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RESEARCH ARTICLE :

Value chain analysis of cashew processing

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SUMMARY : Cashew with its unique combination of fat, proteins, carbohydrates, minerals and vitamins is in fact a poor man's crop and the rich man's favorite snack food all over the world. India is the largest producer of cashew in the world and accounts for 43.8% of the total world production. Export of the cashew kernel in the year 1996-97 was 68758 MT valued at Rs. 1281.04 crores (Source: CEPC). Indian cashew kernels are exported to more than 60 countries in the world, mainly to USA, Netherlands, UK, Germany, Japan, Australia, and UAE etc. Cashew brought home foreign exchange equivalent to Rs. 1781.61 crores (US $ 372 million), from export of 97550 M.T. of cashew kernels (Rs. 1776.70 crores) and 1814 M.T of cashew nut shell liquid (Rs. 4.91 crores) during the year 2001-2002, constituting 0.86% of India's total export earnings. Keeping in view all these, the present study was conducted based on the secondary data and the results reveled were full utilization of cashew apple, cashew nut shell liquid, cashew shell and cashew testa will lead to higher realization of income for farmers and cashew processor-exporters. Many preparations like juices, jams, candies, pickles, chutneys and alcoholic beverages can be prepared from cashew apple. Bakery items like chocolates, biscuits, cakes etc. with cashew kernels have been developed by different manufacturers.

KEY WORDS :
Cashew, India, Export, Kernels, Farmers

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BACKGROUND AND OBJECTIVES

Cashew is a native of South-Eastern Brazil and was probably the first fruit from post Columbian period introduced from New World and subsequently naturalized in the tropics of Old world. Though more than twenty species of *Allacardium* are reported to be occurring within Central and South America, *Allacardium occidental* is the only species introduced to the Old World. The popular notion is that cashew, indigenous to South and Central America and was discovered by Portuguese missionaries in the 15th Century. The Portuguese later brought this nut to India and East Africa. In India, it was first introduced in Goa. From there, it slowly trickled down the Konkan coastline to Malabar and the rest of Kerala. Towards the last quarter of the 20th century, it spread to other parts of India.

Unlike other fruits and nuts, Cashew has two distinctly visible parts, the cashew apple and cashew nut. Both the cashew apple and nut are rich sources of many nutrients

beneficial to man. The apple is a valuable source of sugars, minerals and vitamins. Fermented liquor obtained from the juice of the apple is claimed to have many curative properties. It is called 'Feni' and is very popular in Goa. The cashew nut, cashew kernels as it is known in commercial parlance, is a unique combination of fat, proteins, carbohydrates, minerals and vitamins. Cashew also contains 21 per cent of proteins and 22 per cent of carbohydrates, and a right combination of amino acids, minerals and vitamins and therefore, nutritionally they stand at par with milk, eggs and meat.

As cashew has, almost as low as, 1 per cent of soluble sugar, the consumer of cashew is privileged to get a sweet taste without having to worry about excess calories. Cashew nuts do not lead to obesity and help control diabetes. In short, it is a good appetiser, an excellent nerve tonic, and a steady stimulant and body builder.

Cashews are mainly used as a snack food item and as an accompaniment in cocktail parties. Its use as a food ingredient or health food is not so widespread, especially in western countries. Cashews can be consumed in varied forms apart from a snack. It blends naturally with many of food preparations of India, China and other Asian countries.

Cashew processing industry in India has flourished in India mainly because of the demand in the international market. Export of the cashew kernel in the year 1996-97 was 68758 MT valued at Rs. 1281.04 crores (*Source: CEPC*). India is the largest producer of cashew in the world and accounts for 43.8% of the total world production. This raw material wealth is a positive aspect for promoting processing industry. At present over 1063 cashew industries are functioning in different states of India.

Today, India dominates the world cashew market. Over 770,000 hectares are under cashew cultivation here. The processing and exporting activities are concentrated in Kerala followed by Tamil Nadu and Karnataka. Some quantity is grown in states like Tripura, Meghalaya, Madhya Pradesh, etc. India today enjoys nearly a 60 per cent share in the world market, exporting 80,000 - 85,000 MT valued at around Rs 2000 crores (*Source: NRCC*).

Tiny processing units (upto 100 MT per year) and medium capacity processing industries (100-500 MT per year) account for 39% and 42%, respectively (Balasubramanium, 2001). India is the largest producer, processor, exporter and second largest consumer of cashew kernels in the world. Indian cashew kernels are exported to more than 60 countries in the world, mainly to USA, Netherlands, UK, Germany, Japan, Australia, and UAE etc. Most cashew growing countries around the world are now trying to earn foreign exchange through sale of processed cashew rather than the sale of raw nuts. A clear indication that margins might lie in the value addition of processing.

Methodology:

Secondary Sources of data: Information from DGCI and S, DCCD, CEPC, ANGRAU, NRCC and Internet.

RESOURCES AND METHODS

Inbound logistics :

We are depending on import of Cashew nut from more than twenty countries. It is understood that these countries are also increasing their production along with processing capacities. Their plans and programmes for the coming year are not available to Indian Cashew Industry. Local raw nuts are at a higher price than the imported nuts. But cashew processors prefer local raw nuts because the local raw nuts have good quality. Cashew kernels are graded according to the quality.

Procurement :

The raw nut procurement is mostly done through a broker. The broker informs the processor as to where the nuts can be procure At present most of the raw nuts are procured based on personal experience or the floating or cutting tests that form the basis to fix up the price. Moisture content of raw nut has strong bearing on the quality of the final product and fixing up the price. The quality of the crop is a function of nut size and nut weight. These characteristics are determined to a large extent by strain of sapling and the agro-climatic, soil conditions of region. The storage life of raw nuts in the godown also depends on the quality of the nuts other than the environment provided for storage

Operations:

The processing units purchase the raw nuts required for processing. The nuts are sun-dried for 1-2 days to reduce the moisture content from 16 per cent to 8-9 per cent and stored in gunny bags in the godown. The processing of raw nut involves nut conditioning, shelling,

drying, peeling, grading and packing.

Drying and storage :

Immediately after bringing the nuts to processing industries, drying on semi-finished floor is done to bring down the moisture level to 8-9% (safer moisture level). The harvested nuts are dried under the sun immediately after procurement. Turning of nut at regular intervals is done to ensure uniform drying.

Nut conditioning :

Conditioning of nuts is done to make them hard and brittle, susceptible for cracking or splitting. There are three types of nut conditioning viz., drum roasting, oil bath roasting and steam boiling. Steam boiling is the commonly used method in which the raw nuts are treated at 25-30 lbs pressure for 20-30 minutes. Then the nuts are cooled for 24 hours.

Roasting :

Drum roasting :

Drum roasting consists of feeding tank constructed at raised level so as to move the raw nuts to rotating drum by gravitational force. In this process the nuts are fed into a rotating drum, which is heated initially to red hot sufficiently to allow the shell portion of the nut to ignite and burn. Once ignition starts no further heating is necessary and the drum maintains the temperature on its own because of the burning of oil oozing out of the nuts. However a disadvantage of this method of roasting is the total loss of shell liquid, which has a good commercial value.

Steaming :

This method of processing is finding increasing acceptance. In this method the raw cashew nuts are treated in a cylinder filled with steam. The treated raw nuts are spread out on the floor for cooling and then sent to the shelling section. The turn out and appearance of whole kernels from raw nuts treated in this method are said to be better. The cashew nut shell liquid obtained from the shells is very clear and command a premium price.

Sun drying :

About 5% of the cashew nut produced in India, are simply dried in the sun for 2 to 3 days and shelled without roasting.

Oil bath roasting :

In oil bath method, as a preliminary operation, nuts are soaked in water for 3 hours and stored in silos after draining excess moisture for 3 days. Processing cost of steam boiling is slightly higher than that of drum roasting but it has the added benefit of CNSL extraction as an advantage.

Shelling

De-shelling using mallets :

In most of the factories shelling of roasted nut is done manually for which women labour is employed. The workers have acquired great skill in shelling and it is stated that the outturn of whole kernels is more than 90% in most of the factories.

Cutting :

Factories employing steam roasting are using a hand operated deshelling machine for removing the shell. This method does not eliminate the labour force and hence, is considered suitable in the present circumstances. In steam boiling method the hand cum pedal operated cutter is used. Laborers are provided with finger gloves to avoid the CNSL effect on hands. Only 2 laborers are required to shell 80 kg steam boiled nuts. Whole nut recovery ranges from 90-95% in both the cases. Though the workers engaged in drum roasting method use ash on their hands as compared to the workers in seam boiling factories using castor oil on their hands; their hands are exposed to the ill- effects of CNSL. In a few factories, workers in the shelling section use water balloons as indigenous finger gloves to avoid the adverse effect of the CNSL on bare hands. Kernel recovery in the drum roasting method is lower than the steam boiling method since the spoilt nut gets completely burnt in the drum roasting process. After drying, the kernels are humidified according to prevailing environment, which facilitates easy peeling, and minimize kernel breakage, before they are sent for peeling.

Peeling :

The peeling of the red skin (removal of testa / seed coat) of the kernel was traditionally done by hand but is now done using a sharp knife or bamboo piece. The red skin will have become loose by drying in the Borma and

storage and the kernel is easily peeled off. Small quantities of kernels bits sticking to the skin are later removed by hand screening.

Grading :

After peeling the red skin, the kernels are sorted out into Wholes, splits and broken and the wholes are graded into different sizes on the basis of the number of wholes per lb. Kernels are graded according to the size manually based on the wholesomeness and colour.

Conditioning :

Particularly in the summer months the kernels become very dry during processing. Hence precaution is taken to recondition the nuts to a uniform optimum moisture level before they are packed.

Outbound logistics:

Packing :

The export trade requires packing of kernels in tin containers, which are hermetically sealed after infusing carbon dioxide the metallic solder used for soldering the cashew tins, was an alloy of tin and lead. Moulded Vacuum Packing (MVP) is gaining importance wherein Nitrogen flushing is done to avoid oxidative rancidity. It is a type of flexible packaging which is chemically neutral, recyclable and environmentally friendly. After securing ISO 9000 and introducing (Hazard Analysis and Critical Control Points), importing countries are following stringent quality standards for cashew kernels and the present system of tin packaging is bulky.

Transportation :

The transport is generally outsourced. Lorries are hired and charges are on a per kilometre basis. The cost of this is borne by the buyer. Brokers claim that at times the cost of transportation may go as high as rupees 100 per tin in the domestic market.

Marketing and sales :

There is demand right through the year and the brokers claim that there is no seasonal fluctuations due to the numerous festivals and marriages that take place. There is a belief that cashew is no longer a luxury item at the rate it is being consumed. Marketing of cashew kernels is not too difficult a job for them.

Margins :

The prices of the raw nuts have been inflated to adjust the shelling percentage to 100% instead of 26% so it is taken to be that 80 kilos of raw nuts give you 80 kilos of kernels to facilitate calculations.

Conclusion :

The results reveled were full utilization of cashew apple, cashew nut shell liquid, cashew shell and cashew testa will lead to higher realization of income for farmers and cashew processor-exporters. Many preparations like juices, jams, candies, pickles, chutneys and alcoholic beverages can be prepared from cashew apple. Bakery items like chocolates, biscuits, cakes etc. with cashew kernels have been developed by different manufacturers.

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