Diagnostic Study of Turmeric Processing Cluster in Kandhamal District, Odisha

Submitted to: The DC (MSME), Ministry of MSME (Government of India)

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ACKNOWLEDGEMENT

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Co-ordinator

CSREM Cluster Project Team

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INTRODUCTION

Kandhamal is one among the 30 districts of Orissa state. The district was formed in 1994 by dividing the erstwhile Pulbhani district. It is located in Central Orissa with latitude 19.34 & 20.50 degree North, and longitude 80.30' & 84.48 degree East. The district has a total geographical area of 7649 sq. km. Almost 66 % of the district is covered by forest. The district consists of two subdivisions (Pulbhani and Baliguda), 12 CDBs, 2 ULBs, 153 GPs and 2515 villages. The district has a population of 647912 which constitute 1.47% of State's population. The district is one of the tribal belts of the state with ST population of 2, 81,386 (43%) and SC population 99499(15%). The district is predominantly rural and the rural population constitutes 603912 (93%) and Urban 44,000 (7%). Literacy rate of the district is 52.95% with male literacy of 69.98 % and female literacy of 36.19 %.

Agriculture forms the major economic activity of the people in the district. The total cultivated area consists of 177179 Ha and gross cropped area of 181943 Ha with a cropping intensity of 105%. Major crops include paddy, mustard, pulses, wheat, potato, sesamum, and spices. Nearly 51% of farmers are marginal farmers and 29.1 % small farmers which together constitute 80 % of the farming community.

Turmeric and ginger are the two major cash crops produced in the district. Turmeric is the major spice crop and accounts for nearly 50% of the total turmeric production in the state and shares nearly 5% of the total turmeric production in the country. Of the two marketable commodities, spices have been the major source of cash income for the inhabitants of the district for decades. In terms of value share in the agriculture income, spices generate nearly 50% of the total agricultural production income of the district amounting to approximately Rs. 65 Crores. This accounts for over nearly 30% of the income of the district. This is significant considering the fact that, the land area under spice cultivation is only 10% of the total arable land in the district.

TURMERIC CROP

As a dried rhizome of a herbaceous plant, turmeric is closely related to ginger. The spice is also sometimes called "Indian saffron" due to its yellow color. The underground rhizome imparts a distinctive flavor to food but it is also used to provide food with a deep, indelible orange color. In the form of this fine, dried, yellow powder, turmeric is mostly sold to customers in developed countries. Turmeric is used in a wide variety of foods of the cuisines of Southern Asia but locally it also applies as an antiseptic for skin abrasions and cuts.

Asian countries consume much of their own turmeric production, except for Japan and Sri Lanka. Major importers are the Middle East and North African countries, Iran, Japan and Sri Lanka**.** These importing countries represent 75% of the turmeric world trade, and are mostly supplied by the Asian producing countries. Europe and North America represent the remaining 15%, and are supplied by India and Central and Latin American countries. Taiwan exports mostly to Japan. The United States imports of turmeric come from India at 97%, and the rest is supplied by the islands of the Pacific, and Thailand. The increasing demand for natural products as food additives makes turmeric an ideal candidate as a food colorant, thus increasing demand for it. Additionally, recent medical research demonstrating the anti-cancer and anti-viral activities of turmeric may also increase its demand in Western countries.

Harvesting

Turmeric is harvested when the plants are between 7 and 10 months of age, when the stems and leaves start to dry out and die back. The whole plant is removed from the ground, taking care not to cut or bruise the rhizomes.

Sweating

The leaves are removed from the plant and the roots carefully washed to remove soil. Any leaf scales and long roots are trimmed off. The side (lateral) branches (which are known as the fingers) of the rhizomes are removed from the main central bulb (known as the mother). The mothers and fingers are heaped separately, covered in leaves and left to sweat for one day. The 'mothers' are the preferred material for planting the following year.

Curing

Before drying, the turmeric rhizomes have to be cured. This involves boiling the roots to soften them and remove the raw odour. After curing, the starch is gelatinised, which reduces the drying time required, and the colour is uniformly distributed throughout the rhizome. The specifications for curing turmeric vary from different places. The Indian Institute of Spice Research and the Agricultural Research Centre recommend boiling in plain water for 45 minutes until froth appears at the surface and the typical turmeric aroma is released. Using this method, the colour will deteriorate if the rhizomes are boiled for too long. However, if not boiled for long enough, the rhizome will be brittle. The optimum stage is reached when the rhizomes are soft to touch or can be pierced by a blunt piece of wood.

Drying

The rhizomes are sliced before drying to reduce the drying time and improve the quality of the final product (it is easier to achieve a lower final moisture content in small pieces of rhizome without spoiling the appearance of the product). The rhizomes are traditionally sliced by hand, but there are small machines available to carry out this process.

Polishing

After drying the rhizomes are polished to remove the rough surface. This can be done by hand or by shaking the rhizomes in a gunny bag filled with stones. Polishing drums are used in many places – these are very simple, power driven drums that have an abrasive metallic mesh lining. In some places the rhizomes are sprinkled with a solution of ground turmeric in water during the final polishing, to give the rhizomes a good colour.

Grading

Quality specifications for turmeric are imposed by the importing country. They refer to the cleanliness of the product rather than on the eating quality. Bulk rhizomes are graded into fingers, bulbs and splits. The Indian standards for turmeric follow the Agmark Specifications (Agricultural Directorate of Marketing) to ensure quality and purity of the products.

Table 1: Grade standards and Specifications of Turmeric rhizomes

Grade	**Flexibility**	**Broken pieces, fingers <15mm**- No more than (% by weight)	**Foreign matter**-No more than (% by weight)	**Defectives**- No more than (% by weight)	**Percentage of bulbs by weight max**
Alleppey fingers (a)					
Good	Hard to touch	5	1	3	4
Fair	Hard	7	1.5	5	5
Fingers other than Alleppey					
Special	Hard to touch, metallic twang on break	2	1	0.5	2
Good	Same	3	1.5	1	3

Fair	Hard	5	2	1.5	5
Rajapore fingers (b)					
Special	Hard to touch,metallic twang on break	3	1	3	2
Good	Same	5	1.5	5	3
Fair	Hard	7	2	7	5
Non Specified	-	-	4	-	-
Bulbs (c)					
Special	-	-	1	1	-
Good	-	-	1.5	3	-
Fair	-	-	2	5	-

Source:: Agmark standards for turmeric rhizomes(www.turmeric.8m.com/standards.html)

a. Fingers shall be of secondary rhizomes of Curcuma longa L.; shall be well set and close grained; free from bulbs; be perfectly dry and free from weevil damage and fungus attack and not be artificially coloured with chemicals.
b. Same as (a); have the characteristics of the variety; admixture of varieties of turmeric allowed at a maximum of 2%, 5%, 10% and 10% for the four grades respectively.
c. Bulbs shall be primary rhizomes of Curcuma longaL.; shall be well developed, smooth and free from rootlets; have the characteristics of variety; be perfectly dry and free from weevil damage and fungus attack; not artificially coloured with chemicals.

Grinding

Grinding is a very simple process that involves cutting and crushing the rhizomes into small particles, then sifting it through a series of screens of different mesh size, to get a fine powder. There are a range of grinding mills available, both manual and powered, of different capacities and which work in different ways. The traditional way to grind would be between two stones. The advantage of this method is that the turmeric does not get too hot during the grinding process. With some of the mechanical mills, such as a hammer mill, heat is generated during the grinding process, which can cause some of the volatile taste and aroma compounds to be lost. For higher quality ground turmeric, the grinding temperature should be kept as low as possible. After grinding the powder is sieved through different mesh screens until a uniform, fine powder is obtained.

Table 2: Grade standards for turmeric Powder

Grade	Moisture (%w/w) max	Total ash (%w/w) max	Acid insoluble ash (%w/w) max	Lead (ppm) max	Starch (%w/w) max	Chromate test
Turmeric powder (a)						
Standard	10	7	1.5	2.5	60	Negative
Coarse ground powder (b)						
Standard	10	9	1.5	2.5	60	Negative

Source: Agmark standards for turmeric powder (www.turmeric.8m.com/standards.html)

a. Ground to pass through a 300-micron sieve

b. Ground to pass through a 500-micron sieve

Packaging

Dried rhizomes and rhizome pieces are packed in jute sacks, wooden boxes or lined corrugated cardboard boxes for shipping. Ground turmeric should be packaged in moisture proof, air-tight polyethylene packages.

Storage

The bulk rhizomes are stored in a cool and dry environment, away from direct sunlight. The bright colour of ground turmeric will fade when it is left in the light for a long period of time. Therefore the packets should be stored in a cardboard box, away from the sunlight. The storage room should be clean, dry, cool and free from pests.

PRIMARY PRODUCTS

There are two dominant types of turmeric found on the world market: 'Madras', and 'Alleppey', both named after the regions of production in India. The orange-yellow flesh Alleppey turmeric is predominantly imported by the United States, where users prefer it as a spice and a food colorant. Alleppey turmeric contains about 3.5% to 5.5% volatile oils, and 4.0% to 7.0% curcumin. In contrast, the Madras type contains only 2% of volatile oils and 2% of curcumin. The Madras turmeric is preferred by the British and Middle Eastern markets for its more intense, brighter and lighter yellow color, better suited for the mustard paste and curry powder or paste used in oriental dishes.

Dried Rhizome

Turmeric is mostly traded as a whole rhizome, which is then processed into powder or oleoresin by flavor houses and the industrial sector. Rhizomes come as fingers, bulbs and splits. Fingers are the secondary branches from the mother rhizome, the bulb, and splits are the bulbs cut into halves or quarters before curing. The fingers are 2 to 8 cm long and 1 to 2 cm wide, and are easier to grind than the more fibrous bulbs and splits, and therefore command a higher price. Rhizome quality is judged by a clean and smooth skin, uniform skin and flesh colors, and a clean snap (or "metallic twang" as described by the Indian Ministry of Agriculture standards, Agmark) when broken. Turmeric cleanliness specifications for import pertain to whole rhizomes.

Turmeric powder

Ground turmeric is mostly used on the retail market, and by the food processors. Rhizomes are ground to approximately 60-80 mesh particle size. Since curcuminoids, the color constituents of turmeric, deteriorate with light and to a lesser extent, under heat and oxidative conditions, it is important that ground turmeric be packed in a UV protective packaging and appropriately stored. Turmeric powder is a major ingredient in curry powders and pastes. In the food industry, it is mostly used to color and flavor mustard. It is also used in chicken bouillon and soups, sauces, gravies, and dry seasonings. Recently the powder has also been used as a colorant in cereals.

SECONDARY AND DERIVED PRODUCT

Curry powder

Turmeric is such an important ingredient in curry powder that it merits special mention. In its export statistics of spices, the Indian Spice Board specifically lists curry powder exports. The turmeric content in curry powder blends ranges from 10-15% to 30%.

Oleoresins

Turmeric extractives, or oleoresins, are obtained by solvent extraction of the powdered or comminutated rhizome. This process yields about 12 % of an orange/red viscous liquid, which, depending on the solvent used for extraction and on the turmeric type and cultivar, contains various proportions of the coloring matter, i.e. the curcuminoids, the volatile oils which impart the flavor to the product, and non-volatile fatty and resinous materials. The compounds of interest in turmeric oleoresin are the curcuminoids (40 to 55%), and the volatile oils (15 to 20%).

Essential oil

Turmeric essential oil is obtained by distillation, or by supercritical fluid extraction of the powdered rhizome. It is also the product of curcuminoids purification from oleoresins. The latter procedure, which consists in removing the oil with hexane or other lipophilic solvent, tends to alter the oil by loss of higher volatile molecules in the process of solvent evaporation; or, if alcohol is used as the solvent, artifacts are formed by esterification, etherification and acetal formation.

GLOBAL PRODUCTION AND TRADE

India is the largest producer, consumer and exporter of turmeric.
Other producers in Asia include Bangladesh, Pakistan, Sri Lanka, Taiwan, China, Burma, and Indonesia. Turmeric is also produced in the Caribbean and Latin America: Jamaica, Haiti, Costa Rica, Peru, and Brazil. The use of the spice spread widely in Oceania, but it is not used as a condiment in Melanesia and Polynesia.
Major importers are the Middle East and North African countries, Iran, Japan and Sri Lanka. These importing countries represent 75% of the turmeric world trade, and are mostly supplied by the Asian producing countries.
Europe and North America represent the remaining 15%, and are supplied by India and Central and Latin American countries. Taiwan exports mostly to Japan. The United States imports of turmeric come from India at 97%, and the rest is supplied by the islands of the Pacific, and Thailand.
The total yearly consumption of Turmeric all around the globe is approximately 38 Lakh bags to 40 Lakh bags depending on the rates.

Top exporters

- India (largest exporter of turmeric and other spices)
- Thailand and other Southeast Asian countries
- Various Pacific islands
- Central and Latin American countries
- Taiwan

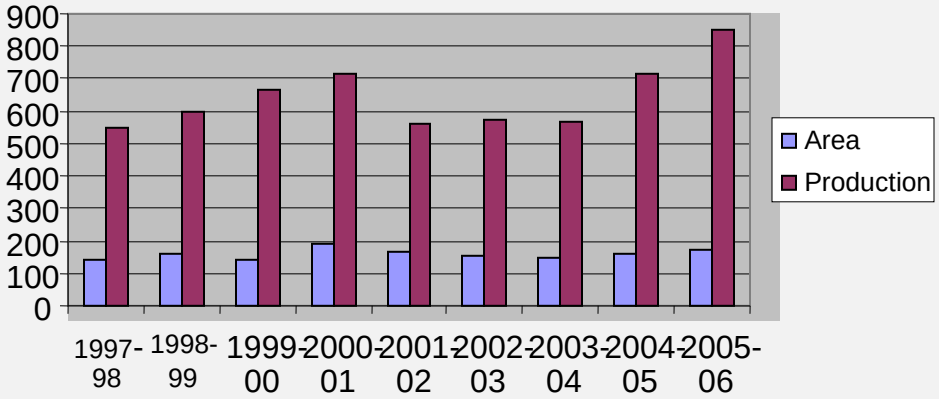
Top importers

- Japan
- Sri Lanka
- Iran
- North African countries
- Middle Eastern countries
- Ethiopia
- United States
- United Kingdom

TURMERIC PRODUCTION IN INDIA

Turmeric is one of the oldest spices and had been used in India since ages. It is also called Indian saffron. It is an important ingredient in curry dishes. It is used in many religious observances, as a cosmetic, as a dye and also for healing many diseases. India is the largest producer, consumer and exporter of this spice. Also India consumes around 80% of its own production. In India turmeric is cultivated in about 172000 ha with annual production of 851700 MT.

Figure 2: Area and Production of Turmeric in India
(Area in 000 Ha Production in '000MT)



Source: Spices Board

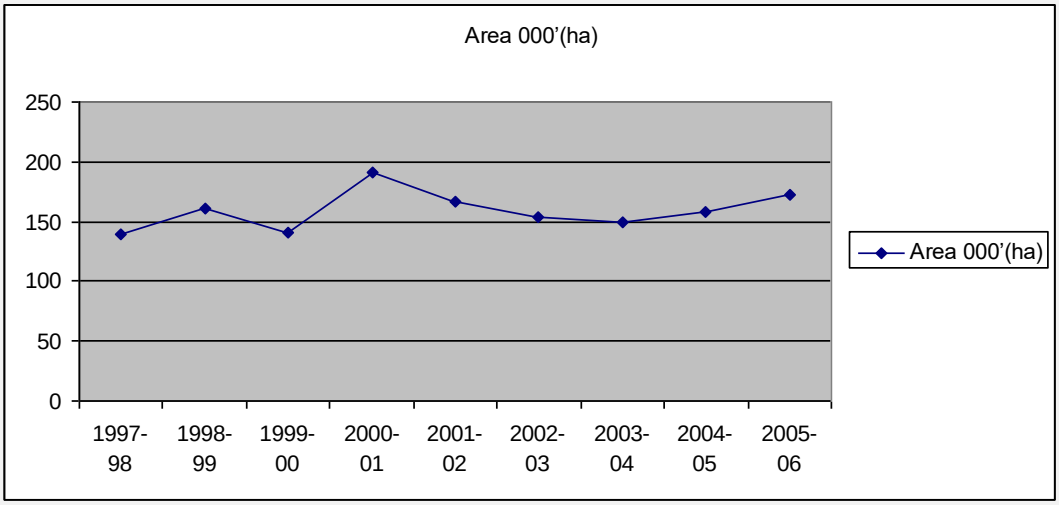
The following table provides the details of area, production and productivity of turmeric in India.

Table 3: Area, Production and Productivity of Turmeric in India

Year	Area 000'(ha)	Production (000'Tonnes)	Productivity (kg/ha)
1997-98	139.7	549.2	3931
1998-99	160.7	597.9	3721
1999-00	141.2	668.5	4734
2000-01	191.7	714.3	3726
2001-02	167.1	562.8	3368
2002-03	154.2	573.9	3722
2003-04	150.1	564.9	3763
2004-05	158.7	718.1	4525
2005-06	172.0	851.7	4952

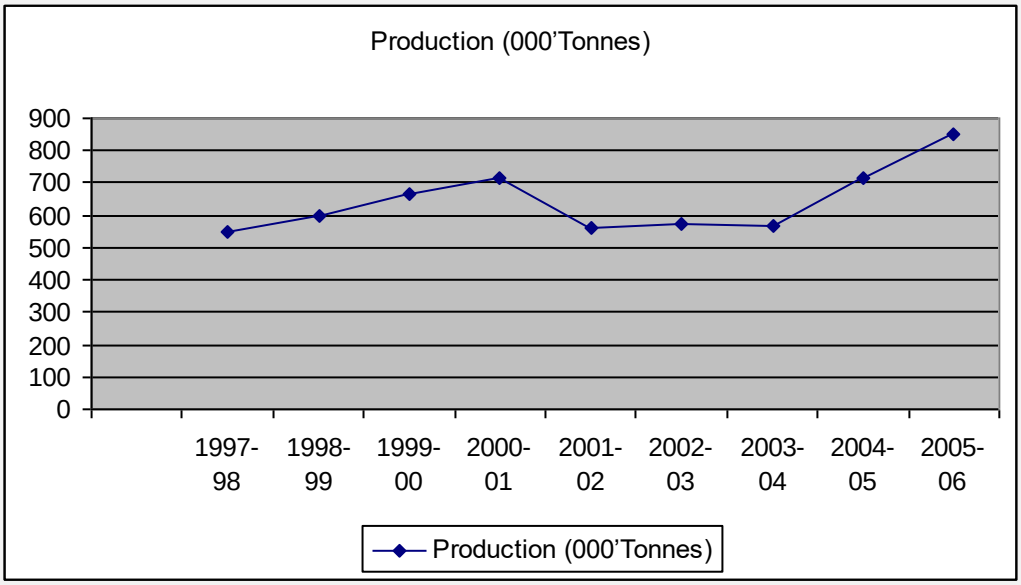
Source: Spices Board

Figure 3: Trends in area under cultivation(Turmeric)



Source : Spices Board

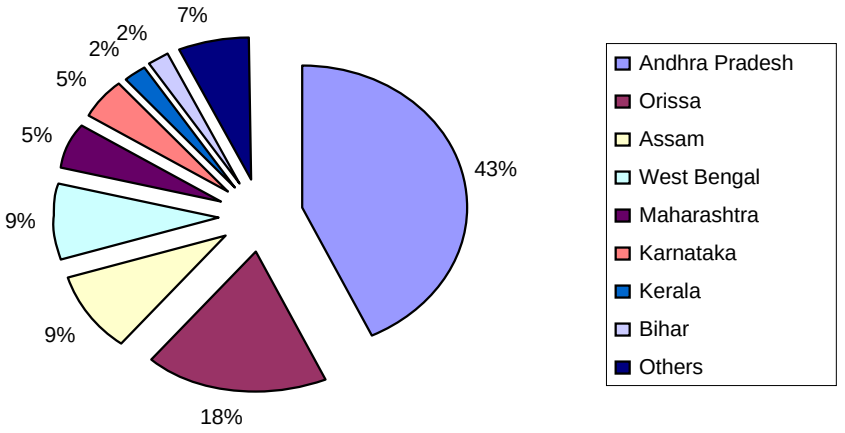
Figure 4: Trends in turmeric production in India



Source: Spices Board

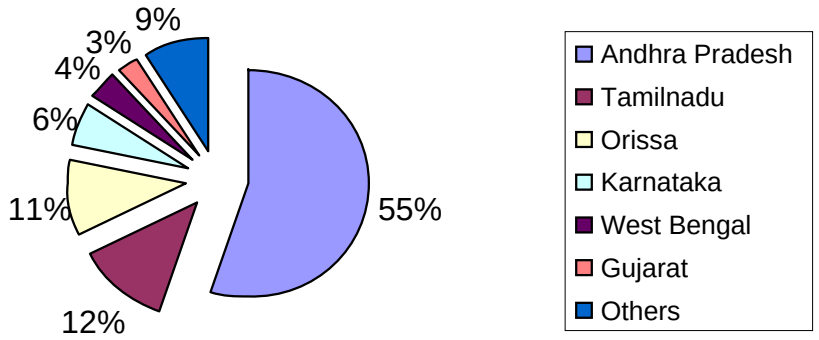
The production of turmeric is concentrated in the southern part of the country. The warm climatic conditions and consistent rainfall in those areas support the growth of turmeric and many other spices also. Important states which grow turmeric are Andhra Pradesh (56822 ha), Orissa (23640 ha), Tamil Nadu (1728 ha), West Bengal (11731 ha), Assam (12066 ha), Maharashtra (6644 ha) and Karnataka (6153 ha). Gujarat, Kerala, Bihar, Uttar Pradesh and North Eastern states are also growing turmeric.

Figure 5: Statewide production of Turmeric in India (Area in Ha) 2002-03



Andhra Pradesh ranks first in respect of production (283541 MT) and productivity (4989 kg/ha) followed by Tamil Nadu with the production of 64536 MT and productivity of 1268 kg/ha. Andhra Pradesh also dominates the area under production of turmeric. Orissa occupies 3rd position in turmeric production (11%) in the country.

Figure 6: Statewide production of Turmeric In Tones:2002-03



ODISHA

Table given below provides the details of area, production and productivity of turmeric in the country.

Table 4: Statewide area, production and productivity of turmeric (2002-03)

State	Area in Ha	Production in Tones	Productivity (kg/ha)
Andhra Pradesh	56822	283541	4989
Karnataka	6153	30147	926
Maharashtra	6644	8220	1237
Orissa	**23640**	**55970**	**2367**
Tamilnadu	1728	64536	1268
West Bengal	11731	21346	1891
Madhya Pradesh	556	542	974
Rajasthan	129	213	1651
Uttar Pradesh	1111	2032	1828
Gujarat	843	14688	17423
Assam	12066	8315	689
Bihar	2895	2873	992
Manipur	330	230	696
Mizoram	287	2785	9703
Meghalaya	1535	8675	5651
Tripura	1512	6600	4365
Arunachal Pradesh	514	1950	3793
Jammu & Kashmir	23	23	1000
Kerala	3140	693	2209
Nagaland	610	3050	5000
All India	147839	522674	3535

Source: Spices Board

TURMERIC EXPORTS FROM INDIA

The export of turmeric constitutes nearly 5% of the total spices export from the country. In 2006, the Turmeric export from the country was 51500MT. The export of Turmeric contributed to the tune of 164.3 Cr in total export earning during 2006. The major export destinations include UK, United States, Germany, Japan and Gulf countries.

Figure 7: Turmeric Exports From India: 2001-06

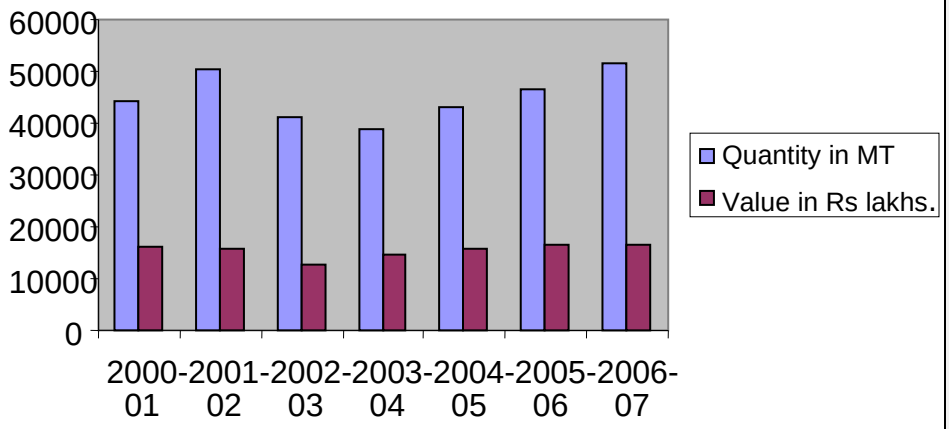


Figure 8: Share of various spices in export Earning: 2006

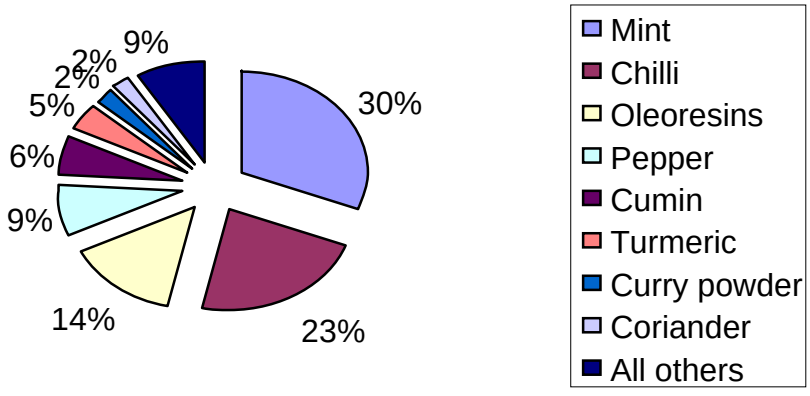
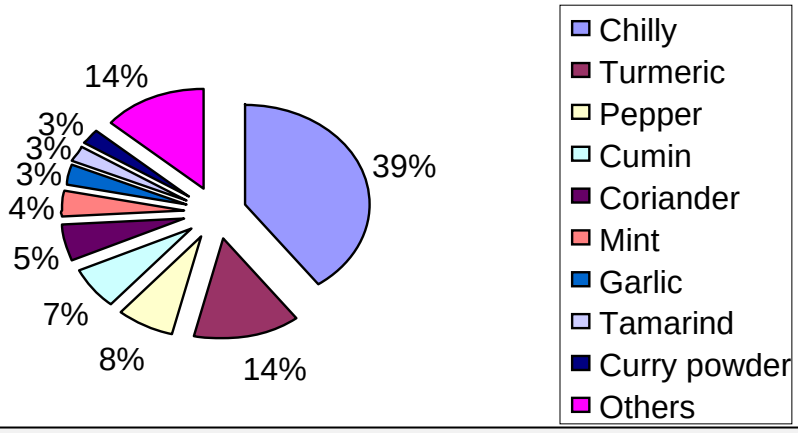


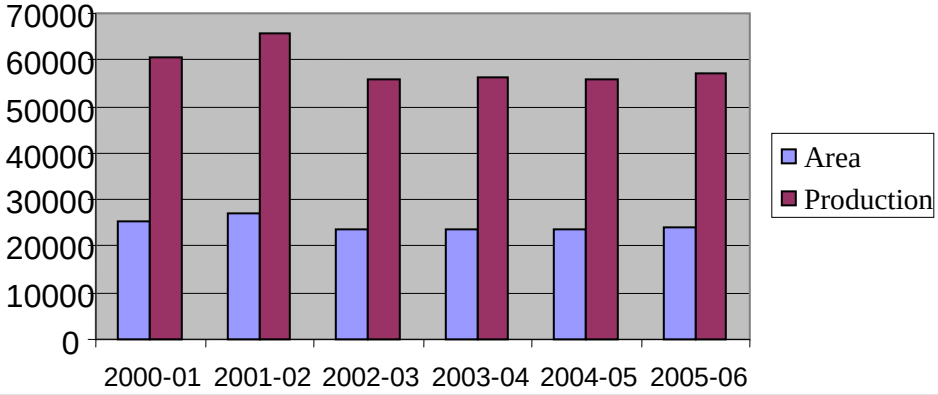
Figure 9: Share of Major spices in the export Basket, 2006



TURMERIC PRODUCTION IN ORISSA

Orissa contributes nearly 7% of the total turmeric production in the country. The total area under this crop is 24730 Ha with production of 59360 MT. The following figure provides the area under cultivation and production of turmeric in the state.

Figure 10: Area and Production of Turmeric in Orissa (Area in Ha and Production in Tones)



The productivity of the crop is very low in the state (2367 Kg/Ha) as compared to other major turmeric producing states in the country. The low productivity is due to primitive method of cultivation. However, the field experiments show that the productivity can be raised to 50 quintals per hectare from the current level of 10 quintal per hectare a with improved cultivation practice.

TURMERIC PROCESSING CLUSTER, KANDHAMAL CLUSTER DETAILS

KANDHAMAL district in Orissa, which is dominated by tribal people, is known for its turmeric cultivation. Kandhamal contribute nearly 46 % of the turmeric produced in Orissa. Turmeric is cultivated in nearly 11000 ha in this district with a total output of nearly 27790 MT. Kandhamal turmeric is known for its organic value, its colour, texture, flavour, aroma and long shelf life. Recently the golden yellow Kandhamal turmeric is creating a ripple in domestic as well as foreign markets including US, several European countries, UK, Germany, Netherlands and Japan.

Table 5: Turmeric production in Kandhamal: 2006

Turmeric production in Kandhamal:2006			
Particulars	Kandhamal	Orissa	% to total
Area in 000 Ha	10.9	27.79	44.08
Yield in Kg/Ha	2550	2400	0
Production in 000 MT	24.73	59.36	46.82

Source: Orissa Agriculture Statistics-2006-07

Spice Development Societies

There exist more than 60 Spice Development Societies operating in the district. The Spice Development Societies were organised during 1990s as part of the Employment Generation Programme implemented by the District Rural Development Agency (DRDA). The following table gives the details of Spice Development Societies in the district.

Table 6: Spice development societies in Kandhamal

Location	Number of Societies	Total Members
G. Udayagiri Block	10	1108
Phiringia Block	11	1181
Raikia Block	17	1486
K. Nuagan Block	6	995
Daringi Badia Block	20	494

Source: KASAM

Spice Development Societies are involved primary processing of Turmeric. The primary processing consists of cleaning, boiling and drying of raw turmeric. In 1995 an Apex society called Kandhamal Apex Spice Association for Marketing [KASAM] was registered to look after the organized marketing of spice products. Since its inception, KASAM is actively involved in organizing farmer groups, organizing training programmes for farmers on improved farming practices, awareness building on turmeric processing, setting up of processing yards and also facilitating entrepreneurship among the farmers. KASAM had set up a turmeric processing unit with capacity of one TPD with a capital investment of Rs. 30 lakhs. KASAM is also actively involved in finding out domestic as well as foreign market

for turmeric products. To its credit, KASAM was able to get Organic Certification for its products. At present KASAM is marketing its product in local as well as foreign market under the brand name KANDHAMAL ORGANIC PRODUCTS.

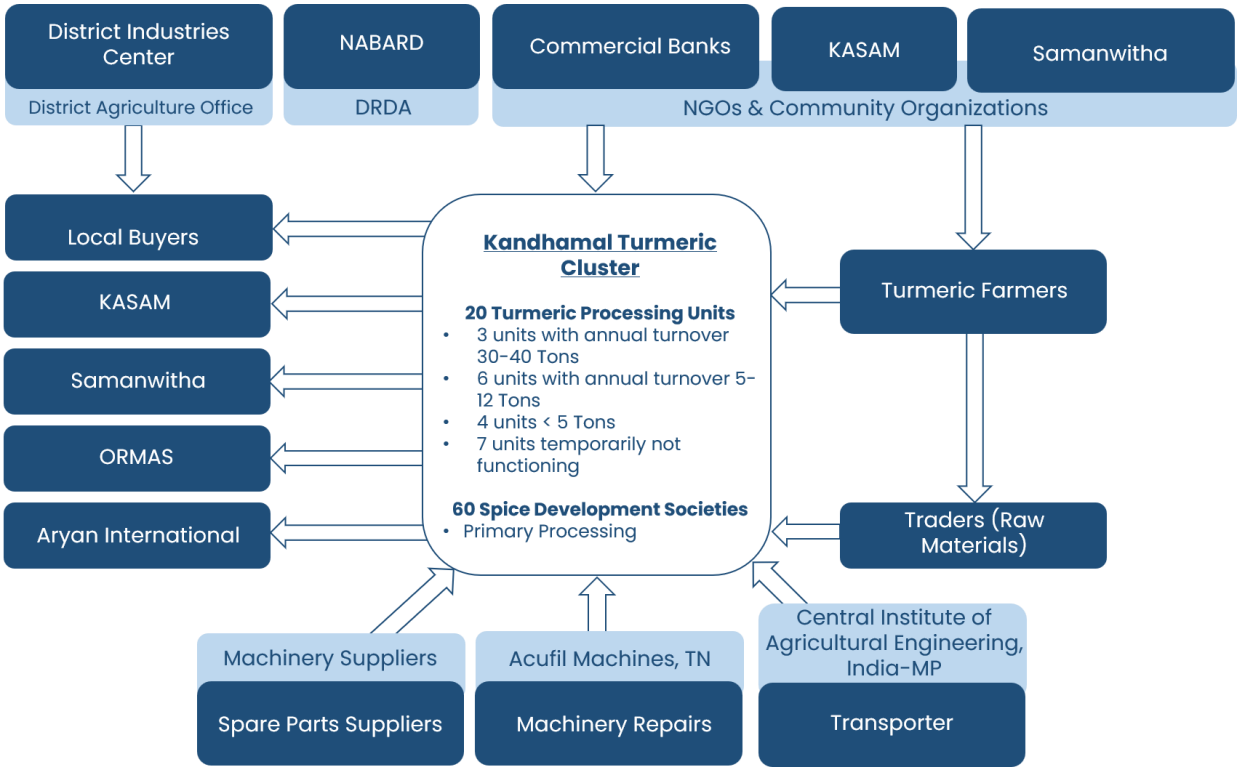
Turmeric Processing Units

In addition to the spice development societies, there exist 20 turmeric processing units registered under industries department. Out of the 20 units 13 are functional units and seven units temporarily closed their operation A brief profile of the turmeric processing unit in the district is given in the following table.

Sl. No	Name of the Unit	Location	Form of organization	Year of Establishment	No of persons employed	Major Products	Investment Rs.lakhs	Turnover In Tones
1	KASAM	Pulbhani	Society	1999	20	Turmeric powder Pulses,Honey,Arrow root	30.00	40
2.	----------	Daringapadi	Sole proprietorship	2001	3	Turmeric powder Rice flour	4.50	4
3	----------	Gumagada, Pulbhani	Sole proprietorship	2004	1	Turmeric powder	2.00	4
4.	Har Sakti	Panapadi, Baliguda	Sole proprietorship	2003	6	Turmeric powder	7.20	5
5	Maa Mangala	Titrapanga Pulbhani	Sole proprietorship	2007	3		2.00	2
6	Mukta Industries	Baliguda, Kandhamal	Sole proprietorship	2003	10	Turmeric powder	33.30	10
7	Ohm Bhabani	Baliguda	Sole proprietorship	2003	30	Turmeric powder	40.00	30
8	Jai Bhabani	Dadhibaman sahi,phulban i	Sole proprietorship	2006	5	Turmeric powder	4.50	3
9	Ruchika	Daringbadi Kandhamal	Sole proprietorship	1992	5	Turmeric powder Amala,Triphala	3.50	12.7 11.5
10	Charm	Khanjuripad a, Kandhamal	Sole proprietorship	2000	10	Turmeric	10.00	5 .0

11	----------	Daringabadi	Sole proprietorship	2001	2	Turmeric powder	1.50	1
12	----------	Baliguda, Pulbhani	Sole proprietorship	2002	2	Turmeric powder	3.50	8.0
13	Samanwitha	G.Udayagiri, Kandhamal	(Sole proprietorship)	2001	12	Turmeric powder Arrowroot, Amala	15.00	36

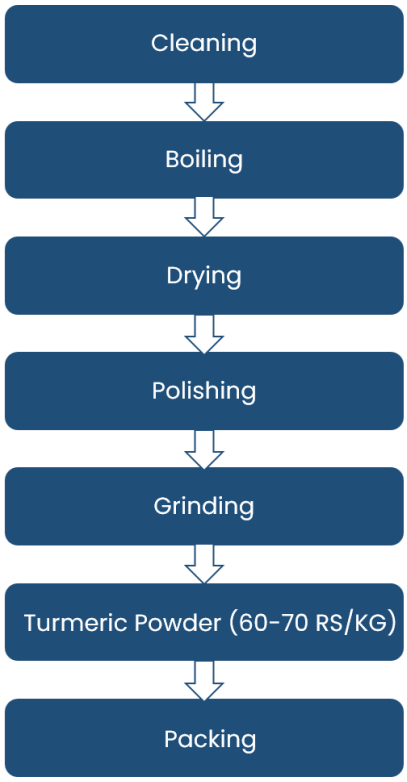
PRESENT MAP OF KANDHAMAL TURMERIC PROCESSING CLUSTER



ANALYSIS OF BUSINESS OPERATION
RAW MATERIALS

- KANDHAMAL district in Orissa, which is dominated by tribal people, is known for its turmeric cultivation. Turmeric is cultivated in nearly 11000 ha in this district
- The district produces nearly 27790 MT of raw turmeric per year. This translates into Nearly 10000 MT dried turmeric.
- Kandhamal is the hub of turmeric production in the state contributing nearly 40-50% of the total turmeric production in the state. The climatic condition in the region is most suitable for turmeric production.

- The present level of productivity of the crop is very low compared the other turmeric producing areas of the country. The curcumin content is also very low (2 3%) as compared to (3.5 to 5%) in other areas.



TURMERIC PROCESSING

- At present processing facility is available only for 10-15% of the total production of the turmeric in the district.
- Processing involves cleaning, boiling, drying, polishing and powdering
- There are 60 Spice Development Societies operating in the district. The Spice Development Societies are mainly involved in primary processing consisting of cleaning, boiling and drying.

Retail Price
Rs 80-90/KG

- The Spice Development Societies formed an Apex Society called Kandhamal Apex Spice Marketing association. Sine its inception, in 1995 the federation is involved in processing and marketing of turmeric in the district.
- There are 20 registered turmeric units registered with District Industries Center, Kandhamal. Out of this, 13 are operational now. These units are involved in grinding and powdering and packaging.

Technology, production process and capacity utilization

- The processing process involves cleaning, boiling, drying and grinding into powder. The primary processing are handled by farmers itself. The units procure the dried turmeric from the farmers as well as traders in the district.

- - Each processing units have their own machineries and equipments. The units of KASAM and SAMANWITHA has the installed capacity of 1 TPD. In the case of other units the installed capacity is very low.
- The capacity unitlisation of the units are very limited. In the case of KASAM and SAMANNWITHA the annual turnover ranges from 36-40 MT. In the case of other units the annual turnover is below 5 MT in a year.

CREDIT ISSUES

- All the processing units in the district have been set up with financial and subsidy assistance from banks
- The financing is available for only for meeting the cost of machinery and premises
- The units are facing difficulties for mobilizing working capital. Due to paucity of working capital, many of the units were not able to stock raw materials and operate at full capacity
- The entrepreneurs expresses difficulty for getting loan due to lack of security for the loan from banks

MARKETING ISSUES

- Traditionally the turmeric trading in Kandhamal is dominated by few traders from Berhampur and Rayagada, the adjoining districts. In general, the trading practice is exploitative. Traders used to purchase raw turmeric from farmers for meager amount. Traders used to lend money for the tribal farmers for cultivation and other purposes on the agreement that they have to sell the entire produce to the trader on previously agreed terms.
- The entire turmeric of the district is traded outside the district. Some of the traders have their own godown for keeping the stock.
- In most cases farmers are not allowed to harvest the crops. The traders themselves harvest the crop and adjust the price towards the loan amount due by farmers. This trading practice is followed for ages in this district and the farmers are not really benefited out of turmeric cultivation.
- Situation had started changing in recent years with the intervention of agencies like KSAM and Samanwitha entered in organised marketing of turmeric in the state. KASAM is a federation of turmeric processing units in the district with 60 spice development societies working under it. KASAM, being an apex federation, collect produce directly from farmers and process it in its own processing centers. Farmers have been educated on scientific method of processing of turmeric.
- For improving quality in processing, KASAM had established common drying yards in various locations for the use of farmer groups. It also provides boiling equipments and polethene sheets for the use of drying of turmeric and other products. Following the improved processing methods, farmers are able to get 30-40% increase in the price of their products.

- The products are marketed as Kandhamal Organic Turmeric Products within and outside the country. KASAM also markets its products through the retail outlets of ORMAS and OMFED within the state. KASAM is the only agency in the district which got organic certification for its products.
- Samanwitha, an NGO promoted by State Bank of India in 1978 is located in G. Udayagiri block of the Kandhamal district. Since its inception, Samanwitha is actively involving in organizing farmer groups, providing support facilities for the production and marketing of turmeric and other products. The farmer groups of Samanwitha run a turmeric processing unit. The products of Samanwitha are marketed through the retail networks of KVIC, ORMAS and OMFED.
- In 2003, OMFED had started a government sponsored project called Kandhamal's Women's Organic Turmeric Project (KWOTP). Under this project, societies were formed; training imparted and improved varieties of seed were distributed to farmers. Currently OMFED directly supervises 350 such societies. The products are being processed and packaged to be sold through OMFED's existing distributional channels.
- In addition to this, the Kandhamal turmeric is marketed by Aryan International [New Delhi], Samiter India [Mumbai], ABC International [Bangalore] and Aricha Trading [Calcutta].

INFRASTRUCTURE ISSUES

- All the units are accessed by road facilitating raw material supply and transport of finished products
- Lack of adequate post production infrastructure for value addition.
- Lack of drying yards
- Lack of hygienic cleaning and processing facilities
- Lack of storing, packing, curing and processing infrastructure
- Electricity is available in all units; but the quality of power supply is very weak. All the units are facing difficulties due to erratic power supply and low voltage.

PRESENSE OF SUPPORT INSTITUTIONS IN THE CLUSTER

Kandhamal Apex Spices Association for Marketing (KASAM)

KASAM is the apex society formed by sixty-one Spices Development Societies with more than 12,000 farmers as primary members. KASAM, is a Registered under Societies Registration Act, 1860 with the District Collector of Kandhamal as its President. KASAM operates as an organization for , purchasing, processing and marketing organic spices under the collective brand identity of KASAM in the market. It is currently working in 5 blocks of Kandhamal, namely, Phiringia, Raikia, G.Udaygiri, Daringbadi and K.Nuagaon. The organization has started marketing of organic spices in a big way under the brand name "Kandhamal". It has developed infrastructure for production and supply of value added spices.

Samanwitha

Samanwitha is an organization promoted by State Bank of India and is working since 1978 in G. Udayagiri block of the district. Since its inception it has done commendable work in empowerment of tribal population by organizing self-help groups, women thrift and credit groups and organising tribal people to undertake income generating activities. Core activity pursued at present is empowerment of tribal farmers through promotion of self help groups and provision of training. As on 2006, Samanwitha had organized around 540 women self-help groups in three blocks of Pulbhani district. In 1993, Samanwitha had set up a turmeric processing unit with an installed capacity of one tone per day. The products are marketed through distribution networks of OMFED and ORMAS.

District Industries Center

The District Industries Center is functioning since 1978, and is providing greater momentum to the industrialization in the district. DIC is actively involved in facilitating industrialization process through various government programmes and by facilitating registration of small medium and miroenterprises in the district. It also provide technical assistance in the preparation of business plan, linking the industrial units with the banks and providing entrepreneurship development programmes to the potential entrepreneurs of this district. This district has high potential for development of agro and food based industries like turmeric processing, spices grinding, black gram de-coating, packing, arrowroot processing, blackgram powder processing, etc.

NABARD

Nabard district office is functioning in the district since 1996. It directs the policy, planning and operational aspects in the field of credit for agriculture and integrated rural development .Besides the refinancing activity, it discharges the developmental functions such as co-ordinating the operations of rural credit institutions, ensuring institution building for improving the absorptive capacity of credit delivery system, developing expertise to deal with agriculture and rural problems, etc. The bank had a portfolio of credit and financial support. It includes credit to production purposes, development of MSMEs in farm and non-farm sectors, SHG Bank linkage programme.

Commercial Banks

The district has the presence of branches of three commercial banks namely State Bank of India, UCO Bank, and Allahabad Bank. A total of 31 branches of commercial banks are present in the district. Apart from this, branches of Orissa Sate Financial Corporation, seven branches of KAGB are also functioning. The presences of these financial institutions have a lead role in the industrialization and entrepreneurship development in this district.

District Agriculture Office

The District Agriculture Office is actively involved in increasing the area and productivity of various crops through the provision of improved variety of seed, introduction of field demonstration of various crops, training to farmers, provision of formation on scientific crop practices, post harvest handling of crops, provision of agriculture equipments at subsidized rates, and provision of extension services in the area of pest management etc. Recently the department is involved in the promotion of organic cultivation of spices like turmeric and ginger.

Spices Board

The regional office of Indian Spices Board situated in Koraput district has presence in the cluster. Spices board has providing assistance to farmers for using improved varieties of turmeric and also assisted in setting up of turmeric processing and packaging unit of Samanwitha.

District Rural Development Agency

District Rural Development Agency plays an important role in the implementation of various rural development schemes. It is the nodal agency for implementation of major rural development programmes like PMRY, SGSY, Pradhan Mantri Gram Sadak Yojana, Employment Guarantee Progamme, etc. DRDA works in co-ordination with district administration, PRIs, Community Based Organisation and NGOs. Recently DRDA have assisted a number of beneficiaries of SHGs through implementation of SGSY programme in the district.

NGOs and Community Based Organisations

The district has the presence of more than 35 NGOs working for the empowerment of tribal communities. These NGOs are involved in organizing tribal groups through SHGs, organizing awareness creation campaigns, facilitating entrepreneurship among tribal people, facilitating collection and marketing of tribal products in the district.

Traders

The turmeric trading in the district is controlled by few traders from Berhampur and Rayagada district. More than 90 % of the turmeric and spices are traded in outside the district.

SWOT ANALYSIS OF TURMERIC PROCESSING CLUSTER

Strengths:

- **Organic Production Potential**
  Since Tribal communities use traditional cultivation practices without the use of any fertilizer, the turmeric production in this region is organic in nature.
- **Resource availability**
  Kandhamal is the hub of turmeric production in the state contributing nearly 40-50% of the total turmeric production in the state. The climatic condition in the region is most suitable for turmeric production.
- **Farmer groups and existing social capital**
  In recent years efforts were made to organise farmer groups in the district. Nearly 60 farmer groups were organized by KASAM with a total membership of 12000 farmers. In addition to this, a number of farmer groups were organized by SAMANWITHA and ORMAS during past years.
- **Institutional networks and support facilities**
  The district has the presence of various institutional networks such as DRDA, DIC, District Agriculture Office, NABARD, Commercial banks, ITDA etc which together can contribute to the entrepreneurial development of the people in the district.
- **Quality Products**
  The quality of the products has been well accepted by the consumers within and outside the country.

Weaknesses

- **Low Productivity of the crop**
  The present level of productivity of the crop is very low compared the other turmeric producing areas of the country. The curcumin content is also very low (2-3%) a compared to (3.5 to 5%) in other areas.
- **Inadequate Processing Facilities**
  The processing facility available for turmeric is very limited. A lion share of turmeric is traded without any value addition. The district has no facilities for making value added products like oleoresin, curcumin extraction which have been highly valued in foreign market.
- **Lack of organized Trading**
  Turmeric trading in the district is monopolized by few traders. Trading practices are highly exploitative and the farmers are not receiving real price of the products. More than 90 % of the products are traded outside the district with out any value addition.

- **Weak infrastructure facilities**

  The district doesn't have the required infrastructure facilities such as good roads,uninterrupted power supply, and infrastructure facilities for storage, processing and value addition of turmeric products. Due to weak infrastructure facilities farmers are forced to sell the produce even below the prevailing market price. Due to lack of organized marketing facilities such as regulated markets or co-operative marketing ,the products are sold by using traditional marketing channel which is totally exploitative.

  - Lack of drying yards
  - Lack of hygienic cleaning and processing facilities
  - Lack of storing, packing, curing and processing infrastructure
  - Lack of adequate post production infrastructure for value addition

  Inadequate credit facilities

  Despite having the presence of 35 bank branches and other financial institutions networks the credit requirement of the entrepreneurs are not addressed properly.

Opportunities

- **Growing domestic demand**

  The domestic demand for turmeric is growing at the rate of 5-6% per annuam. The present level of supply is not adequate to meet the growing demand. Considering the growing demand in domestic and foreign markets there exists an assured market for the turmeric products from this district. Hence there is an assured demand in the domestic market.

- **Potential for increased price realization**

  Turmeric crop pricing in the international markets is very sensitive to the cur cumin (a coloring dye pigment) content in the turmeric rhizome. Higher the cur cumin contents higher the price. The present quality of turmeric grown in the district has very low curcumin content of 1.5% compared to varieties which have been developed in the state at High Altitude Research Centre, Pottangi (Orissa University of Agriculture technology) yielding over 5-5.5% cur cumin content. These varieties have successfully been tested in the field on a sustained basis (in a 700 Ha area under the development program of Innovative Jawahar Rozgar Yoga under the District Rural Development Agency). The domestic price of the turmeric depends on the international price movement. Since India is the largest producer of turmeric there is good opportunity for realizing high price in the international market.

- **Opportunities for Marketing**
  At present more than 90% of the turmeric is traded outside the district with out any value addition. Turmeric is traded through traditional marketing channel. The district doesn't have facilities such as regulated market, co- operative marketing etc of organized marketing .There exists opportunities for developing internal market for the turmeric within and outside the district.
- **Processing and Value addition**
  At present turmeric is traded with near zero value addition. The processing facility available in the district is very limited. Considering the resource availability and other factors there exists opportunities for setting up of large scale as well as small scale turmeric processing units such as turmeric powder making extraction of oleoresins etc in the district.

Threats

- Competition from other turmeric producing states
- Exploitative trade practices
- Threat from unregistered units

KEY ISSUES FACING THE CLUSTER

The various issues facing the cluster which have been identified during the participatory workshop are provided in following lines.

1. Low productivity of the crop
2. Low level of cur cumin content.
3. Lack of drying yards
4. Lack of hygienic cleaning and processing facilities
5. Lack of storing, packing, curing and processing infrastructure
6. Lack of adequate post production infrastructure for value addition
7. Inadequate credit facilities.
8. Shortage of power supply
9. Exploitative trading practices.
10. Under developed local market.
11. Low price realisation.
12. Lack of adequate social capital.
9. Inadequate market information
10. Lack of facilities for grading, standardization and quality control
11. Difficulties to market the products

CLUSTER VISION AND STRATEGY

- Increasing processing availability from the present level of 10-15% to 50 % of the total production of turmeric in the district within five years
- Increasing the capacity utilization of the existing units to the level of 60% to 70% within five years
- Developing post harvest processing facilities for curing, drying , storage, processing and packaging
- Marketing the products under the Brand name of Kandhamal Organic Turmeric Products within and outside the state territories
- Export of nearly 50 % of the products outside the country realizing higher value for products
- Establishment of large scale units for the manufacture of value added products like Oleoresins and Volatile oils

BROAD STRATEGIES

- Establishment of post harvest processing facilities for curing, drying, storage and processing
- Replacement of old machinery and installing new machineries of increased production capacity
- Facilitating credit linkage to financial institutions and help the members to get easy credit and subsidy assistance from government under various schemes
- Incalculating entrepreneurial spirit and business skills of existing entrepreneurs
- Improvement of technology and facilitating adoption of new technologies for curing, drying and processing
- Tailoring production to meet international standards and specifications
- Improvement of packaging and grading
- Organic certification for the products
- Setting up of units for production of value added products like Oleoresins, volatile oils etc
- Improving the raw material quality by encouraging farmers to cultivate high yielding variety with high curcumin content
- Promotion of an SPV for co-ordinating various activities for overall improvement of the cluster
- Creation of Common facility centers for procurement, storage, processing and packaging

CLUSTER ACTION PLAN

The turmeric processing cluster in Kandhamal has tremendous potential for growth in terms of value addition and exploration of markets. Based on the assessment of the strengths and issues facing the cluster the following action plan has been proposed for further development of the cluster in the district.

- Training on post harvest operation involving scientific curing, drying, and processing
- Organising awareness and training programmes on grading, standardization, and quality standards
- Organising exposure visits to similar clusters to understand best practices
- Facilitating credit linkage of the existing units
- Establishment of Market yards with facilities for storage of produce and trading of raw materials
- Establishment of Common Drying Yards for farmers' groups
- Provision of Boiler units for farmer groups
- Setting up of packaging units
- Organising and participating in trade-fairs and exhibitions
- Organizing buyer seller meets
- Facilitating export promotion
- Facilitating market information
- Facilitating quality certification
- Encouraging BDS providers in the cluster for facilitating the units to get certification under various agencies (ISO Certification, Organic Certification)
- Establishment of large scale units for manufacturing of value added products like oleoresins, volatile oils etc

IMPLEMENTATION

The proposed action plan may be considered for implementation within a period of three years. The implementation should focus on a convergent approach by bringing various support institutions like DIC, financial institutions, DRDA, NGOS, entrepreneurs, traders, equipment and machinery providers etc. The service of a cluster development agent is required to co-ordinate all the cluster activities. The cluster development agent should work on a regular basis with various cluster stakeholders during the implementation period.

CONCLUSION

The presence of existing turmeric processing units in the cluster reveal that turmeric processing is one of the enterprise activity the district. However the present units are very weak and facing issues of inadequate credit facilities, infrastructure facilities, lack or market information, lack of training etc. Considering the potential for the cluster, efforts should be initiated for strengthening the existing units and improving the basic infrastructure facilities in the cluster. Considering the resource potential of the district, there exists sufficient scope for development of micro and small enterprises in the district.

Appendix I
Workshop Photos

Annexure II

Cluster Diagnostic Workshop- Kandhamal

List of participants

SL. No	Name of the Participant	Organisation	Contact No
1	Pramod Chandra Pandey	General Manager, DIC Kandhamal	9437215011
2	P. K. Mohapatro	Assistant General Manager NABARD	9437074290
3	H. P. Pattanaik	Secretary KASAM Kandhamal	06842-253022/255206
3	Alagh Uma Mahesh	DSMS Pulbhani	9438440114
4	Abhay Kumar Sethy	Deputy Director Agriculture	0684253713
5	Bhirangi Narayan Sahoo	Charms	9437696447
6	Sisir Kumar Tripathy	LAMPS G. Udayagiri	9437649097
7	Sushanth Kumar Patnaik	Secretary AJSS Pulbhani	9437186204
8	Subash Chandra Sathpathy	Assistand Project Director Samanwitha	06847260048
9	Krupa Sindu Sahoo	LAMPS Pulbhani	
10	Girish Chandra katei	LAMPS Tikabali	9437921574
11	Arjuna	LAMPS	----
12	Subash Mohapatra	LAMPS	
13	Jayhar Mohanty	Har Sakthi	
14	Dhirendra kumar digal.	Ma Mangala	9437983948

15	Pramod Kumar Naik	Jai Bhabani	9853133786
16	Jeevan J Arakkal	CSREM	9437662055
17	Pradeep Kumar Singha	CSREM	9438115346
18	E. M. Reji	CSREM	9437957130

Appendix III

Name and Address of Units

Sl. No	Name of the Unit	Type of the Unit	Address	Contact Person
1	KASAM	Society	Pulbhani Kandhamal District	H. P. Patnaik
2	Samanwitha	Society	G. Udayagiri Kandhamal District	Project Director
3	Har Sakti	Sole proprietorship	Panapadi Baliguda Kandhamal District	Jayhar Mohanty
4	Maa Mangala	Sole proprietorship	Titraponga Pulbhani Kandhamal District	Dhirendra kumar digal. 9437983948
5	Mukta Industries	Sole proprietorship	Baliguda Kandhamal District	Jhunu kumari w/o Sudarsan 06846-239729
6	Om Bhabani Industries	Sole proprietorship	Baliguda Kandhamal	Namita rani panda w/o Sivsankar panda(owner) 06846-243942 9437112252
7	Jai Bhabani	Sole proprietorship	Dadhibamansahi Phulbani Kandhamal District	Pramod Kumar Naik 254297. 9853133786
8	Ruchika	Sole proprietorship	Daringbadi, Kandhamal District	Managing Director Kumar Sahoo
9	Charm	Sole proprietorship	Khanjuripada, Kandhamal District	Programme in charge

10	Manu Industries	Sole proprietorship	Baliguda Kandhamal District	Manu Digal
11	--	Sole proprietorship	Baliguda Kandhamal	---
12	--	Sole proprietorship	Dadhibamansahi Kandhamal District	---
13	--	Sole proprietorship		--

Appendix IV
List of Equipment suppliers

Dryers

Acufil Machines S. F. No. 120/2, Kalapatty Post Office
Coimbatore - 641 035
Tamil Nadu, India
Tel: +91 422 2666108/2669909
Fax: +91 422 2666255
Email: acufilmachines@yahoo.co.in
acufilmachines@hotmail.com
http://www.indiamart.com/acufilmachines/# products

Bombay Engineering Works
1 Navyug Industrial Estate
185 Tokersey Jivraj Road
Opposite Swan Mill, Sewree (W)
Mumbai 400015,
India
Tel: +91 22 24137094/24135959
Fax: +91 22 24135828
Email: bomeng@vsnl.com
http://www.bombayengg.com/contact.html

Planters Energy network (PEN)
No 5, Power House 3rd Street
N R T Nagar
Theni 625531
Tamil Nadu, India
Tel: +91 4546 255272
Fax: +91 4546 255271
Email: info@pen.net.in
http://www.pen.net.in/Contactus.asp
Email: Rank@poboxes.com

Slicing machines

Central Institute of Agricultural Engineering
Nabi Bagh
Berasia Road
Bhopal 462 038
Madhya Pradesh
India
Tel: +91 755 2737191
Fax: +91 755 2734016
director@ciae.res.in
http://www.ciae.nic.in/

Eastend Engineering Company
173/1 Gopal Lal Thakur Road
Calcutta 700 035
India
Tel: +91 33 25536937
Fax: +91 33 23355667
Gardners Corporation
158 Golf Links
New Delhi 110003
India
Tel: +91 11 3344287/3363640
Fax: +91 11 3717179

Cleaning/abrasive machines

Central Institute of Agricultural Engineering
India
Gardners Corporation
India (see above)

Premium Engineers Pvt Ltd
Plot No 2009, Phase IV, GIDC
Vatva, Ahmedabad 382445
India
Tel: +91 79 25830836
Fax: +91 79 25830965

Rank and Company
A-p6/3, Wazirpur Industrial Estate
Delhi – 110 052,
India
Tel: +91 11 7456101/ 27456102
Fax: +91 11 7234126/7433905

Narangs Corporation
P-25 Connaught Place
New Delhi 110 001
India
Tel: +91 11 2336 3547
Fax: +91 11 2374 6705

Milling and grinding machines
Central Institute of Agricultural Engineering
India (see above)
Gardners Corporation
India (see above)
Premium Engineers PVT Ltd
India (see above)
Rajan Universal Exports PVT Ltd
India (see above)

Packaging and labelling machines
Acufil Machines
India (See above)
Gardners Corporation
India (see above)
Gurdeep Packaging Machines
Harichand Mill compound
LBS Marg, Vikhroli
Mumbai 400 079
India
Tel: +91 22 2578 3521/577 5846/579
Fax: +91 22 2577 2846

Rajan Universal Exports
Post Bag no 250
162 Linghi Chetty Street
Chennai 600 001
India
Tel: +91 44 25341711/25340731/25340751
Fax: +91 44 25342323
rajeximp@vsnl.com
http://rajeximp.com/rajeximp/contact.html
MMM Buxabhoy & Co
140 Sarang Street
1st Floor, Near Crawford Market
Mumbai
India
Tel: +91 22 2344 2902
Fax: +91 22 2345 2532
Email: yusufs@vsnl.com; mmmb@vsnl.com;
yusuf@mmmb.in

Narangs Corporation
India (see above)
Orbit Equipments Pvt Ltd
175 - B, Plassy Lane

Bowenpally
Secunderabad - 500011,Andhra Pradesh
India
Tel: +91 40 32504222
Fax: +91 40 27742638
Website: http://www.orbitequipments.com
Pharmaco Machines
Unit No. 4,
S.No.25 A
Opp Savali Dhaba, Nr.Indo-Max
Nanded Phata, Off Sinhagad Rd.
Pune – 411041
India
Tel: +91 20 65706009
Fax: +91 20 24393377
Rank and Company
India (see above)
Banyong Engineering
94 Moo 4 Sukhaphibaon No 2 Rd
Industrial Estate Bangchan
Bankapi
Thailand
Tel: +66 2 5179215-9