

# Customary Development Practices of Turmeric in Odisha

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## Abstract

*Turmeric (Curcuma longa L) is a significant money crop developed by inborn ranchers of Odisha for their business. In spite of the great agro-climatic condition, the efficiency of turmeric in Odisha is much underneath (2.4 t/ha) when contrasted with national normal (5.1 t/ha). In this manner, the current examination was completed during 2011-12 and 2012-13 to survey the present status of the customary acts of turmeric development followed by ranchers. Four areas of Odisha to be specific Nayagarh, Ganjam, Kandhamal and Keonjhar were chosen where this yield is developed by the ranchers all in all and tribals specifically. The example comprised of 360 ranchers including 180 ladies. It has been seen that countless innate ranchers despite everything practice the conventional technique for development of turmeric. Turmeric is developed in slop with or without patios and in fields as a sole yield and intercrop. Dughi, Jobedi, Katigia, Nearby, Lakadong, Ranga, Rasmi and Suroma varieties of turmeric are developed in Odisha. Turmeric is developed by the ranchers of Odisha for home utilization, seed reason and for wellspring of salary. It has been seen that mechanical intercessions like rhizome treatment, soil utilization of Trichoderma (bio-control specialist) in well bad bovine compost, wood debris, crop pivot, mulching, plant insurance estimates expanded rhizomes yield by tune of 20-30% at rancher's field.*

**Keywords:** Turmeric, Conventional Practices, Rhizomes, Curcumin, Innate Belt, Job prospects.

## I. INTRODUCTION

Turmeric is a significant business zest crop developed in India since old occasions and it is named as "Indian saffron". It is known as the "brilliant zest" just as the "zest of life." It arrived at China by 700 Advertisement, East Africa by 800 Advertisement and West Africa by 1200. It was presented to Jamaica in the eighteenth Century and began turning out to be well known all through the world. Turmeric was likely developed from the outset as a color, and afterward got esteemed as a topping just as for corrective purposes. The Middle Easterner dealers took turmeric to Europe in thirteenth century. During his movements in China in 1280, Marco Polo was so intrigued by

turmeric that he referenced it as a vegetable that has properties of saffron, however it isn't generally saffron.

Turmeric is for the most part known as a zest everywhere throughout the world. It is use as a flavor in curry powder, chicken bouillon, sauces, flavors, dry flavoring, heating blends, and handled cheddar pickles, savors, breading soup, refreshments and sugary treats. Turmeric is presently developed in nations like India, China, Pakistan, Bangladesh, Vietnam, Thailand, Philippines, Japan, Korea, Sri Lanka, Nepal, South Pacific Islands, East and West Africa, Malaysia, Caribbean Islands and Focal America. The world creation of turmeric is 800000 tons in which India hold a portion of roughly 75-80% and expends around 80% of its own creation. India is by a wide margin the biggest maker and exporter of turmeric in the world. Indian turmeric is viewed as the best on the planet showcase in view of its high curcumin content (6.7%). Turmeric possesses about 6% of the complete territory under flavors and toppings in nation. During 2012-2013, the nation delivered 9, 92, 900 tons of turmeric from a territory of 1, 95, 100 ha. During the period between April 2011 to January 2012, India traded 67,000 tons of turmeric esteemed at Rs 6,438 million. From India's complete turmeric trades, 65% sent out to UAE, USA, Japan, Srilanka, UK, and Malaysia. Andhra Pradesh, Tamil Nadu, Odisha, Karnataka, West Bengal, Gujarat, Meghalaya, Maharashtra and Assam are significant states developing turmeric. Andhra Pradesh alone involves 35.0% of territory and 47.0% of creation [1].

In Odisha, turmeric is a significant money crop developed by ancestral families for their work and over half of this yield producer is tribal. Odisha contributes about 21 % of India's turmeric development as far as territory and Kandhamal compensates for more than 50 % of the state's share. Odisha created turmeric 59361 t from 24733 ha. Kandhamal region stands first in turmeric region too as creation (28,828 t from 11,088 ha). Koraput is the second biggest delivering area (7,761 t from 3,168 ha) followed by Nayagarh (5343 t from 2473 ha) and Keonjhar (2937 t from 1224 ha). Turmeric is a money crop developed by Kondha clans of Kandhamal locale and Langi Kondha of Gajapati region. The harvest is developed in terrace by the tribal with their indigenous strategies for crop creation. The harvest is for the most part created naturally and the ranchers get a decent return [2].

Considering the capability of turmeric, the state proposed for the Agri Fare Zone (AEZ). The zone covers the locale of Kandhamal. Turmeric is likewise credited with strict and otherworldly customs in India and certain South-East Asian nations. Traditionally turmeric has been utilized in India for treatment of an assortment of human and veterinary illnesses, as a whiz color, just as readiness of heavenly dishes. In spite of the fact that customary Indian Ayurvedic and Siddha frameworks of medication have perceived the therapeutic estimation of turmeric in its rough from since extremely

old occasions, the couple of decades have seen broad research intrigues worldwide in the biomedical movement of turmeric and its mixes [3].

Along these lines Curcuma is currently picking up significance everywhere throughout the world as a powerful fix to battle an assortment of afflictions, as the class conveys atoms credited with mitigating, hypocholesteremic, choleraic, antimicrobial, antirheumatic, antifibrotic, antivenomous, antiviral antidiabetic, antihepatotoxic and anticancerous properties just as bug repellent movement. Turmeric can be developed in Odisha as an intercrop in coconut and areca nut manors. Turmeric is the third-biggest zest sent out from India. As far as amount and worth, it accounts about 12% and 5% separately. Data on conventional development practices of turmeric in Odisha isn't all around reported up until this point. In this manner, an exertion was made to evaluate the present status of the customary practices followed by ranchers in general and tribal specifically for turmeric development in Odisha with the goal that Indigenous Specialized Information for development practices of turmeric can be reported and advanced among ranchers to upgrade profitability with quality [4].

## II. METHODS AND MATERIALS

The investigation was embraced in Nayagarh, Ganjam, Kandhamal and Keonjhar regions of Odisha during 2011-12 and 2012-13. From each region, 3 towns were chosen where turmeric is being developed monetarily and put away by the ranchers. Ability preparing and introduction field visits were sorted out for aptitude up degree of homestead ladies and empowering their support underway of turmeric [5]. After primer review, thirty arbitrarily chose ranchers from every town were composed into turmeric developing gatherings (with embraced innovation like seed treatment, soil utilization of bio-control operator like Trichoderma in well bad bovine compost, wood debris, crop pivot, mulching, plant insurance measures) [6]. Additionally, another thirty arbitrary ranchers from every town were chosen as control gathering or Non-embraced innovation gathering and they were permitted to follow their own practices. At long last in the year 2012-13, the effect of mechanical intercessions was concentrated to envision the contrasts between the two practices. The examples comprised of 90 ranchers from each area and altogether 360 ranchers were chosen [7]. The data on the technique for development, sexual orientation cooperation, varieties, seed choice, seed treatment and planting, mulching, crop turn, indigenous plant assurance works on, reaping and post gathering exercises were gathered time to time by checking, individual meeting and conversation with received innovation gatherings and non-embraced innovation gatherings [8].

## III. RESULTS OBTAINED

### A. Land Arrangement: -

Turmeric is developed in slop, from ocean level to 1500m above MSL under rain fed condition with or without terracing just as in plain, in open and under shade of mango (*Mangifera indica* Linn), jackfruit (*Artocarpus heterophyllus* Lam.) coconut (*Cocos nucifera* L.) and arecanut (*Areca catechu* Linn.) and other woods tree like sal (*Shorea robusta* Gaertner f.) in Ganjam, Khurda and Kandhamal. Pigeon pea (*Cajanus cajan*. L.Millsp) and castor (*Ricinus communis* Linn.) are planted by a few ranchers on the fringes and on water system channels to give conceal. Sticky climate alongside 30-350 C temperature for germination, 25-300 C for tillering and 20-250 C temperature is perfect for rhizomes commencement under Odisha condition. It has been watched that development and yield of harvest are higher under mango what's more, jackfruit trees than crop become under Sal tree.

Ranchers said that mango and jackfruit are giving halfway shade which is appropriate to the harvest for their development what's more, rhizomes advancement. In slopes ranchers are planted turmeric over the slop. Ranchers announced that planting of turmeric rhizomes over the slop control soil disintegration during stormy season and improved efficiency of yield. The land holding was 200sqm in terrace to 1.5 ha. It has been seen that in the slope inclines of Raygada square of Gajapati area pineapple (*Ananas comosus* L.) what's more, turmeric are developed by the ranchers with help from the Orissa Ancestral Strengthening and Business Program (OTELP). Ranchers detailed that the two harvests are conceal cherishing so that there is no trouble in developing turmeric with pineapple.

Legitimate dividing convenient intercultural activity, suitable yield blend and required plant insurance are received by practically all the ranchers. Ranchers accepted that planting of rhizomes in a similar land parcel each year doesn't create great yield of turmeric. Ranchers planted rhizomes on raised bed of around 30 cm stature and 1m width to keep away from water stagnation during blustery season. In the low slopes of Kandhamal, Keonjhar and Nayagarh the land is furrowed however in mid slopes and messy regions it is burrowed with spade and consolidated FYM. Little ranchers in Kandhamal and Keonjhar are applied poultry excrement what's more, goat fertilizer 5-7 t/ha in patio development. Weeds, stubbles, roots and so forth are expelled by men and ladies. Rhizomes are planted during May-June with the receipt of premonsoon showers.

## 1. Varieties:-

Dughi, Jobedi, Katigia neighborhood varieties of turmeric are developed in Odisha. Alongside these, Lakadong, Ranga, Rasmi and Suroma varieties of turmeric are developed by ranchers in

Kandhamal of Odisha. By and by crop is developed natural and extensive zone has been brought under Lakadong turmeric, considering its high curcumin content. Research endeavors in Odisha fundamentally in Koraput have brought about the development of 4 high yielding varieties with great brilliant shading and high curcumin content (6.7%) viz Rango, Reshmi, Roma, Surma have become well known among turmeric producers. The striking highlights of significant turmeric varieties developed in Odisha are portrayed underneath.

Roma: Appropriate for both rainfed and inundated condition, appropriate for uneven territories and late season planting. Curcumin content 6.1%, oleoresin 13.2%, fundamental oil 4.2%, dry recuperation 31.0% and crop term 250 days with normal yield 20.7t/ha.

Suroma: Round and plumpy rhizome, field resistance to leaf smear, leaf spot and rhizome scale, curcumin content 6.1, oleoresin 13.1%, fundamental oil 4.2%, dry recuperation 31.0 % and yield span 250 days. Yield was recorded 20.0 t/ha.

Ranga: Striking and axle molded mother rhizome, reasonable for late planting and low lying zones, Respectably impervious to leaf smear and rhizome scales, curcumin content 6.3%, oleoresin 13.5%, fundamental oil 4.4%, dry recuperation 24.8% and crop span 250 days.

Rasmi: Intense rhizomes, appropriate for both rainfed and flooded condition, early and late planted season, curcumin content 6.4%, oleoresin 13.4%, basic oil 4.4%, dry recuperation 23.0% and crop term 240 days. Normal yield (new) at ranchers field were recorded 31.5t/ha.

## 2. Determination of Seed Materials & Planting Technique:-

It has been seen that ranchers are planted rhizomes on raised beds and furthermore on edges during April-May. A portion of the ranchers in Keonjhar and Kandhamal areas are planting rhizomes in wrinkles for that reason they made wrinkles with the assistance of little spade and applied homestead yard excrement 10 t/ha. After that rhizomes are planted in the wrinkles at the dispersing of 30 cm and secured with soil. Ranchers announced that they liked mother rhizomes at any rate 100g in weight for planting as they give half more yield than finger rhizomes. For terrace development mother rhizomes are utilized for planting however for medium and huge size of development both mother and finger rhizomes are utilized for planting. The finger rhizomes are cut into 4 - 5 cm long pieces, what's more, the mother rhizomes are planted comprising in any event one solid bud.

All around created sound and infection free rhizomes are chosen for planting. It has been seen that rhizomes are treated with 0.3% Dithane M45 for 30 minutes before planting to stay away from

sicknesses. This technique is embraced by dynamic ranchers. At the time of planting a few ranchers applied 25 g neem cake powder and blended well in with the dirt in each pit taken at a dividing of 20-25 cm inside and between lines. Little pits are made with a hand digger in the beds in lines with dispersing of 25 cm x 30 cm and secured with soil or cows excrement. The ideal dividing in wrinkles and edges is 45-60 cm among lines and 25 cm between plants. A seed pace of 2000-2,500 kg of rhizomes is required for planting in one hectare of land. Little and minimal ranchers are utilized their own seed or gathered from locals yet enormous ranchers are additionally utilized their own seeds as well as outstanding seed rhizomes bought from open what's more, private nurseries. Ranchers are utilized just sound, nematode free rhizomes to stay away from nematode issue in turmeric.

### 3. Mulching:-

The rhizomes are mulched following planting with Sal leaves at the pace of 12-15 t/ha. Mulching (green leaves) is likewise applied 7.5 t/ha at 45 and 90 days after weeding. Ranchers announced that mulching in turmeric beds with green leaves is a basic to improve germination of seed rhizomes and to forestall washing off of soil in blustery season. It additionally assists with including natural substance to the dirt and ration dampness during the later piece of the trimming season. Ranchers are applied glyrecedia (*Glyrecedia sepium* Jacq.) leaves wealthy in nitrogen content, phosphorus content like (*Acalypha indica* L.) and potassium content like (*Calotropis gigantean* L.) as mulch. Ranchers accepted that mulching would expand germination; decrease weed development and delicate spoil. It has been seen that natural substance of the dirt assists with checking the increase of nematodes. It has been seen that little ranchers poured bovine manure slurry on the bed after each mulching to improve microbial action and supplement accessibility. In Kandhamal locale Sal (*Shorea robusta* Gaertner f.) leaves are gathered by ladies during February and walk for mulching purposes.

### 4. Yield pivot :-

The vast majority of the ranchers practice crop pivot. The yield turn is fluctuated from 2-4 years yet it is exceptionally rely on size of the land holding and market cost of turmeric. Paddy, potato, brinjal, tomato, bean, elephant foot yam, cabbage, okra, ragi and maize are developed in pivot. It is developed as an auxiliary harvest to ginger in certain territories. Be that as it may, a few ranchers likewise develop turmeric in the equivalent field consistently because of absence of land.

### 5. Indigenous Plant Security Practices :-

Shoot borer (*Conogethes punctiferalis* Guen.) is the most significant nuisance of turmeric hatchlings drill into the pseudo stem and feed on the developing shoot coming about in yellowing



and drying of the pervaded shoots. The ranchers in this state have been followed indigenous bug and dis-ease the executives rehearses. A few ranchers plant rhizomes soon after consuming the field to maintain a strategic distance from soil borne infection and creepy crawly harm. The grown-up of shoot borer after rising up out of the dirt choose the tree and ranchers gathered and annihilated them. Ranchers revealed that splashing neem oil 0.5 percent during July-October is viable against the shoot borer. Leaf smear a contagious illness brought about by *Taphrina maculans* shows up as little oval rectangular earthy colored spots on either side of the leaves. They before long become grimy yellow or dull earthy colored.

Ancestral ranchers expelled mud from base of unhealthy plant to open to the roots to the sun. This practices found to diminish sickness (rhizomes decay) invasion. Dynamic ranchers are additionally profound furrowed their field during summer to diminish the sickness. Spoiled plant establishes scratched by ranchers in Kandhamal and Keonjhar and applied wood debris too as vermicomposting 2 t/ha in field to deal with the rate. Ranchers are applied *Trichoderma viride*, *Beauveria bassian*, and *pseudomonas* to control rhizome spoil. Ranchers in Kandhamal locale planted turmeric in red soil and under the shade of tree like Sal, mango what's more, jackfruit to lessen rhizomes sicknesses. It has been seen that dynamic ranchers utilized own seeds for planting change seed source each 2-3 yrs. to diminish the spread of seed borne sicknesses. Turmeric planted in the red soil was discovered less frequency of bug and maladies during capacity period.

## 6. Harvesting :-

The yield is harvested in seven to nine months from January-April. The sweet-smelling type developed in around 7 months and longa type in around 9 months. The primary collect season starts from end of December and reaches out up to spring. Turmeric is reaped when leaves turn yellow and begin evaporating. In gathering, the entirety cluster is lifted out with the dry plant, at that point the verdant tops are removed, the roots are evacuated, all the following mud particles are evacuated and the rhizomes are then washed well with water. Reaping of turmeric is done after pre storm downpour. After downpours soil is gotten free and burrowing of turmeric rhizomes is simple. It has been taken note that ranchers are harvested turmeric consistently yet a few ranchers are collect postponed the rhizomes as indicated by advertise request and permit the remainder of rhizomes stay in the field for keep up its curcumin content. Reaping of turmeric is finished by the ranchers with the assistance of little spade. Normally the land is furrowed and the rhizomes are accumulated by hand. The normal yield (green turmeric) were recorded 10-16 t/ha at ranchers field. The fingers rhizomes are isolated from the mother rhizomes by people and kept in conceal for 2-3 days. The mother rhizomes are saved for seed reason and finger rhizomes are restored for selling.

## 7. Restoring & Drying :-

In conventional strategy for relieving, rhizomes of turmeric are bubbled in aluminum pots with 20 kg limit along with  $\frac{3}{4}$  water for 45-an hour, contingent upon the amount. The pots are secured with a cover. Bubbling procedure is proceeded till white foam shows up with a unique quality enhance. Cooking process is finished when rhizomes become delicate and inward shading turns yellow. Over cooking ruins the shade of the last item while half-cooking renders the dried item weak. Mother and finger rhizomes are relieved independently. Bubbled rhizomes are dried in the sun by spreading them in 5-7 cm thick layers on bamboo tangles or ground floor for 10-15 days. The rhizomes are blended 2-3 times to guarantee uniform drying. Inappropriate drying brings about the rhizomes become hard or fragile. A more slender layer isn't attractive, as the shade of the rhizomes antagonistically influenced. During evening time, the rhizomes are loaded and secured with Sal what's more, turmeric leaves. This technique for handling is embraced by tribal Kondha.

The restored rhizomes are put away by ranchers in pits of 4 x 3 x 2 m size. Pits are dove in raised spot what's more, sun dried for multi week; base and sides of the pits are thickly fixed with grass or Palmyrahmats. Accordingly relieved produce is filled in pits and is secured with mats lastly with earth. The seed rhizomes are put away for 3-4 months from gathering to planting by spreading them daintily under a front of turmeric leaves. For capacity seed rhizomes are additionally put away by loading them under the shade of trees. Stacks are secured with turmeric leaf and put with soil and bovine excrement blend. It has been seen that rhizomes are treated with bavistin fungicide 2gm/L of water answer for 15 minutes before capacity to stay away from contagious infections during capacity. It very well may be left undisturbed for 2 - 3 months until planting. In Kandhamal region, ranchers put away turmeric in the field and furthermore in patio under the shade of mango, jackfruit.

As tree shield rhizomes from heat what's more, downpours and furthermore make miniaturized scale condition to upgrade the timeframe of realistic usability and lessen the misfortunes. For that reason pits are burrowed around 1 m size and spot the rhizomes of turmeric 40-80 kg and secured by Sal and turmeric leaves. Ranchers said that Sal and turmeric leaves were found compelling for control of termites. The customary practices and control of post collect misfortunes by conventional techniques for capacity has likewise been acquired in turmeric.

## 8. Prospect for Natural Turmeric in Conventional Cultivating Framework :-

The utilization of inorganic manures (53.20 kg/ha) what's more, pesticides (143g/ha) is low in Odisha when contrasted with national normal (121.60 kg/ha and 500 g/ha, individually). In this way, the extent of creation of turmeric naturally in Odisha is high. Ranchers are progressively



taking up natural turmeric development on business scale because of more appeal in nearby just as in Universal markets. Natural turmeric is currently developed in Kandhamal, Keonjhar, Raygadha and Koraput. The legislature of Odisha is advancing natural turmeric development in innate zone and set up a Natural Model plants with help from Agrarian Fare what's more, Preparing Fare Improvement Authority. Agrarian Fare Zone would be set up in Kandhamal for advancing natural turmeric among tribals. Kandhamal Zenith Flavors Affiliation for Showcasing stepped up to the plate and sorted out the 61 turmeric developing social orders and now it has 12,000 innate ranchers with 68 ladies self-improvement gatherings.

Odisha Improvement Activity Gathering is additionally advancing natural turmeric development and promoting through ladies Rack Help Gatherings in Kandhamal. The total fare estimation of Kandhamal Natural Turmeric item was Rs 1.25 crore during 2007-08. Kandhamal Turmeric is a significant item and now become mainstream in the natural nourishment market of Europe and North America. It is a natural item with guaranteed by SKAL Netherland with "EKO". During development, no substance manures, pesticides are utilized. No counterfeit hues and pith are added to it. It is best for wellbeing and healthy skin. Accordingly, it has increased great piece of the pie in international and nearby market. Kandhamal Pinnacle Flavors Relationship for Showcasing Kandhamal (KASAM) and Orissa Milk League (OMFED) are advancing natural turmeric development and its advertising in Odisha.

## 9. Sexual Orientation Investment in Turmeric Development :-

People were associated with practically all the exercises from land arrangement to capacity. Anyway their job relies upon family circumstance than upon sex, ethnicity what's more, level of salary. In a family with more men part, men work in the field, though in family with less men, ladies work similarly with men. Furrowing of field is finished by men while burrowing and hoeing are finished by the two people. Use of excrement, planting, assortment and arrangement of answer for plant security, mulching, reaping, stockpiling and retail selling are finished by people. Sal and turmeric leaves for pile/pit stockpiling and mulching of rhizomes are gathered by ladies. As ladies are the ones who have customarily been gathered these items. Study uncovered that in the wake of reaping turmeric rhizomes, evaluating and cleaning are finished by the ladies. Weeding is done by ladies in spite of the fact that men help as when required.

## IV. DISCUSSIONS

It has been generally recognized that manufactured composts, pesticides and fungicides are increasingly compelling and routinely use for the administration of harvest for yield all over the world. Be that as it may, these synthetic compounds are destructive to the environment and it

likewise diminishes improvement of microbial exercises in the dirt. Thinking about every one of these realities and conquer theories issue, elective strategy for crop the executives utilizing customary practices is additionally similarly powerful instrument for crop the board. Moreover, indigenous practices are increasingly well known among inborn ranchers in the state. It may be because of minimal effort and locally accessible materials. The yield and nature of turmeric under conventional techniques for development seems, by all accounts, to be upgrading by expanded microbial exercises in the dirt and improved wholesome status in the root zone just as in the plant framework. Better return and quality under conventional techniques for development has additionally been recorded in turmeric.

## V. CONCLUSION

Turmeric is one of the most significant zest crops in India in any case, the efficiency is low. Therefore, there is have to build the efficiency to satisfy the local prerequisite and for send out. Turmeric development is capital escalated and needs greater venture. Ancestral ranchers are inadequate to contribute required data sources and unfit to bear more dangers. Turmeric is a significant money crop developed by innate families for their vocation and that's just the beginning than half of the turmeric cultivators are tribal in Odisha. It has been seen that innovative intercessions like rhizome treatment, soil utilization of Trichoderma, wood debris, crop pivot, mulching, plant assurance estimates expanded rhizomes yield by 20-25% at rancher's field. To upgrade the efficiency promotion of financially savvy, eco amicable creation advancements among the cultivating network are the need of great importance. The indigenous specialized information obtained by the ranchers should be tried and refined with the cutting edge strategies. This will push the ranchers to increment the profitability from their current framework.

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