



**Cluster Development Programme, India**

**DIAGNOSTIC STUDY**

**MSME**

**THE CASHEW AND FRUIT PROCESSING CLUSTER**

**SINDHUDURG DISTRICT, MAHARASHTRA**

**By UNIDO CDP, New Delhi**

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THEMATIC COOPERATION BETWEEN UNIDO AND SDC IN THE AREAS OF SME  
NETWORKING AND CLUSTER DEVELOPMENT 2002-2005**

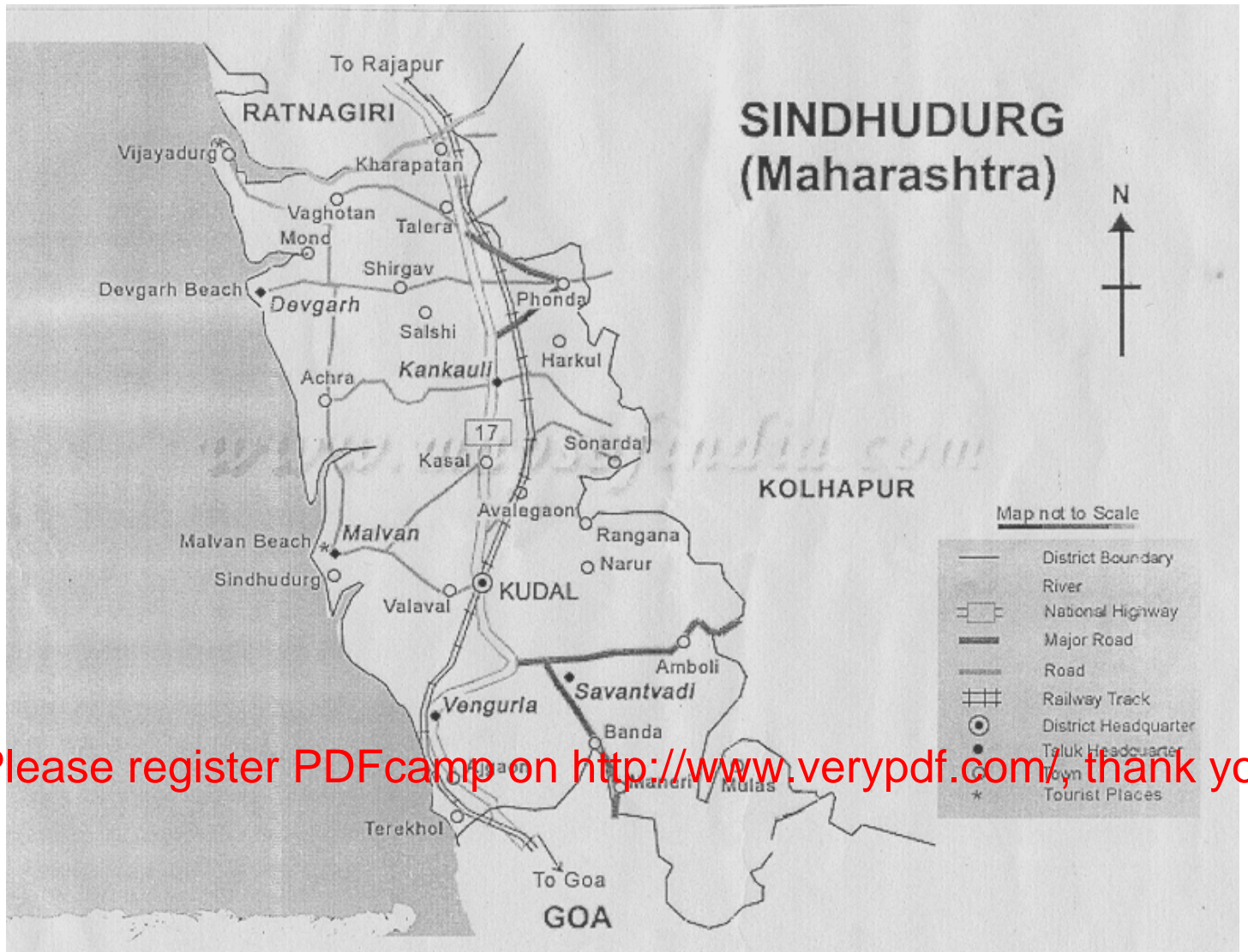
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## 1. Introduction

The State of Maharashtra is divided into seven areas<sup>1</sup>, which are themselves divided into several districts. Sindhudurg is one of the five districts under the Konkan division and is divided into six Talukas (Devgarh, Kankauli, Kudal, Vengurla, Sawantwadi, and Malwan).

Sindhudurg is the smallest district in the state, occupying only 1.65% of the total area of Maharashtra. The total population of the district is 862,000, 92% of which lives in the rural parts (710 villages). And 31% amongst them are considered to live below the poverty line.

The rural population in the district experiences difficulties such as under employment, unemployment, lack of access to income generating resources, fragmented land holding and problems such as common ownership and land inheritance disputes. In this context, farming has become an occupation for subsistence for a majority of farmers.

Agriculture is the main occupation for people in this district. The main crops grown are paddy (representing 90% of the crops grown and is mainly used for auto-consumption). The other predominant traditional economic activities are cashew, mango, coconut and other forest fruits plantations; cashew processing; and fishing related activities. In addition, fruit processing and agro-based industries, such as pickle and 'papad' making are also being taken-up on a large scale as new economic activities in the district.

## 2. National Scenario

The main commercial product from cashew fruit is the cashew kernel, which is obtained through factory processing (roasting/steaming, shelling and peeling) of cashew nuts. The cashew nut shell liquid (CSL) used for various industrial applications is a by-product obtained while processing cashew shells.

World over, the cashew nut market is highly concentrated, with India and Brazil providing almost half of total world production, along with Vietnam, Nigeria, Mozambique and Tanzania. These six countries contribute to more than 95 per cent of world production. India is the second biggest consumer of cashew kernels after USA, which accounts for 50 per cent of the global imports of cashew kernels. The price of cashew nut is characterised by unpredictably high fluctuations in the global production. The international price of cashew nut is fixed in New York and Rotterdam. The market of cashew nut grows at 10 per cent every year.

In India, cashew was first introduced in Goa, from where it slowly trickled down the Konkan coastline to Malabar and the rest of Kerala. It had spread to other parts of India only towards the last quarter of the 20th century. Around 650,000 H<sup>2</sup> of land is under cashew cultivation in India, with Maharashtra being the largest producer state, with 150,000 hectares dedicated to this plantation. It was as early as 1905 that Kochi started exporting cashew nuts to the USA.

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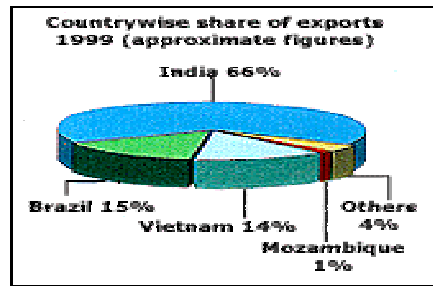
<sup>1</sup> Konkan, Nashik, Pune, Aurangabad, Amravati, Nagpur and Vidharbha

<sup>2</sup> 1 hectare = 10,000 square metric tones (sq MT). Note that one metric tone equals one tone.

In the 1920's, exports picked up and ever since then, Indian cashew nuts have become a favourite table nut in the USA. Slowly but consistently, this trend has spilled over to other markets. Today, the quality of Indian cashew nuts is recognised as a global benchmark.

India has maintained its position as the world's largest producer of raw nuts, processor and exporter of cashew kernels, accounting for over 66% of the world cashew trade in 1999 (see chart 1 below). The USA is the largest buyer of cashew kernels from India, followed by the EU, Japan, Australia, Canada, Russia, Hong Kong, Singapore and the Middle East<sup>3</sup>.

**Chart 1: World share of exports in 1999**



Source: unknown

During the past two decades, an important number of cashew processing units have sprung up in India. At present, about 1000 units exist in the country. The total processing capacity of these units is one million MT<sup>4</sup>. However, the industry is not able to utilise its installed capacity fully, due to a shortage of raw nuts. At present the industry imports raw nuts from other cashew producing countries. During the year 2000, 450,000 MT of raw nuts were imported in India.

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Today, this highly labour intensive industry employs more than 400,000 persons, out of which 90% are women.

**Table 1: Production in India**

Year	Cashew Kernels		Cashew Nut Shell Liquid (CNSL)	
	QTY (MT)	Value (Rs. Crores <sup>5</sup> )	QTY (MT)	Value (RS. Crores)
1997-98	76,593	1,396.10	4,446	7.17
1998-99	77,076	1,630.10	1,912	4.21
1999-2000	96,805	2,569.50	1,930	3.74
2000-01	89,155	2,409.60	2,246	3.89
2001-02	97,550	1,776.70	1,814	4.91

Source: D.G.C.I & S, Calcutta

<sup>3</sup> More than 51 per cent of the total quantity of cashew kernels exported from India during 2001-02 were to the American Zone. Europe accounted for 31%, South East & Far East Asia 7% and West Asia for 8%.

<sup>4</sup> Equivalent to an output of kernels of 250,000 MT, since the recovery rate is 25%

<sup>5</sup> 1 crores = 10 millions

### 3. Evolution of Sindhudurg

Cashew processing being a seasonal industry, raw cashew nuts are available in Sindhudurg for 3-5 months in a year (beginning December with March/April being the peak period). During the off-season, processing units process imported raw cashew that comes via traders from African countries or Indonesia.

At present 92% of plantations are of young age<sup>6</sup>. Industry sources estimate the production of cashews at 40,000 tons per annum, of which 12,000 tons are processed within Maharashtra and the balance is sold to processors in Kerala and Karnataka. But the estimate by the Agriculture department shows more than one lakh tons. On an average, it is reported that 30% of the production is consumed by the local industry.

#### *The past*

With an area covering about 5,000 square kilometres contained in 9 talukas, the region abounds in horticultural produce mainly mangoes, cashew, kokum, amla (the Indian gooseberry) and jamun. The history of Cashew processing units in Sindhudurg is almost a century old, while the other processed food units are a relatively recent phenomenon.

The first cashew-processing unit came up in 1920 in Vengurla and subsequently spread to other areas of the district. Two more units followed in 1928 and 1929. The fourth unit came up in 1953. These units were exporting cashew kernel from the Vengurla port, through Portuguese traders to the USA.

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In the beginning cashew processing was profitable as export markets were fetching good prices. But since the raw material was available only for a limited period in a year the processing units required huge working capital to procure and stock raw cashew nuts. In 1940, the oldest unit suffered a major financial loss due to the fluctuation in procurement price of cashew nut and its effect on final price, a phenomenon, which is still common today. The establishment of a Cashew Corporation, made available imported cashew at a much lower price and regulated exports.

This measure wiped out the export market for the units of Sindhudurg. Dreading to take the risk of losses in buying cashew from foreign sources which, in many cases were below standard, these units confined themselves to the local market.

While on one hand, the growth of the local market in Mumbai allowed a steady growth in the number of cashew units in Sindhudurg, on the other, the high birth rate that at one point of time led to 110 SSIs in the district, was closely followed by a high death rate, especially for the new units. Paucity of working capital, the emergence of big processing units in Kerala and Mangalore (Karnataka) with appreciable working capital facilities and price fluctuations

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<sup>6</sup> Old plantations are characterized by low and declining productivity; or established with less genetically performing variety seeds or plants. New or recent plantations on the other hand, are characterized by high productivity, or established with good genetically performing seeds or plant.

adversely affected the SSIs in the district and many units had to close down. In fact, the units that followed a high risk-high profit model perished faster.

In the early 1970's, the Government of Maharashtra introduced the minimum wage laws for the cashew nut processing workers. This led to a proactive discussion among the manufacturers and led to the creation of the Konkani Cashew Manufacturers and Exporters Association (KCMEA) in 1973. The association is mainly into policy advocacy.

During the late 1970's and early 1980's, the labour disturbances in the textile mills in Mumbai led to huge number of closures. The remittances received from family members living in Mumbai city had been a constant source of income for most families in Sindhudurg<sup>7</sup>. These money orders virtually stopped and brought a lot of uncertainty in the region. Local people started to reflect and discuss on how to create more employment, based on the existing natural resources. They were in need of employment not only for the villagers but also for those coming back from the cities where they had migrated.

These discussions contributed to inputs and some socially active people in cooperation with some SSI units and a local NGO, Dr. Hegdewar Sewa Prakash (HSP) designed small-scale boilers that were suitable for micro/household cashew processing units.

On the technology front, the processing technique was primitive to start with. For e.g. the cashew shells were cooked in fire on ground, before being taken out for shelling. But soon, in the late 1930's, the pan roasting technology replaced this system. Since the USA imported considerable amounts of cashew from India via Mumbai and Karachi, an American company called the Vita Pack Corporation introduced a new packaging technique, i.e. packaging in cases, to decrease breakage during transportation.

After a visit to Mangalore, two forward-looking entrepreneurs introduced a superior technology in the cluster called the 'boiler roasting technique'. During the early 1980's, another proactive entrepreneur introduced electrical driers from Mumbai. Both technologies are still prevalent in the cluster.

#### *Recent Developments*

In the recent past, Maharashtra has witnessed a surge in cashew production and it ranks first in its production and productivity in India. It offers a huge natural resource base for establishing and expanding the cashew processing industry.

The State Government has taken active steps for the growth of micro units and SHGs in the sector. This has led to the creation of a large number of micro cashew processing units. The most recent development in this area is related to the "Employment Guarantee Scheme" that was launched in 1990-91 by the State Government under a horticulture development

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<sup>7</sup> A "Money Order Economy" characterises the Konkani region. This refers to the migration that, for many years, has taken place towards Mumbai and Pune. In all families, one or two members have migrated in order to find employment in the city, especially in the textile sector. Those left back in the villages depended for a long time (and

programme. Wastelands and fallow lands that are capable of being cultivated, are being developed with crops like cashew, mango, coconut, kokam, jamun, jackfruit, sapota and spices. 63% of the additional area brought in 2001-02 for cultivation has been sown with cashew.

In November 2002, the Agriculture Department, with the help of NABARD and the NGO Gopuri Ashram has applied the scheme of subsidies for planting and expansion of the acreage to cashew cultivation, and assistance for the purchase of processing machinery and interest subsidy to the cashew industry in Sindhudurg. These come under the Cluster Development Programme of the National Programme for Rural Industrialisation (NPRI). Numerous cashew processing units have been established and value added products are also being produced. Additionally, training in production and processing technologies have been made available to the farmers and processors.

Although most small/marginal farmers continue to cultivate paddy for domestic consumption, there is a growing tendency among them to grow horticultural crops due to the attractive incentives. These incentives attract people, who had migrated to Mumbai and Pune in search of better standard of living. Having accumulated savings away from home and having an historical link with the cashew industry, they return looking for new opportunities in the district.

As a result of these trends in the last 2 years, there has been a substantial expansion in the area of horticulture in the state, and many farming/processing units have emerged. A good number of former framers have been given the opportunity to process their production and thus have become micro-entrepreneurs. Some families that have no land at all, have also started the

cashew processing by buying raw nuts from the local market.

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may still depend) on the money sent by their family members in Mumbai/Pune through "Money Orders" for their maintenance

#### 4. Cluster Profile

##### *Cashew Processing Units*

- **SSIs:** There are 30 SSI cashew-manufacturing units in the cluster, with an annual turnover of Rs. 250 million. They function during 10 months i.e. from March to December and it is estimated that they employ around 1500 persons, mostly women. Their processing capacities is as given under (Table 2).

**Table 2: Processing capacity of SSIs**

No. of bags processed per day (1 bag = 80 kg)	No. of firms
More than 30 bags	2
20 to 30	2
10 to 20	13
Below 10	13
<b>Total number of SSIs</b>	<b>30</b>

- **MEs:** The processing capacity of the cashew processing MEs ranges from 1 to 3 MT and operates for 3-4 months i.e. from March to June. It is estimated that there are around 200 functional micro cashew-processing units with a total annual turnover of Rs 5 to 6 million.

##### *Other fruit processing units*

- **MEs:** Other food products include kokum syrup, mango pulp, amla squash. Most of the existing 44 units have FPO (Food Products Order) licenses with installed capacity of less than 50 MT per annum. Their total turnover is estimated at Rs. 60 million.

- **SHGs:** Around 100 SHGs manufacture cashew apple syrup, chutney, spices, papad, kulith pethi, kokum agal, chikki, kulith pethi and other ethnic foods such as snacks. Their estimated turnover is around Rs.2.5 million (USD 56000).

The fruits and the range of products that are processed in the cluster are given in table 3. The Taluka wise distribution of cashew and fruit processing units are given in table 4.

**Table 3: Major Products of the Cluster**

Fruit	Products
Mango	Pulp (canned or bottled), jam, squash, pickles, papad
Kokum	Syrup, Fat
Jamun	Juice, seed powder
Amla	Squash, supari, peta
Pineapple	Jam, squash
Cashew	Cashew kernels, cashew nut shell liquid, cashew apple syrup
Jackfruit	Jackfruit papad

**Table 4: Taluka wise distribution of Units**

<b>Talukas</b>	<b>Cashew processing units</b>		<b>Other fruit processing units</b>	
	<b>SSI</b>	<b>ME</b>	<b>ME</b>	<b>SHGs</b>
<b>Kudal</b>	3	58	8	No break up is available at the moment. A mapping of SHGs in the region is undertaken by UNIDO.
<b>Sawantwadi</b>	4	55	13	
<b>Vengurla</b>	12	51	8	
<b>Malvan</b>	8	48	4	
<b>Sub-total</b>	27	212	33	
<b>Other talukas</b>	3	101	11	
<b>Total</b>	<b>30</b>	<b>313</b>	<b>44</b>	<b>100</b>

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## 5. Cluster Stakeholders

The principal cluster stakeholders are the producers, SSI cashew processing units, ME cashew and other fruit processing units, SHGs and of course, the traders.

### *Processing Units*

In addition to the information provided above, it can be said that SSI units employ wage labourers (an average number of 40-50).

MEs mainly use family labour but often also employ outside wage labourers (one or two maximum and generally women). Their processing units are mostly located in a room adjacent to their house and remain closed during the off-season.

The SHG units use their own labour only with most of them having around 10 members from a same village. They are formed to create income-generating activities and generally start by the collection of savings that correspond to the seed investment to start the identified activity (here cashew/fruit processing). Generally, the production facility of an SHG is housed at the residence of a member.

### *Producers*

There are 100,000 farmers in the district and 70,000 are said to be involved in cashew cultivation. Each village has one or two big farmers and the rest are small and marginal farmers i.e. with a maximum land holding of not more than 2 Ha. Small and marginal farmers have between 10 to 100 trees, while the biggest farmer has around 1,000 trees. However, it has to be pointed out that every household has a few cashew or other fruit trees such as kokum, mango and/or jamun.

Most of the farmers undertake processing as well or in other words, most of MEs are cultivators. They all have a diversified production of mango, cashew or forest based products. Most of the landholdings are small and 70% of the farmers tend to be small or marginal farmers. Taluka wise area and estimated production is given in table 5.

Small and marginal farmers use family labour, while big ones generally have additional sources of income, such as a nursery, and employ permanent staff as well as daily wage labourers.

To sell the raw material, small and marginal farmers at times approach a processor directly, especially during the Ganesh festival. But usually they sell their cashew nuts to local petty traders. Bigger farmers directly sell to the main traders.

**Table 5: Taluka wise Area and Estimated Production at Sindhudurg**

<b>Taluka</b>	<b>Total cropped area (Ha)</b>	<b>Productive area (Ha)</b>	<b>Production (MT)</b>
<b>Sawantwadi</b>	9576	7578	10609
<b>Vengurle</b>	2206	2802	4049
<b>Kudal</b>	6932	2338	3273
<b>Malvan</b>	5643	2931	4103
<b>Kankavalli</b>	7558	3197	4476
<b>Deogad</b>	2103	687	962
<b>Vaibhavadi</b>	2772	150	210
<b>Total</b>	<b>36790</b>	<b>19683</b>	<b>27682*</b>

#### *Traders*

It is estimated that there are at least 1500 petty traders and 5 big traders dealing in cashew nuts in Sindhudurg. Petty traders bulk the produce of small and marginal farmers and sell it to one of the existing main traders, normally maintaining a loyalty towards one. The big traders, in turn sell the major part to Mangalore at a commission of Rs.1 per Kg. They also stock some of them and when in demand, sell it to the processors of Sindhudurg.

Each SSI cashew unit has its own agent to procure raw material on its behalf. MEs procure raw material through local traders or directly from villagers. They do not have agents.

The ME fruit processing units procure mainly from the farmers and at times through traders. The SHG units generally work with their own cashew/fruits, however they also gather the primary raw material at village level.

#### *Machinery and Packaging Suppliers*

There are three machinery suppliers and 1 packaging unit in the cluster. Machinery and packaging material are sourced from outside the cluster. There are about 10 MEs and two SSI units manufacturing CNSL and one involved in tannin extraction.

## 6. Institutional Set-up

**NABARD** has a district level office headed by District Development Manager (DDM). It has schemes like REDP (Rural Entrepreneurship Development Programme) and Common Service Centres to support various promotional interventions in the Rural non-farm sector, which includes fruit and cashew processing. NABARD also supports common marketing/training/workshop related initiatives. It is playing a key role in promoting and strengthening SHGs in the district through NGOs and in financing local banks for extending credit to MEs.

Since March 2001, NABARD is implementing a Cluster Development Programme (CDP) for the cashew sector through an NGO, Gopuri Ashram. This project is covered under the District Rural Industries Project (DRIP). The programme aims towards creating employment opportunities through enhanced credit flow. A Pune based NGO, Bharatiya Agro Industries Foundation (BAIF) strengthens Gopuri Ashram in implementing the CDP.

The **Sindhudurg District Central Cooperative Bank** provides short-term credit to the farmers. The bank has been actively involved in promoting SHGs in the district. The bank has promoted 463 SHGs so far, of which 40 are into fruit processing. It has one officer who exclusively attends to SHG work. It has recently created a society of 99 SHGs, with share capital of Rs.27000. The bank has also financed the cashew micro enterprises promoted by Gopuri Ashram. Some good Primary Agricultural Cooperative Societies (PACS) are affiliated to this bank. For instance, there is one society at Talwade (Sawantawadi block), which has promoted 40 SHGs, with membership of 380 members and a pooled contribution of Rs. 425 lakhs. The society is also providing infrastructure for development of training facilities for SHGs.

The **Ratnagiri Sindhudurg Gramin Bank** is a rural bank. SHG promotion is one of their key development activities. At present, it is financing cashew micro-enterprises as “Small business Strategy”. It also lays thrust on poverty alleviation and women empowerment. It has financed micro cashew processing units, which came up thanks to NABARD’s CDP initiatives. It has been recognized as a Self-Help promoting institution by NABARD for promoting linkages of SHGs.

**Commercial Banks**, such as Bank of India, Union Bank of India, Syndicate bank and Saraswati bank (Urban Cooperative bank) are the major banks providing working capital loans to the cashew processing units. Banks sanction mainly through two instruments, the hypothecation limit and the pledge limit<sup>8</sup>.

Credit lending institutions face the problem of obtaining “adequate” margins from the SSIs, and collaterals from the MEs as well proper storage godowns for pledging cashew nuts.

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<sup>8</sup> While the former one is an open book limit, through which goods are hypothecated to the bank but ownership remains to the borrower, the latter is operated through a “lock and key” system (see section credit support in chapter 7.1.2 for further detail), with which the bank physically takes possession of the goods pledged.

The **Department of Agriculture (DoA)** is a key player in promoting cashew cultivation, and supporting cashew MEs in the district. The department is providing subsidy to farmers for cultivation of cashew under their Employment Guarantee Scheme since 1990-91. Subsequently, it has drawn a subsidy-linked scheme to farmers for establishing micro enterprise at their homes. It supported Gopuri Ashram to implement NABARD CDP. It has schemes for promoting organic cashew cultivation in the district and is taking a keen interest for strengthening the cashew MEs through their taluka level agricultural officers.

The **District Rural Development Agency (DRDA)** is promoting SHGs of below poverty line in the district. The measure of poverty is expressed in terms of; annual income of the family being below Rs.10,000; or ownership of land smaller than 5 acres; neither owing a Pucca house, T.V, fan, light petroleum gas, two wheeler vehicle, tractor etc. It has formed 197 BPL SHGs in the district, of which it is estimated that 26 are into fruit processing/food business, for which it has created the "SINDHU" brand. It also supports the training programmes for BPL people and participation in trade fairs.

The **District Industries Centre (DIC)** is headquartered at Oros. Its main function is to register the prospective units as SSI units and to sponsor the application to financing banks under Prime Minister Rojgar Yojana (PMRY). It assists the new enterprises with subsidies, according to the criteria of the location of the unit. DIC also provides information to associations on trade fairs. All the talukas in Sindhudurg district have been classified as backward talukas by DIC. They are all eligible to receive financial incentives e.g. subsidies.

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The **Food Drug Administration (FDA)** is based at Oros. Its main function is to administer the Prevention of Food Adulteration Act (1954) and to check food samples. All the units, other than those registered under Food Products Order (FPO), have to be registered with them. FDA also occasionally appraises the processors on amendments to food laws.

The **Khadi Village Industries Board (KVIB)** has a scheme called as Margin Money Assistance scheme for individuals and societies. Cashew and food processing units are eligible for availing this scheme. An important benefit of this is that the units registered with the KVIB get sales tax exemption. Every year, they sanction 40-50 proposals for various purposes. Some cashew and food processing units, both MEs and SSIs have already availed of this subsidy.

The **Krishi Vigyan Kendra (KVK)** is based at Kirlos; Malvan taluka. It is managed by an NGO named Sindhudurg Zillaha Krishi Pratishthan, and is funded by the Indian Council of Agricultural Research (ICAR). Its main activities are training of farmers, providing vocational training, on-farm research and front-line demonstrations. It has formed 20 SHGs (10 BPL and 10 non-BPL) and plans to upgrade them for intensive training on fruit processing. It has necessary technical manpower for conducting technical training programmes.

**Dr. Hedgewar Seva Smuti Prakalp (HSP)** came into being in 1985 as an NGO. It is based at Mangaon, Taluka Kudal and its main objective is agricultural development and developing processing industries in rural areas. Since 1992, it conducts training programmes in cashew and

fruit processing (Kokum, mango, jamun) and has so far trained over 1500 prospective entrepreneurs. It has also pioneered in designing of boilers and dryers for micro enterprises, which led to the establishment of many micro enterprises of cashew processing. It has FPO registration for its fruit training centre. The products made by the trainees are sold to a major Kokum and Jamun processor at Ratnagiri district, who has good market linkages. His linkages are so well developed that some of the fruit processors sell their products to HSP, who in turn sell them to the large processors. Besides the regular training programmes, the centre is contemplating to develop SHGs in a radius of 10-15 km from the NGO. HSP has a qualified food technologist and the centre is planning to upgrade their services so that it can cater to the problems of existing fruit and cashew processors.

The **Jan Shikshan Sanstha** (JSS) is an NGO supported by the Human Resources Development Ministry, Government of India. It is based at Kudal and its main objective is to provide vocational training programmes to the illiterates, neo-literate, drop out students, weaker sections, SC/ST, OBCs, and physically challenged persons. JSS has identified fruit processing as its thrust area for its training programmes. It is currently surveying the training needs in each taluka. Its outreach and impact can be further enhanced with the services of technical expert in fruit processing, who can help them in designing appropriate curriculum for training programmes and manuals for fruit processing. It has allocated a budget of Rs.800,000 for training programmes for the current year (2003-04).

**Gopuri Ashram** (GA) is an NGO registered with Khadi Villages Industries Board. Late Shri Appasaheb Patwarchan, known as the Konkan Gandhi established the Gopuri Ashram in Kankavali. It is currently implementing the CDP of NABARD in 5 talukas viz: Malvan, Kankavali, Kudal, Deogad, and Vaibhavwadi. The main objective of this CDP is to promote MEs of cashew processors run by the cultivators, which will provide gainful employment to the womenfolk at their place of residence. Around 61 micro processing units have become members of the GA. Each member pays Rs 500 as membership. In turn they become eligible for sourcing cashew. The members take the cashew home, process and give it to GA for marketing. GA markets it under the brand 'GOPURI'. GA has conducted a number of training programmes and continues to do so. These were partly subsidized programmes. NABARD has roped in BAIF, Pune to act as a resource agency for GA. BAIF is entrusted with the responsibility of capacity building of GA and its members. NABARD has sanctioned a revolving fund to GA through BAIF for purchase of raw cashew for distribution to the members.

**Lupin Welfare and Research Foundation** (LWRF) is a trust created by the Lupin Pharmaceuticals Company, Mumbai. Its principal objective is to empower the poorest of the poor in rural areas. It is teamed up with Manav Sadan Vikas Samstha (an NGO) and its main work in the district has been SHG formation in non-farm activities, their promotion and their development. It has so far created 500 SHGs in the whole Rajapur constituency. The agency is focussing in the talukas of Dodamarg, Sawntawadi, Deogad and Rajapur in the Ratnagiri district. The LWRF has the potential to involve SHGs in fruit processing.

The **Regional Fruit Research Station** (RFRS) is affiliated to the Research Institution Dr. Balasaheb Sawant Krishi Vidyapeeth, Dapoli, Ratnagiri district. It has developed a number of cashew varieties, of which Vengurla 4 and Vengurla 7 are the most important ones accepted by the farmers. Its main source of income is through sale of planting material (nursery). RFRS is also conducting training programmes for processing of cashew, kokum and jamun, sponsored by DRDA. It is also one of the centres for All India Coordinated Research project for Cashew and Mango. It disseminates the information on packaging practices (especially for mango and cashew) to the farmers and officials of the Department of Agriculture.

The **Konkan Cashew Manufactures and Exporters Association** (KCMEA) was formed in 1973 primarily for addressing the labour related issues. It has a membership of about 30 firms but has not gone for an office or a secretariat. As previously mentioned, it is mainly engaged in policy advocacy.

**Ion Exchange Environ Farms Pvt. Ltd's** registered office is located in Pune. It is mainly into promotion of organic cultivation of banana, cashew and other cereal based crops and promotes organic cultivation in the Sindhudurg district. It buys processed cashew and organic mango directly from farmers, societies, Gopuri Ashram and Dr.Hedgewar Seva Prakalp.

**Others:** The district has few other NGOs that are working in health related areas. These are Manav Sadan Vikas Samstha (MSVS), Mauli Mahila Mandal - Shiroda, Taluka Vengurla, Foundation for Health, Educational and Cultural activities- Banda and Naryana ashram -Koloshi. Other support institutions include the Cashew Export Promotion Council at Kochi, Central Food Technology Research Institute (CFTRI), Medicinal Plant Board etc. The Ministry of Food Processing Industries will be an important support institution for the cluster.

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## 7. Analysis of Business Operations

### 7. 1 Analysis of Business Operations: Cashew Nut Processing

#### 7.1.1 Backward Linkages

##### *Plantations*

For cultivators in the district, cashew nut is the preferred crop as it is easy to grow<sup>9</sup> and has a readymade market for immediate sale. However, unlike Mango there are no block plantations of cashew in the district. Almost all the farmers have a few plants of a cashew in their backyards. There are certain pockets, which are physically isolated, where hardly any fertilizers or pesticides are used. These areas are the major source of organic cashew in India and could be converted into organic cultivation sites.

Since 1990, the cashew plantations got impetus with the advent of the Employment Guarantee Scheme (EGS) under the Horticulture Development Programme<sup>10</sup>, that resulted in the expansion of area under cashew cultivation from 13,953 Ha in 1990-91 to 36,790 Ha in 1997-98 (2.5 times additional area in 6 years).

##### *Ownership and Patterns of Land use*

As previously mentioned, most of the landholdings are small and 70% of the farmers tend to be small or marginal. There are only between 25-40 plantations in the district. The remaining land is split into small family landholdings and therefore the owners are small producers. There is indeed a predominance of small and marginal farmers: 61.6 % of land holdings are smaller than 1 Ha; 14.8 % are between 1 and 2 Ha; 12.5% between 2 and 4 Ha; and 11.1% above 4 Ha. But the land owned by the marginal farmers is only 11% of the total land area.

Even families with no landholding at all have an access to some trees. For e.g. a landless women SHG processes the cashew nuts collected from trees on hills belonging to a local temple taken on lease.

##### *Yield and Forecasting*

As previously mentioned, small and marginal farmers have between 10 to 100 trees, while the biggest farmer has around 1000 trees. The yield varies with the age of the plantation and the variety of tree. For instance, the Vengurla 4 variety gives a yield of 4 to 5 Kg per plant during the fourth year and gradually goes up to 7 to 8 Kg per plant during its tenth year. It is estimated that around 28,000 MT of cashew are produced in Sindhudurg.

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<sup>9</sup> It is rain fed, requires very little maintenance and can be grown in small plot of land.

<sup>10</sup> This scheme provides financial assistance to the farmers for planting material or fertilizers for a period of three years.

Some traders forecast the crop that will be yielded and therefore the likely price of cashew, based on the observation of the number of female flowers in a panicle. Some processors have this ability too. However, there is a lack of local capacities both at the association and at the NGO levels, for crop forecasting techniques.

### *Quality*

The quality of cashew nut is calculated in terms of 'raw cashew count', 'floaters' and a 'cutting test'. It is only when SSI units resort to these tests can they take decisions on prices. They however do not have any fixed buyer and therefore do not document the results. In contrast, the Mangalore units, which have fixed buyers, document the test results to inform the traders with the purpose of improvement in procurement. ME units do not use this test at all.

The quality in terms of the above parameters varies from place to place. Cashew nuts obtained from Banda (Sawantwadi taluka), Dodamarg taluka, and some parts of Vengurla are reportedly better since they are harvested at full maturity i.e. when the cashew apple is fully matured. This is due to the proximity of market for cashew apple in Goa<sup>11</sup>. In the other talukas, the cashew nuts are most of the time harvested at immature stages mainly due to the fear of thefts and also due to the distance from the Goa market for cashew apples.

Some traders and processors do test the quality of the raw material procured from the petty traders or from big farmers. But except for a few, a majority of the processors do not send any feedback on the quality of cashew nuts to the traders.

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### *Storage*

Cashew nut is a seasonal crop and is available in Sindhudurg between March and the end of May. It is therefore required to store the raw cashew during that period for processing during the off-season. The moisture content in cashew nut is removed to ensure a longer life of the stored cashew.

### *Drying and Grading*

Some farmers do one or two dryings for immediate sales, while others store the raw nuts for off loading during the Ganapathi festival that takes place in last week of August or the first week of September. For this they need to dry the nuts three or four times. However, most of the farmers do not dry the produce at all. The reasons given are; a) a fear of weight loss (estimated to be 7-8%); b) because of the small size of their lot (which will be mixed up with other lots) and c) consequent lack of negotiation power because of which they do not get any extra price advantage.

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<sup>11</sup> Cashew apple can be used for making juice, syrup and feni-a hard drink very popular in Goa.

In addition, the infrastructure needed for drying i.e. drying yards is not available with the farmers. Moreover, many of them are not aware of the drying technology i.e. number of turnings of the heap, testing the extent of drying by observations or cutting etc.

While SSIs are aware of the quality of nuts in terms of moisture percentage, micro entrepreneurs do not know about these quality parameters. Moisture meter are available, but as the moisture varies from area to area, it is difficult to calibrate it so that it satisfies both the buyers (processors) and the sellers (farmers/traders). Meters are not being used.

Further, both farmers and petty traders often mix the dried and the un-dried cashew nuts pulled from different places when selling them in bulk. This phenomenon is well known to the big traders and as a result farmers loose on the price advantage of dried cashew nut.

Farmers do not grade<sup>12</sup> the cashew nuts. The lot purchased by processors is therefore an heterogeneous mixture of varied sizes. Processors do not feel that segregated lots of cashew nuts are necessary, since the cutters will not accept to cut small nuts as their wage level (related to the weight of cashew processed) would decrease.

### *Pricing and Procurement*

The price of cashews is contingent on the world prices for cashew kernels and the price of other surrogate nut crops. The local price of cashew nut depends upon the price declared by the growers' association at Phonda, Goa<sup>13</sup>. As the quality of raw cashews produced from this region is good, the price for Sindhudurg raw cashews is higher than in other parts of the country. The price generally fluctuates between Rs 32 and Rs 40 per Kg and short term price fluctuations are very common.

The procurement is the most risky and critical of operations for cashew-processing units and depends on the prices applied. Ultimately, it is the weighed average procurement price over a season that will decide the profitability of the operation<sup>14</sup>. An optimum procurement depends on having access to critical information such as what is the availability of cashew nuts from different places within and outside the district, what is the estimated demand for raw cashews from other states, what are the international price movements of dry fruits etc. This information ultimately helps one to decide to buy or wait. There is no sharing of information on raw material price among the firms.

Once the decision to buy is taken, it is followed by a routine activity to raise the required working capital by approaching banks. Sindhudurg processors always encounter difficulties in obtaining

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<sup>12</sup> The peeled cashew kernels are classified according to size, color and maturity.

<sup>13</sup> Farmers and processors are aware of the cashew price prevailing on day-to-day basis through radio and local newspapers. During the season, there is also a daily periodical called Mangala Reporter published from Mangalore.

<sup>14</sup> The incapacity to decide properly when to buy is the main reason for collapse of cashew processing units in the district.

adequate credit. This is due to the mismatch between their expectations and the demands of the lending institutions with respect to “adequate” margins / collaterals.

Raw cashews are procured by SSIs from the district, Ratnagiri, Chandgad and Ajra (areas in Kolhapur district, adjoining Sindhudurg). MEs get cashew nuts from their own farms or buy them from traders of the same taluka. Local producers buy cashew in lots and do not get any price benefits, unlike the processors of Mangalore who buy in bulk. 70% of the raw cashews produced in Sindhudurg get better prices as they are armed with export orders.

### 7.1.2 Cashew Nut Processing

#### *The Process*

The procured cashew is processed through a series of steps that do not require sophisticated machinery. The major steps involved in cashew processing are as follows (detailed steps can be found in Annex 1):

- **Steaming/Roasting:** Roasting is done to facilitate the removal of kernel from the shell.

The steam boiling method (called the Mangalore method) provides the advantage of allowing a recovery of the Cashew Nut Shell Liquid (CNSL), which is not possible using other methods of roasting such as the drum roasting<sup>15</sup>. The raw nuts are fed into boilers, which work on the principle of pressure cookers. At present the SSI units use wood and cashew shells as fuel for the boilers. A factory in Mangalore has adopted the rotary method using Liquid Petroleum Gas. This process provides uniformity in drying, cooling is faster and the product appearance is cleaner.

For the micro units that were created under the Scheme of Department of Agriculture (since 2000-2001), there is a need of setting up quality standards for their small scale machinery. The boilers used give poor colour to the end product. Each boiler requires a unique protocol and many micro enterprises do not know the optimum process for boiling. Most of them have learnt the process by trial and error after following short training programmes. Further, many machines do not work properly and processing is still a concern of most of the micro enterprises.

- **Cutting:** The heat applied to the nut makes the shell brittle and allows them to be cut by both, hand and leg operated cutters. The first is usually preferred by older workers and the latter by the younger ones<sup>16</sup>. Cutting is a skilled operation done by women and usually learnt on-the-job.

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<sup>15</sup> Drum roasting is only used by 2 units in the cluster.

<sup>16</sup> First, a precise area of the external shell must be hit with a blade to trigger a small crack, and then, pushing on a handle connected to springs carefully enlarges it.

SSI units use precise-cutters brought from Mangalore. MEs get cutters from local machine manufactures, which are of low quality and thus result into high amount of split cashews. MEs lack knowledge of proper maintenance of their machinery and the local machinery suppliers worsen this problem due to the poor after sales service. There is no defined standard for cutters that would ensure good quality from machinery suppliers. Those MEs who want to change the cutters are unable to do so due to their weak financial capacity.

On an average, about 12-15 Kg of kernels are obtained (shelling percentage is 24-25%<sup>17</sup>). Wholes and pieces are separated and wages are paid to workers according to the kilograms of wholes obtained (Rs 5 per kg). To gain a daily wage of Rs 50, a cutter needs to cut at least 25 kg of nuts per day. In case of MEs, all family members share the cutting job.

While splitting, the CNSL can spill on the hands and can cause severe dryness and black spots on the skin. Cutters wear plastic bags around their hands<sup>18</sup>, cover their fingers with cotton or apply oil and ash to their hands to avoid any direct contact with CNSL. Nonetheless, one can easily identify the cashew cutters by looking at their hands. Many young workers show reluctance to work as cutters due to this problem. Young women accept this work only if they have no other job. SSI units would like to develop special gloves to attract additional labour.

- **Drying:** To facilitate the removal of the outer skin attached to the kernel, drying is done in an electric conventional oven called the drier. The wholes and splits are kept there for 8 hours to remove the moisture from the kernels. The capacity of drier varies from 400-500 Kg in case of SSI units and from 9-15 kg in case of MEs. Small enterprises face the problem of voltage fluctuations and as a result the nuts are not properly dried. Further, since local masons do not properly construct conventional dryers, non-uniform temperature diffusion across the trays affect the quality of cashew kernels as well.

- **Peeling:** The peeling of the outer skin is a skilled operation done mostly manually by women with the help of a small blade. The quantity of skin obtained is 100 grams per kg of cashew kernel. Since this operation is uneconomical, it is most of the times sub-contracted outside by both SSIs and MEs. In the morning, dried nuts are put in 5 kg tins, weighed and transported to a common point from where peelers pick them. Each processor has its own colour tin for easy identification.

At the SSI level, a register is maintained and each peeler is given a card for writing down the quantity peeled. Sometimes, after completing of their work at the factory, workers take home the cashew kernels in tins and do peeling at home along with their family members. A family of 4 to 5 members can peel 10 Kg per day. Old women are also involved in the peeling operations.

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<sup>17</sup> 10 kg of raw nuts give 2.5 kg of kernels.

<sup>18</sup> The rubber gloves available are not used, as they do not provide grip for cutting.

It is the slowest operation and since it is contracted out, it gets beyond the entrepreneurs' control. If production is to be enhanced, the factories will have to face labour constraints since there is a shortage of labour.

- **Grading:** Cashew can be classified in 26-32 types depending upon colour, scratch, size, wholeness etc. Different grades of cashew kernel and average yields of cashew kernels of different grades per quintal of cashew nuts appear in the Annex 2<sup>19</sup>.

SSI grading is done on 10 counts based on colour and size, and takes place in the factory as per the specifications laid out by Cashew Export Promotion Council, Cochin. Each factory displays the grading chart and the quantity of cashew kernels in kilos so that the graders, generally women, can verify their accuracy. There is a variation in grades among SSIs as it is a manual operation.

It is very difficult for MEs to grade the kernels as SSI units do it, since it is a time-consuming task, which requires high volumes of nuts and skills/techniques. In spite of training given by NGOs, most of the MEs do not do it and those who do, take only 4 categories<sup>20</sup>.

- **Packaging:** Graded cashews are packed by SSIs in tins of 10 Kg that are filled with Carbon dioxide to avoid growth of moulds during storage periods. SSIs do not feel the necessity for vacuum packing technique<sup>21</sup>, as their markets do not demand such packaging. Both SSIs and MEs use simple polypropylene bags to cater to the retail markets. These bags are sealed either with the help of sealing machines, operated by electricity or with candle flames.

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#### *Credit Support*

The season for harvesting of cashew lasts only for three months, during which the processor should ideally purchase cashew, dry it and store it in order to process it throughout the year. But building up such raw material inventory requires huge working capital and as a consequence the processing capacity of SSIs/MEs is dependent on the credit available from banks. The Bank of India, Union Bank of India and the Saraswat Bank are the major banks providing credit to SSI units in the cluster. There are two types of credit limits sanctioned by Banks – hypothecation and pledge limit<sup>22</sup>.

As previously mentioned, with the hypothecation limit the ownership of the hypothecated good remains with the borrower. In the case of pledge limit, the bank physically takes possession of the goods pledged. It is operated through a “lock and key” system: the bank sanctions a limit to the processor, from which he draws money to buy raw cashews. After drying the cashew, the processor will request the bank to accept the pledge of its stock. The bank values it and takes it

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<sup>19</sup> Grades can start from W-180. “W” meaning that cashews are “White Wholes”, and 180 meaning that there is between 170 to 180 of cashew kernels in 454 grams (1 pound).

<sup>20</sup> Without shell (NW); wholes (mixture of W-180, 210 and 240); splits; and half-splits

<sup>21</sup> Only one cashew processor has got a vacuum packing machine.

<sup>22</sup> In both cases, the processor needs to put a margin of at least 25%.

as a pledge that will be stored in a godown arranged by the processor. The key of the godown will be kept by the bank. The value of the goods will be credited into the hypothecation limit. Whenever the processor wants to take nuts, he will have to pay the corresponding amount to the bank. When the sale proceeds, the amount earned will be credited into the hypothecation account from which the processor can again take raw material. This cycle goes on during the procurement season.

Sindhudurg processors are often constrained by the margins that they are asked to bring, unlike Mangalore ones that benefit from more flexible credit instruments that leaves them with more liquidity<sup>23</sup>. The best practices and new instruments evolved by traditional banks such as Corporation bank, Canara bank, Syndicate bank based at Mangalore, are not being used by the local banks here.

For MEs, getting adequate and timely credit is a serious constraint. This caution of banks is partly explained by the failure encountered in the cluster by the Prime Minister's Rojgar Yojana (PMRY)<sup>24</sup>, where the Department of Industry and the banks implementing the scheme, did not obtain any viable business propositions. However, NABARD had made persistent efforts to convince the banks that cashew processors can be viable, if given a chance. The MEs managed to borrow some loans ranging from Rs 1 to 3 lakhs<sup>25</sup> (USD 2,000-6,000) for processing 1-3 MT of raw cashew.

However, some processors still feel that they cannot afford the initial documentation charges (Rs 14,000 i.e. around USD 300) and the initial deposit required. To address this issue, NABARD arranged a sensitisation meeting for bankers under their District Rural Industrialisation Programme (DRIP).

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### *Quality certifications*

None of the cashew enterprises have quality certifications, neither ISO nor HACCP standards, which their counterparts in the other states have. There is no need felt for these as the domestic market for which the firms cater to do not require such certifications. In addition to this, there is a lack of BDS that could provide for such services. However, with rising consumer awareness, some firms start to feel the need for such certification.

While SSI units can judge the profitability of their operations, most of the MEs have a farming background and lack knowledge on enterprise management. Many of them do not know about self-assessment tools, in terms of prices of raw material, percentage of splits and wholes obtained, market prices to apply etc. There are no second line managers in the units.

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<sup>23</sup> The existing banks are historically based in Mangalore, hence the differential treatment applied by the banks to the two regions.

<sup>24</sup> 2 lakhs for new entrepreneur that would set up any industry, business or service related activity.

<sup>25</sup> 1 lakh = 100,000

BAIF has imparted training to the members of Gopuri Ashram on writing of accounts and on how to assess their profitability. This could be up scaled to other areas/institutions.

### 7.1.3. Forward Linkages

#### *Untapped Potential for value added products*

Split cashew kernels and low grade ones are being utilized in sweets, confectionery, ice creams industry and is distributed in temples or by retail chains. Cashew products are a growing segment in food processing sector and it is estimated that at least 90 cashew products can be prepared from lower grades of cashew kernels. In the cluster, splits can be used in an effective way to enhance value addition by at least three times but only a few SSI units and MEs are manufacturing some of these value added products e.g. salted cashew, cashew chocolate, modak, cashew apple syrup. No ME can manufacture these products individually because of the problem of scale. Diversifying the basket of products can also lead to additional employment for women during the peak season.

The potential for value added products remains untapped on account of the following reasons:

- Poor shelf-life of the products presently manufactured
- Poor hygiene standards
- Lack of linkages between consumers, especially those located in Mumbai and processors
- Lack of access to technical know-how developed by Central Food Technology Research Institute (CFTRI) Mysore, and private entrepreneurs
- Lack of knowledge on cost effective packaging
- Lack of flexible credit instruments, which can provide credit based on market orders to group of entrepreneurs, repayable at the end of the season.
- Inability to meet market demands in short periods of time
- Inability to access simple machines to manufacture in large quantities and reduce wastage

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### Box 1: A Case Study of Cashew Modak

Cashew modak (a sweet) is very much in demand during the festival of Lord Ganesh. In the district of Sindhudurg alone, its demand is estimated at Rs 1 million during the festive season. At present, this demand is catered by manufactures from Mumbai but the quality is poor, since it contains ground powder (a low portion of cashew and artificial colour is added).

As a result of NABARD CDP initiative, Gopuri Ashram started to produce cashew modak. Later on two more groups (both in Kudal, the Sindhudurg Gramin Rojgar Vikas Samstha in Mangaon and the Omkar Youth Forum, Kadaval) also started producing it. Locally manufactured modak contains good quantity of cashew and no artificial colours are added. It is also attractively packed.

In one group, the members pooled Rs 60,000 and due to the lack of credit support from banks, borrowed from relatives Rs 40,000 at an interest rate of 5% per month. The manufacturing activity took place at one of the members' house and each member was delegated one particular responsibility. The group gathered collected additional splits from SSI units, as their own volume was not sufficient. Sugar, glucose and cashew powder was grinded into a mixer and made into a paste, which was put into modak cashew moulds. Both family labour and additional female workers were employed.

During this season, there is no regular farm employment for women, while this provided employment to 15 of them (at a wage rate of Rs 30 per day). Old women<sup>26</sup> and young women were also involved<sup>27</sup>.

One of the entrepreneurs took up the responsibility of marketing the cashew modak. He directly supplied to distributors, local shops, grocery shops and hotels, located in the talukas of Kudal, Vengurla, Sawntawadi, Marvan, and Kankavalli. A fifteen-day credit period was given to buyers. With a total cost of Rs 100,500, the group earned a net income of Rs 11,500 after deducting interest expenses.

The above case study illustrates the importance of encouraging the production of value-added products in the cluster, because of their potential benefits to MEs, workers, especially women, and even for consumers. The cluster can develop a niche market for cashew-based products.

The above example also demonstrates the imperative to introduce micro-credit to tap the seasonal demand.

#### *Usage of by-products*

Almost every by-product obtained during the processing of raw cashew has an utility. Cashew shells are sold to CNSL manufactures in Goa for Rs 2.5- 3 a Kg. The outer layer peel (the testa, skin adhering to cashew kernels) is sold at the rate of Rs 4 per kg to local agents, who in turn

<sup>26</sup> The annual income of an elderly agricultural labourer is of about Rs 7,200 per year (USD 160). Not only does she get employment for about 15 days per month only, but also this income is uncertain.

<sup>27</sup> The young women feel comfortable to work in the neighbourhood and enjoy the opportunity it provides to learn a new skill.

supply it to leather and paint industries. The cashew apple can be transformed into juice or syrup.

#### *Manufacturing of CNSL*

The price of CNSL is Rs. 30 per litre. It is sold to the trader, who in turn sells it to an agent in Mumbai by adding his margin of Rs. 10 per kg. The CNSL is traditionally used as a leakage proof agent, to season old wooden beams or paint boats but with the advent of fibre boats, the business has been affected.

There are about 10 MEs and 2 SSIs manufacturing CNSL. Their manufacturing method is crude as they use indirect heating of cashew shells in earthen pots through the heat generated from burning of leaves. The unit operate from October to May (on farm operation), since they can not run during the rainy season.

One SSI unit has forward integration with CNSL manufacturing. The reasons attributed are; a) it requires specialization as the product caters to different market segments all together; b) it represents limited margins and although market prospects are good for value added products (made by further distillation), the technology is unknown; c) the CNSL is highly taxed in Maharashtra, which does not give a competitive edge to the district, since it is not being taxed in Goa.

CNSL manufactures would like to have one filtering plan (cost of Rs 60,000-70, 000) to improve the quality of the product. This additional investment is beyond the capacity of an individual entrepreneur.

#### *Marketing*

The peak demand for cashew arises during festivals, particularly during Ganapathi and Diwali (September to November). Thereafter, there is a lull in the market.

SSIs send the packed tins to Mumbai by road to the commission agents at the Agriculture Production Marketing Committee (APMC) market at Vashi (in Mumbai). They act as consignment agents to the processors. The marketing charges are: 3-3.5% of the sales for the commission agent, 1-1.5% of brokerage charges, 1% for the APMC tax, Rs. 5 per tin for the godowns and labour charges at Rs 5 per tin. The total marketing charges comes to about 6.5-7.5% on the value of goods sold.

Sale proceeds after a minimum period of 5 weeks. Some of the processors have also opened retail outlets in Sindhudurg to cater to local markets and also tourists from Mumbai. The commission agents at Mumbai are catering to Madhya Pradesh, Maharashtra, Rajasthan, and Gujarat. MEs sell the cashew kernels to local markets and to Mumbai markets through their friends and relatives. In local markets, the price of unpolished cashew fetches Rs 170 - 200 per Kg, whole kernels Rs 210-250 per kg, half splits Rs 140 - 160 per Kg, one-fourth splits Rs 130 - 150 per Kg and bits Rs 100 per kg.

The price of kernels fluctuates and depends upon several factors both national (e.g. transport strikes) and international (e.g. indexed to the almond price). The price varies also from grade to grade e.g. from Rs 135 per tin of scorched burns to Rs 400 per tin for the W-180 grade. The prices are regularly reported in Mangala Reporter, a publication from Mangalore that specialises in cashew nuts.

The value chain analysis of the cashew processing of SSIs and MEs is given below in table 6.

**Table 6: Value Chain Analysis of Cashew Kernels**

	Particulars	Percentage of total cost	
		SSI	MEs
1	Raw material cost	79	91
2	Processing cost	13	7
3	Interest cost	1	1
4	Marketing cost	7	1
5	Total cost	100	100
	Selling price of 1,000 kg of kernels (Rs)	48,716	40,460
	Net Income from 1,000 kg of kernels (Rs)	3,925	8,716

The above table reveals that raw material is the major cost for both SSIs and MEs and that therefore procurement of raw cashew at an appropriate price is critical to success.

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MEs are more vulnerable to price fluctuation than SSI units. MEs utilise their family labour for processing, grading and selling in local markets. Though the net income per lot of 1,000 kg is higher for MEs than for SSI units for a single lot of 1,000 kg but MEs derive their income only 1-3 times in a season while SSI units derive it once in every 5 days. Also the return on investment is higher for SSIs than for MEs.

Moreover, SSIs generally grade cashew kernels in 28 different grades and are therefore able to benefit from the increase in price of particular grades while this is not possible in case of MEs. Grading is the critical thing for MEs for reaching Mumbai markets and getting better prices, for which a critical mass is required.

#### *Domestic market*

The size of the domestic market is estimated at 100 million kg (4.4 million cartons)<sup>28</sup>. 50 to 70% of broken nuts is consumed in local markets and there is a growing demand for cashew kernels from confectioneries, hotels, ice cream manufacturers, temples and retail chains.

<sup>28</sup> One carton being equivalent to 2 tins of 11.34 Kg

Promoting cashew as a healthy food, free from cholesterol, is a strategy that can be adopted to reach this market. Also there can be cashew festivals organised more frequent in India and abroad.

Tourist represent an additional opportunity. In that front, Sindhudurg can benefit from the proximity of Goa. Further, the Government of Maharashtra has declared it as an area for Tourism industry.

### *Exports*

Goa controls most of the exports of the region. It is estimated that for the year 2002-03, about 705 MT<sup>29</sup> of cashew kernels left the port of Goa. Exports have not emerged in the district because no firm has the capacity to produce the quantity to fill one container with only one grade (1300 tins of 11.34 Kg each). Moreover, it requires huge working capital and export market is full of risk, which the entrepreneurs do not want to take since there are bright prospects in the domestic markets too.

## **7.2 Fruit Processing**

Mango, Kokum and Jamun are the main raw materials for fruit processors. All the raw material is of good quality and is specific to the Konkan region.

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### *Mango*

The principal mango variety cultivated in Sindhudurg is a table variety called “Alphonso”. It has a typical aroma, is fibreless and has a long shelf life (20 days) and is exported to Gulf countries through Mumbai. Sindhudurg has about 21,026 Ha of Mango orchards for commercial cultivation, with an estimated production of 44,315 MT per year<sup>30</sup> (mainly concentrated in Deogad and Vengurla talukas).

Considering the rich potential to export fresh mangoes from this region, Agricultural Processed Food Export Development Authority (APEDA) has identified Ratnagiri and Sindhudurg districts as Agri-Export Zone (AEZ) and has nominated the Maharashtra State Marketing Board as the nodal agency for undertaking the promotional interventions required to export fresh mangoes from here.

Alphonso mangoes are procured during April, May and the first week of June for table consumption. Those that are procured for processing are of small size and usually have spots or are of irregular size. Processors also procure ripe mangoes when the price of these mangoes

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<sup>29</sup> Equivalent to Rs 113 million (USD 2,500,000).

<sup>30</sup> Source: Cebeco Indai Private Ltd.

come down in the Mumbai market or when there is a bumper production. In Sindhudurg, the price ranges from Rs. 10 to Rs 12 per Kg.

Many processors purchase directly from the farmers. The mangoes of other varieties are not processed and usually go waste.

The department of Agriculture has identified Sindhudurg District as one of the implementing districts under AEZ scheme of APEDA for mango crop (a Government promotional scheme for exporting of fresh mangoes).

#### *Kokum (Garcinia indica)*

Kokum is a regional fruit, mostly grown in the region as a rain fed crop. Hydroxyl citric acid is its major constituent. The fruit is used as a medicinal plant against obesity; the rind is used as souring agent and food colour; and the seed fat is commercially extracted for cosmetic and confectionery preparations. In the past, locals used it for edible oil.

No organized kokum plantations exist in the district but almost every farmer has a few plants of Kokum in their plot. It is estimated that around 1,000 Ha are under kokum plantation, producing a total output of 12500 Tons. The major Kokum plantations/concentrations are found in Vengurla, Malvan, Sawantwadi and parts of Kudal talukas. Kokum fruits are harvested during May (pick period) and the first week of June. The yield of Kokum varies, ranging from 200-300 Kg (full grown plant) to a maximum of 600 Kg (for very big tree). 30-40 per cent of kokum fruits are processed, while the rest go waste due to rain, difficulty in harvesting and lack of suitable harvesting device.

After harvesting, the fruit are cut manually into pieces to separate rind and seeds. This a time consuming task and young labourers are reluctant to this job (the skin of this mucilaginous nut is very hard). A need is felt to develop a simple machine, which reduces the manual drudgery. The Government EGS has provision to allocate subsidies to Kokum plantations.

#### *Jamun (Eugenia Jambolana)*

Jamun is a horticultural crop, which is abundantly grown in the forests of the district. It is estimated that there are around 15,000 trees in Sawantwadi, Kudal, and Vengurla talukas. The higher quality fruits are obtained from Mangaon, Banda, and Sawantwadi. On an average, one plant gives a yield of 200 Kg per season.

The juice extracted from the fruit has medicinal properties for diabetic patients. The powder made from the seeds has medicinal properties too and is used by Ayurvedic manufactures in Gujarat. Farmers do not harness this potential alternative use.

Harvesting of jamun is tedious since a person has to climb the tree to harvest the fruits. Farmers often auctions the tree to local contractors for Rs 200-300 per season. They arrange to harvest

the fruits and then sell them in Mumbai market for table consumption at Rs 15 a Kg. When the price of jamun comes down to Rs 7-8 per kg, the processors purchase directly from the traders.

#### *Other fruit crops*

Jackfruit is another crop, which is grown widely in the district. However, less than 1% is processed since the technologies required are not known in the district. The situation is similar for amla and karonda.

There is one “dry fruit plant” called Charoli which grows in forest areas. During February and March, its seeds (akin to cucurbits seeds) are extracted from hard seed coats by women and are sold at Rs 400 per Kg to sweet makers. A simple tool is useful for breaking the hard seed coat and the commercial utility of fruits can easily be increased.

#### *Packing materials*

Preservatives are sourced from Mumbai, while packaging material such as cans and bottles, are procured from Kolhapur, Satara, Pune and Bangalore. Some units get their labels printed in Sivakasi (Tamil Nadu), if the order is important enough because of the transportation cost that can otherwise be disproportionately high. If orders are small, labels are procured in Kolhapur (bordering district) or Tamil Nadu.

The total number of cans procured is estimated at 200,000 in the peak season. To put down on price, quality of can is sacrificed. It is estimated that if bulk purchases are made, not only savings can increase by at least Rs 2 per can but the quality obtained will be higher as well.

#### *Processing of fruits*

There is only one cycle of processing in a year. Processing is highly season dependent. The basic raw materials are available from April, May and to the first week of June. The processors purchase the raw material and processing operations such as canning of mango pulp, juice extraction for jamun or kokum takes place. The primary processed products are stored in plastic drums. Subsequently as and when the demands increase, packaging is done and product is dispatched to the markets. All the operations are manual.

During the off-season and in order to recover the fixed costs incurred, the units feel that it is essential to prepare products from the original stock of mango pulp. For example, mango pulp can be used to prepare nectar (concentrate juice), ready to serve beverages, mango bar or jam.

- Mangoes, depending upon the variety, are processed into mango pulp or pickles. All operations are manual: the fruits are washed and peeled before being placed into a pulper that removes the seed. The pulp is then boiled and pored in sterilised cans or bottles. These

containers are finally sealed and packed. A process chart appears in Annex 3 and the value chain analysis of tinned mango pulp is given in Table 8.

- In the case of kokum, the fruits are manually sorted, cut and seeded. Seeds are put to dry and juice is extracted from the pulp. The outer skin is sun dried for two days. There is a scope to improve the processing methodology by introducing very rudimentary codes of practice e.g. drying the seeds on plastic sheets to avoid adherence of sand. Salt is added to the juice to avoid fermentation and sorbet (concentrate juice) is made from it, which is packed in plastic drums. A process chart appears in Annex 4.

- The juice of Jamun is extracted with a pulper and preservatives are added to it. The seed is grinded to make powder and sold to ayurvedic manufacturers. A process chart is given in Annex5.

Many processors have acquired the knowledge through the training programme imparted by Dr. Hedgewar Seva Prakash, Mangaon. They know how to process, but cannot address problems of quality and are also unable to understand the causes of spoilage. The units are less informed about basic principles for preservation, especially for jamun and amla. They have no proper measurement tools, which leads to an inconsistent quality in the product and poor shelf life.

#### *Quality Check*

Many units lack confidence to approach large buyers due to lack of quality parameters. There is no testing laboratory in the district and few units have in-house quality testing instruments. For quality check, most of them send their samples to Mumbai and Kolhapur. High testing charges are a disincentive for regular quality checks. Confidence of using testing instruments is low as is the local knowledge on food laws.

The packaging used by fruit processors is obsolete. Their quality is poor but a majority of the units are not aware of the available options. For example, the Indian Institute of Packaging (Mumbai) has developed for attractive packaging adapted for the wholesale, as well as for the retail markets. Linkages with such specialized institutions are missing in the cluster<sup>31</sup>.

As far as the labelling is concerned, in most cases there is no detailing such as instructions on how to consume or to store it.

#### *Resources*

The processing industry is seasonal. As the cashew processing units requires working capital before the season so loans are required to purchase the raw material. There is only one

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<sup>31</sup> Only a few firms have collaboration with Dr. Hedgewar Sewa Prakash for sharing of packaging machinery and market linkages.

manufacturing cycle in a year. There is a problem in estimation of working capital limits by banks for the processing industry.

Being a seasonal industry, it requires large numbers of workers during the season. On an average, each ME employs 20 workers, mostly female.

*Market*

As explained earlier, the products are specific to the region and have a niche in the markets. The products are sold either in local markets or in Mumbai, through agents or relatives.

The main season is Feb to mid-June and there is almost no demand for the products during the rest of the year.

Although in the past, Air India enquired about Kokum juice but their demand could not materialize due to lack of capacity in the cluster to produce large volumes of consistent quality. Lately, institutional players such as Mahamango, a mango growers co-operative society being operated under the supervision of Maharashtra Marketing Board in Pune, is providing marketing support to the fruit processors through their outlets in Pune. A huge potential exists for these products in other parts of Maharashtra. No firm attends trade fairs such as the Amba Mahostav (a mango festival) that is held in Mumbai during mango season.

**Table 8: value chain analysis of tinned mango pulp**

Particulars	Estimated Costs (Rs.)
Raw material cost	20
Processing cost	5
Packaging cost	13.5
Overheads	1.5
<b>Total Production cost</b>	<b>40</b>
Selling cost to local shopkeepers and agents	80
Local shopkeepers to customers	120
Or	
Bulk sales to distributors at Mumbai	70
Distributors to shop keepers	90
Shop Keepers to customers	120

The share of processors in the total value is 1/3. This share can increase through direct or collective marketing and institutional sales. There exists an immense scope for providing BDS in marketing. The following case study elucidates this issue.

### **Box 2: Scope for BDS in Marketing**

A group of unemployed civil engineers have established a trading company for marketing of konkan products in other parts of Maharashtra, mainly developing a warehouse function.

They have established a customers' chain close to 5000 people, have developed networks with other food chain distributors (such as hotels, big restaurants, etc) and even offer discounts to their regular customers. They procure the fruit from different local suppliers and store them in their warehouses. According to the demand, lots are prepared for transportation organised.

They conduct workshops for product launching in other parts of Maharashtra and are aware of the bright prospectus for value added products e.g. cashew or mango chocolates. They are growing at 20% per annum.

#### *Institutions*

Dr. Hedgewar Seva Smuti Prkalp is the major training intuitions in the cluster and is responsible for the origin of many fruit processing units in the district.

Konkan Krishi Vidyapeeth (Dapoli, Ratnagiri distict) is another technical institution that specialises in post-harvesting (processing). They have done pioneering work in fruit processing for Konkan region. They have published a book on processing options in vernacular, which serves as reference for fruit processors

Since the last two years, the Regional Fruit Research Station, Vengurla also conducts training programmes in cashew and fruit processing for those units sponsored by DRDA.

In spite of the presence of such training institutions in the district, there is no institute available that can act as a resource centre on on-going bases, to solve their technical problems. Further, neither the training institutions, nor the processing units, have any linkages with national reputed institutions, for example the Central Food Technology and Research Institute (CFTRI) in Mysore. There is therefore scope for enriching the content and capacities of some of them, so that they can serve the local industry in a better way.

Geographical distances between the units and a lack of associative behaviour prevents the fruit processors to address their common problems. The cooperative spirit witnessed in Western Maharashtra such as in Kolhapur district, the epicentres for cooperative moment is absent in the district. People don't believe in such collaboration and there is a price-based competition among the firms for local markets.

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## 8. SWOT Analysis

### 8.1 Cashew processing

#### Strengths

##### *Raw materials*

- Abundant raw material of good quality
- Young plantation ensures a continued supply of raw material for at least 10 years
- The Government of Maharashtra is promoting cashew processing under their Employment Guarantee Scheme
- Certain isolated pockets hardly use any fertilizers or pesticides thus they can become grounds for organic cultivation
- The district is the major source of organic cashew in India

##### *Processing*

- Existing knowledge on processing methods and on risks related to the business
- The boiling method has been adopted, from which CNSL can be recovered in an environment friendly way
- Existence of small scale machinery that can be adopted by micro enterprises
- Natural backward integration for micro enterprises

##### *Markets*

- Established traditional market channels
- Proximity of Mumbai market, capable to absorb any incremental production
- Reliability of payments from traders of Vashi (Mumbai) markets
- Agents can be easily reached

#### Weakness

##### *Raw materials and procurement*

- Improper harvesting of cashew nuts
- No scientific system for forecasting raw cashew nut price
- No control over price due to small purchases
- Lack of public storage structures/warehouses for cashews
- MEs lack of knowledge on quality tests and storage aspects for raw cashew

##### *Processing*

- MEs lack of awareness on improved machinery for roasting of cashews
- Lack of acceptable hygiene standards while processing
- Labour shortage for peeling (slowest operation)

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### *MEs*

- Little quantity of cashew is purchased, no bargaining power and lower quality procured to save transportation costs
- Lack of knowledge on processing techniques (roasting, peeling, drying)
- Inexistence of a protocol for standardization of processing methods
- Lack of knowledge on maintenance of cutters
- Problems with the cutters result in higher percentage of splits
- The small pressure cooker type boilers give a yellowish colour to the kernels
- Lack of knowledge on packing material and labelling for attractive packaging
- Lack of a critical mass for grading according to the standards of the Mumbai market

### *Quality*

- None of the SSIs have got quality certifications e.g. ISO or HACCP standards
- MEs have inconsistent quality

### *Credit*

- The industry is seasonal, and requires huge working capital at the time of procurement
- The processing capacity of firms depends on the margin brought to banks
- Credit period extended to commission agents is too long and strains the liquidity of the processor

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- No new credit instruments have been developed by the bankers
- Inability of MEs to bring collateral that satisfy the bank

### *Management*

- The business approach is focused on production
- No second line managers
- Since almost all MEs are small farmers that recently have become entrepreneurs, they lack knowledge on enterprise management
- No proper financial books are maintained to calculate the profitability of operations

### *Linkages with Support institutions*

- No reputed technical institution for cashew is located in Sindhudurg district (all are in South India)
- Linkages are non-existent with the existing support institutions and therefore most of MEs do not have any institutional support to address their technical problems

### *Workers*

- Workers are not keen to work on cutters, because CNSL can damage their hands
- Knowledge on peeling is poor; quality of cashews decreases.
- Lack of trained manpower available in villages.

- Lack of incentive system for getting better productivity from labourers
- Lack of benchmarks for labour welfare, productivity and safety

#### *Markets*

##### *- SSIs*

- Cater to Mumbai and domestic market only
- No single firm can commit a lot to a large buyer
- Very narrow band of value addition products
- No retail outlets outside Sindhudurg District

##### *- MEs*

- Very narrow range market base (local and network of relatives only)
- Lack of critical mass to enter the Agricultural Produce Marketing Committee (APMC), Mumbai market

#### *Association*

- Lack of priority for developmental issues on the part of the cashew association

#### *Product diversification*

- Very few value added products are manufactured
- No technical know-how available in the cluster on cashew by-products

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#### *Opportunities*

##### *Technology*

- Introduction of better machinery e.g. sorter for raw cashew nut
- Creation of linkages with National and International institutions working on cashew

##### *Credit*

- Scope for introduction of Mutual Credit Guarantee Fund Scheme for small processors

##### *Management*

- Scope for introduction of Management Information Systems (MIS) like Resource Enterprises Planning (REP)
- Scope for e-commerce for catering to retail markets

##### *Markets*

- Generic promotion of cashew as snack food
- Increasing usage of cashew kernels in sweets, biscuits and confectionery items

##### *Employment*

- Major employment provider to women and to micro entrepreneurs (opportunity)

## Threats

- It is season dependent
- Prices are highly volatile

## 8.2 Fruit Processing segment

### Strengths

#### *Raw material*

- Abundant production of mango, kokum and jamun
- Kokum and Alphonso mango are unique to the cluster of Konkan region
- The Department of Agriculture has identified the district as one of the implementing districts under the AEZ scheme of APEDA for mango crop
- Subsidy under EGS for Kokum plantations

#### *Processing*

- Processing of kokum and jamun has been a traditional activity
- Low cost processing techniques have been adopted that small processors can afford
- Local institutions are source of know-how

#### *Quality*

- The variety of mango used is among the favourites from all over India

#### *Markets*

- The products have got immense potential in important markets in Mumbai

### Weakness

#### *Raw materials*

- Lack of appropriate post-harvest techniques
- Huge post-harvest losses of Kokum, jamun and mango
- High cost of raw materials like amla due to lack of local production

#### *Processing*

- Inadequate knowledge on preservation techniques
- Lack of knowledge on product diversification
- Inferior and high cost of packaging material
- Poor awareness on food grade packaging material
- Lack of linkages with reputed national technical institutions

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### *Quality*

- Shelf life problems for jamun, kokum and amla products
- Poor hygiene practices
- No testing facilities available and lack of awareness on simple testing procedures
- Lack of awareness on food laws
- Labelling norms
- Cost based competition due to narrow market base

### *Markets*

- Catering limited to local and domestic markets
- Usage of kokum products is virtually non-existent in other states
- No instructions on packaging on how to store or use the products
- No access to trade fairs or use of e-business to expand their business
- Inadequate knowledge on other potential markets

### *Other issues*

- Units are widely dispersed in the district
- No association for fruit processors (since recently formed)
- No authentic database of production capacities

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### **Opportunities**

#### *Raw materials*

- Scope for introduction of better post-harvest measures, particularly for kokum
- Introduction of the standards for good agricultural practices for food safety
- Sustainable use of natural produce
- Kokum has been identified as a medicinal plant and has been selected for an intensive development by National Medicinal Plant Board in New Delhi

#### *Processing*

- Scope for simple improvements in the products and introduction of new technologies
- Scope for developing new products based on mango pulp
- New product recipes can be developed
- Scope for introduction of HACCP principles
- Introduction of simple machinery or tools for large scale manufacturing

#### *Credit*

- Scope for introduction of Mutual Credit Guarantee Fund scheme

### *Institutions*

- Scope for strengthening local training institutions at par with reputed institutions
- Support from National Medicinal plants Board, for R&D as well as processing and cultivation

### *Marketing*

- Opportunities for export of mango pulp
- Opportunities for sub-contracting to leading national and international food chains
- Kokum juice can become a leading health drink
- Healthy, natural juice

### **Threats**

#### *Processing*

- Increasing requirement of quality codes may erode the position of the cluster
- The other mango pulp production centres like Chittor in Andhra Pradesh may offer stiff competition to Alphonso based products
- The cluster might emerge as a mere raw material provider, if the processing capacities and quality certifications are not taken care of

### **9. Vision of the cluster**

“Sindhudurg cluster will enhance its processing capacity, especially from the current level of 30 per cent to 50 per cent for cashew nuts by the year 2007, thereby empowering the SHGs, workers in SSI & ME units, and the marginal and the small farmers”.

### **10. Cluster Development Strategy and Short-term Objectives (2004)**

Thrust area: The Sindhudurg cluster is spread over an entire district but a majority of the units are concentrated in 4 Talukas, as shown below in table 1.

**Table 9: Estimated Concentration of Food Processing Units**

	<b>Taluka</b>	<b>SSI</b>	<b>ME</b>	<b>SHG</b>
<b>1</b>	<b>Malvan</b>	8	48	49
<b>2</b>	<b>Vengurla</b>	12	51	43
<b>3</b>	<b>Sawantwadi</b>	4	55	5
<b>4</b>	<b>Kudal</b>	3	49	25
<b>5</b>	<b>Kankavali</b>	2	60	8
<b>6</b>	<b>Devgad</b>	1	29	31
<b>7</b>	<b>Vaibhawadi</b>	-	9	2
<b>8</b>	<b>Dodamarg</b>	-	-	7

Most of the units are concentrated in Malvan, Vengurla, Sawantwadi, Kudal and Kankavali.

Gopuri Ashram is active in Kankavali (with the support of NABARD). Hence for all practical purposes, UNIDO activities will concentrate in the Talukas of Malvan, Vengurla, Sawantwadi and Kudal.

Thrust product: Though cashew is the principal product, many units are also involved in various other fruit processing (e.g. mango, jamun, kokum, etc.). Thus all such units shall be assisted.

Intervention strategy: As previously mentioned, the objective of this project is to document the possibilities and best practices of addressing “poverty” through cluster development methodology. Hence new tools will be tested within the framework of the cluster methodology (e.g. targeted joint action and creation of linkages).

The SWOT analysis reveals the major issues as:

- Information constraints related to appropriate processing technique/technology, future markets, raw material prices and existing support schemes
- Technical constraints related to processing
- Lack of awareness on quality, testing facilities and certification
- Restricted marketing channels
- High cost of credit and long realisation cycles
- Restricted product range
- Absence of consultants for technological, marketing and quality related issues
- Absence of forum to carry out “targeted joint action”
- Dissemination of information on health related issues

The strategy for intervention will therefore hover around the following actions:

- (a) Creation of multiple platforms (including networks of MEs and SSIs) and revival of SHG units (especially for women). The capacity of these networks and institutions will be built through training and exposure visits. Specialised consultants will support this activity. It is expected that the Social Capital will be improved.
- (b) As networks mature, short run result oriented activities like process up-gradation, hazard reduction, productivity improvement, training in new product preparations, joint exposure to markets etc, will be promoted to make the stakeholders realise the potential of joint action and the need to tackle issues of importance for the long run (such as joint marketing/production).

(c) Active measures for information dissemination and improvement of health related productivity will also lead to empowering the poverty nodes e.g. better knowledge and improved access; change of behaviour of entrepreneurs, improvement in health of workers via better working environment.

(d) Simultaneously, detailed studies will be conducted for the various long run activities like regular joint marketing, choice of new product range, joint production, infrastructure provision etc. for sustained impact on the cluster both with respect to growth and development.

(e) The networks will be promoted to go for long run activities as per their maturity

SHGs and workers will be empowered through better technical knowledge, creation of jobs and additional income through better productivity. SSIs and MEs will be empowered through better access to credit from official sources and an improvement of their processing capacity. It is expected that this will increase the market share of the cluster, bring additional income and create a sustainable growth path for the cluster as a whole.

#### Strategic activities

- Linkages to steady marketing channels and promotion of intra-cluster sub-contracting
- Identification/creation of best technical practices (at various stages) and dissemination
- Quality improvements through awareness creation, basic training and certification
- Availability of working capital
- Creation of new BDS for sustaining the above
- Capacity building of NGOs and other networks
- Enhancement of Corporate Social Responsibility of SSIs and MEs
- Dissemination of information at all levels for empowerment of economic agents

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**Detailed Flow Chart in Cashew Processing**

1. RAW MATERIALS PURCHASED IN 2 MONTHS FOR 8-9 MONTHS STOCK  
?
2. THROUGH AGENT OR DIRECT FARMERS  
?
3. R. M. DRIED ON YARD TO REMOVE MOISTURE  
?
4. DRIED RAW NUT TO BE COLLECTED ,WEIGHED AND PACKED IN JUTE BAGS  
?
5. PACKED RAW NUT BAG TO BE SENT TO GODOWN  
?  
?
6. RAW MATERIAL TO BE STORED AS AND WHEN FUNDS REQUIRE FOR FURTHER PURCHASE OF RAW MATERIAL  
?
7. PROCESS GOES ON 1 TO 6 (POINTS) FOR STORAGE PURPOSE  
?
10. RAW NUT TO BE ROASTED IN ROASTING MACHINE  
?
8. ROASTED NUT TO BE DRIED IN FACTORY SHED FOR 1 NIGHT AND THEN TAKEN TO REMOVE SHELL  
?
9. AFTER REMOVING SHELL NUT TO BE WEIGHED AND SENT TO OVEN (IT MAY BE CONVENTIONAL OR ELECTRIC OVEN) TO REMOVE MOISTURE  
?
10. NUTS GIVEN TO PEEL OFF TESTA (RED SKIN)  
?
11. PEELED KERNELS TO BE GRADED IN 32 GRADES  
?
12. GRADED KERNELS PACKED IN PP BAGS OR TINS  
?
13. TINS VACCUMISED AND FLUSHED WITH CO<sub>2</sub> GAS  
?
14. TWO TINS PACKED IN CORRUGATED BOXES FOR EXPORT ONLY 22.680 KGS. (25 lbs.)  
?
15. PP BAGS TO BE PACKED IN CORRUGATED BOXES IN 5/10 KGS.

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### An Illustration of Cashew Grades and their Yield Percentage

Grade	Meaning
W-180	White wholes, 170-180 no. of kernels in 454 grams
W-210	White wholes, 200-210 no. of kernels in 454 grams
W-240	White wholes, 220-240 no. of kernels in 454 grams.
W-320	White wholes, 300-320 no. of kernels in 454 grams.
W-400	White wholes, 380-400 no of kernels in 454 grams.
LWP	Large white pieces
Pieces - SS	Splits, count not applicable, generally scorched and slightly overheated
SSW	Count not applicable, scorched and immature and discoloured
SSP	Scorched and small pieces

Note: The above is meant to be illustrative only, not all the grades are mentioned

Grade	Kg	%
Cashew Kernels W-180	0.5	2.17
Cashew Kernels W210	1.5	6.52
Cashew Kernels W -240	2.5	10.87
Cashew Kernels W- 320	3.5	15.22
Cashew Kernels W- 400	1.5	6.52
Cashew Kernels SW	1.5	6.52
Cashew Kernels SSW	0.5	2.17
Cashew Kernels DW	0.3	1.30
Splits	2.0	8.7
Second Splits	1.	4.35
Second Scorched Splits	0.7	3.04
Dessert Splits	.4	1.74
LWP pieces	3.0	13.04
SP Pieces	1.4	6.08
SSP Pieces	0.8	3.48
DP Pieces	0.6	2.61
SWP pieces	0.4	1.74
BB pieces	0.5	2.17
Rotten	0.4	1.74
Total (for 100 Kg of raw nuts)	23	100

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