longer time for curing.

Fuel: Dried turmeric leaves, redgram stalks, sugarcane trash, tobacco stems country date-palm leaves, babul twigs, and cheap forest wood are all used, depending upon the availability in the respective

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localities. In the Duggirala area, the turmeric leaves are carefully conserved for boiling the rhizomes and this is supplemented with red-gram stalks. In other parts of Guntur district, babul twigs are purchased. In Krishna district, sugarcane trash and tobacco stems are used. In Prodattur area, country date-palm leaves are largely used. In other places of Cuddapah district, forest fuel is bought and used. Taking the whole area into consideration, the cost of fuel works out to Rs. 3/- per candy of cured produce. In Cuddapah district dried turmeric leaves are not used as fuel.

The cost of appliances and the labour charges for curing are as below:—

- (a) Construction of furnace, 2 men each at Rs. 1—4—0 per day.
- (b) Cost of iron rods and grating for the furnace Rs. 30—0—0
- (c) Cost of a set of one tank and four buckets at controlled prices. ... 225—0—0
- (d) Cost of pan or tank in local markets ... 240—0—0 each.
- (e) Cost of troughs in the local markets ... 20—0—0 each.
- (f) Hire charges for tank and troughs (full set) ... 1—0—0 per cdy.
- (g) Wages for the curers. ... 1—8—0 per cdy.

Other methods of curing: Previous to the introduction of the water-bath system of boiling described above, the produce was directly heated in iron pots or in pans. The same practice is still in vogue in a few remote villages of Krishna district where iron pots with a capacity of about 150 lbs. of fresh rhizomes are used. In Cuddapah district, the furnaces are much bigger and crude in form, resulting in waste of fuel and the produce is boiled in iron pans which are similar to jaggery boiling pans.

Drying and cleaning: The cured produce is dried on clean drying floors in a thin layer for 10 to 15 days till perfectly dry. Rounds and fingers are separately dried. The rounds take a longer time for drying. The rounds have some adhering roots, which drop off ordinarily during the curing and drying process. Whatever remains is removed by manual labour in some places. In Duggirala tract they are spread in a thin layer and over this straw is spread lightly and burnt. The rounds are kept carefully stirred so that only the roots get burnt. In Prodattur area the plank is drawn over a layer of rounds for the removal of roots and for smoothening the surface. The next process is cleaning. The rhizomes are well rubbed with old gunny pieces or with hand, taking a small basketful each time. This removes the adhering scales and roots and smoothenes the surface. The produce is then cleaned by winnowing. This process of rubbing is not done now in Guntur area as machine polishing is done by the exporting firms, and polishing by hand is too expensive.

Yield: The average yield per acre is 10 candies (of 500 lbs. each) of cured produce. When there are pests and diseases, it may be 6 to 8 candies only. Maximum yields go upto 16 to 18 candies per acre. The proportion of cured produce to fresh produce is 1 to 4; i. e. about 40 candies of raw produce gives 10 candies of cured stuff. The proportion of rounds and fingers is also 1 to 4. Normally, 10 candies of rounds are obtained from one acre. On storage till the planting season there is a drilage loss of about 5% and about 5 candies of rounds will be available for planting one acre.

(10) *Storage of seed material:* From the time of harvest in March — April, till the time of planting in July, the seed material is carefully preserved. The period of storage is 3 to 4 months. In Guntur and Krishna districts the material is invariably stored under the shade of trees. The seed material is loosely heaped and covered over with a thin layer of dry turmeric leaves. The heap is left undisturbed till required. In parts of Krishna the heap is removed after $1\frac{1}{2}$ months, spoiled rhizomes, if any, are removed and reheaped. In the absence of shade nearby, a number of ryots store the material together in a garden engaging watch jointly, paying a nominal rent for the site. Throughout Cuddapah district the seed material is covered over with ragi straw or neem leaves; but not with dry turmeric leaves. A layer of sands is spread on the floor before heaping. The heaps are also plastered over with earth or dung or a mixture of both. The heaps are not disturbed. If there are no rains in summer, water is sprinkled over the heaps once. Where there is no sufficient shade, low pandals are erected over the heaps. There is also a practice of storing seed material in sheds if space is available. The rhizomes are heaped in a corner over a layer of sand and left uncovered.

11. *Storage of produce:* When the cured produce is not immediately disposed off it is stored in pits dug in an elevated site and allowed to dry for a day or two. The bottom and sides are lined with thick twists of "Rellu" grass (*Saccharum spontaneum*). Over this layer of grass, country date mats are spread at the bottom and the pit is filled with the produce. At the top again mats are spread and over this "Rellu" is spread in a thick layer and finally covered over with earth.

In Guntur and Krishna, the normal size of the pit is 15'x 10'x 7' which holds about 200 bags. Charges for digging the pit and storing the produce are one anna per bag. Cost of grass for one pit is Rs. 49/- at 700 bundles costing Rs. 7/- per 100 bundles. Cost of 20 mats at 0—8—0 each is Rs. 10/-. For the site, rent is charged at $1\frac{1}{2}$ annas per bag irrespective of period of storing. Banks advance money on the stored produce at Rs. 25/- a bag in Duggirala, which is a trading centre for turmeric. In

per 100 bags. for weighthment Rs. 6—4—0, for stalking Rs. 1—9—0 and for stitching Rs. 0—12—0 per 100 bags are the usual rates. The wooden planks of the polishers require renewal once in 2 to 3 years at a cost of Rs. 300/-. Some of the factories are leased out by the owners for working to others, in which case Rs. 8000/- are paid to the owner. All repairs above Rs. 200/- have to be borne by the owner.

(ii) *Colouring*: In Cuddapah, colouring is done before exporting to certain places like Calcutta, Rangoon, Singapore and Penang. This is done in two ways, dry colouring and wet colouring. In the dry method a yellow dyestuff (middle chrome) is lightly dusted on a small heap of rhizomes and thoroughly mixed. This method of colouring is for the Calcutta market. In wet colouring, the yellow colour is mixed in water and the coloured water is sprinkled over small heaps of rhizomes and rubbed well. The produce is then well dried for about a week. For both the purposes only half-polished stuff is used. Wet colouring gives a better-looking material and fetches a better price in the market over the dry-coloured rhizomes. The colour that is used for this purpose is "Middle chrome" manufactured by International Chemical Manufacturing Company, Calcutta. It is sold in half-pound packets costing Rs. 1—8—0 each. A packet is used for treating 2 candies of turmeric. The colouring is done by dealers who use the premises of factory paying a rent of Rs. 2/- per candy for storage.

(iii) *Factories*: The location of turmeric factories and their capacities are given below :—

	<i>Number of Factories</i>	
1. Duggirala—Guntur District	6	Each with 4 polishers.
2. Tenali do.	2	do.
3. Cuddapah	3	Two with 4 and 1 with 3 polishers.
4. Kodur—Cuddapah District	2	Each with 3 polishers.

(iv) *Trade*: The following is the approximate quantities of produce handled per year in the various trading centres :—

1. Duggirala	2,50,000	Bags
2. Kodur	30,000	"
3. Cuddapah	30,000	"

Another 2,00,000 bags per year are powdered and exported to various centres in this Province. The following are the importing centres.

and the rhizomes are attacked by borers and this is called "Oola telugu" and "Morum". Generally, the incidence of pests and diseases is not high and no serious damage is caused. Bordeaux mixture checks the leafspot disease if the plants are regularly sprayed with it. When the cured produce is stored for a long time in gunnies, it is attacked by borers. The produce is therefore stored in pits, to avoid this.

14. *Cost of Production*: The average costs of production at the current rates are:

1. Seven ploughings at Rs. 3/- per ploughing	Rs. 21/-
2. 30 carts clay @ Rs. 2/- including carting	60/-
3. Cost of penning 800 cattle (labour only)	40/-
4. Penning 2000 sheep @ 12—8—0 per 1000	25/-
5. Cost of 50 cart cattle-manure Rs. 3 per cart load	150/-
6. Cost of carting the @ 0—8—0 per cart	25/-
7. Cost of 8 bags of groundnut cake @ Rs. 8—8—0 each	68/-
8. Spreading manure and covering	5/-
9. Cost of $4\frac{1}{2}$ candies seed material at Rs. 50/- a candy	225/-
10. Preparation of seed material and planting	8/-
11. 4 Weedings ... 100 women	50/-
12. 4 Ploughings ... 4 pairs	12/-
13. Water rate and labour for irrigation	15/-
14. Harvesting, gathering and separating rhizomes	35/-
15. Curing, drying, and cleaning charges Rs. 5 per candy	50/-
16. Transport and storage charges	11/-

Total Rs. 800

Value of 10 candies of produce @ Rs. 110/- per candy 1100

Net Profit per acre 910

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