



CUSTARD APPLE VALUE CHAIN

Standard Operating Procedures and Prospects





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01

INTRODUCTION

Forests resources have constantly been an integral part of subsistence and sustainability of any region as well as the livelihood of the forest and indigenous communities. Non-Timber Forest Produce Resources (NTFPs) contribute significantly to the quality of life of the millions of forest dwellers as well as local and regional economies.

The NTFPs contribute more than 50 percent of the total household income among rural communities and are also incentives for the forest dwellers to protect the existing forests. NTFPs contribute substantially to the rural livelihoods, generate revenue for different institutions and conventionally play an important role in the world's economy. The current global resurgence in the consumption of these NTFPs in form of natural drugs, flavours, and additives, and other multitude of usages has indeed amplified the scope of the utilization of NTFPs both from wild and cultivated land. NTFP still is a primary commodity for the subsistence and livelihood in many developing countries including India.



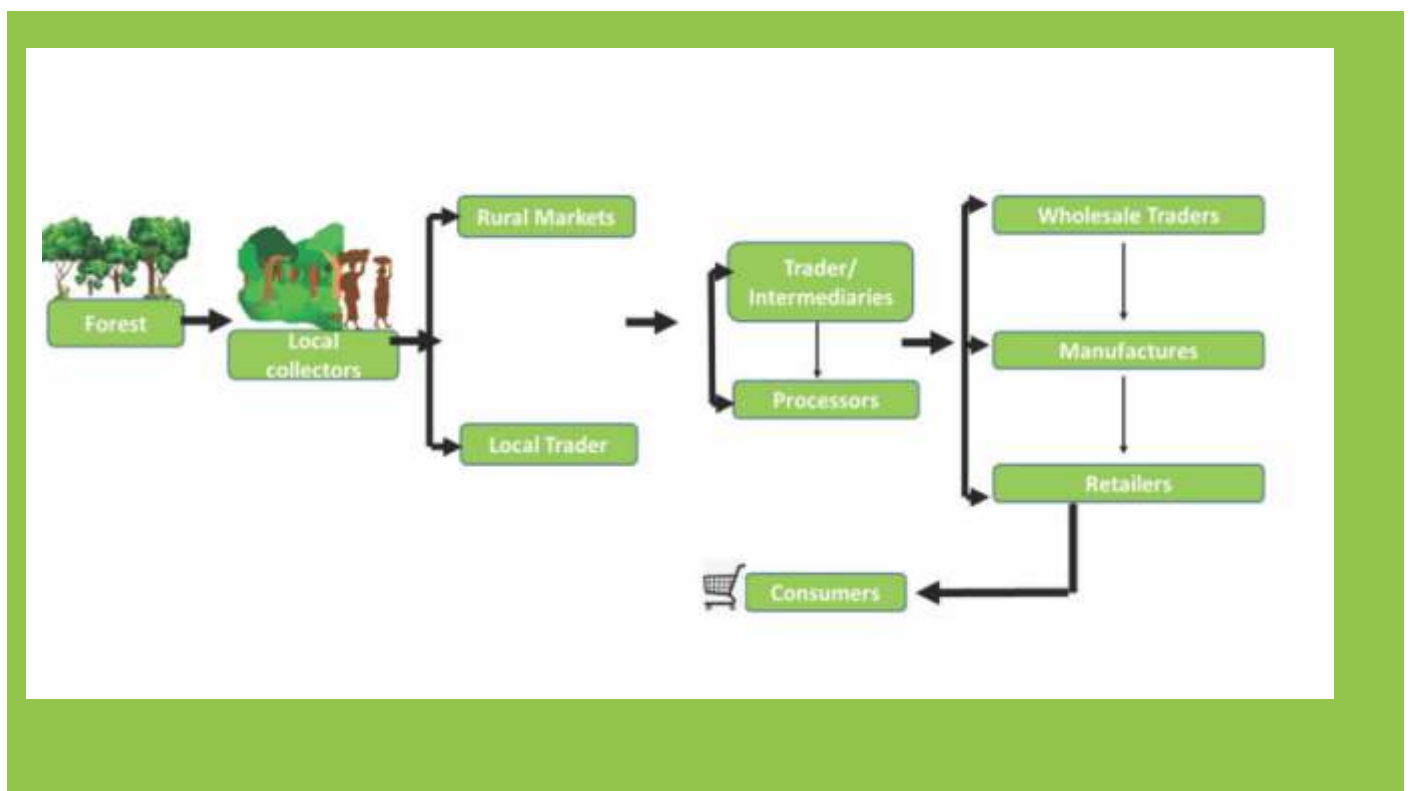
Non-Timber Forest Produce Scenario in India

India's NTFPs have a well established global market of about US\$ 60 billion in the recent years. India is a mega diverse country that accounts a rich biodiversity, for over 45,000 plant species out of which several species are extracted from the forest as NTFPs with the first-rate turnover. NTFPs are an integral part of daily household activities as well as a source of cash income for tribal people in India.

The population of the tribal community in India, as per official data, is 104.3 million (10.43 crore) which is about 8.6 percent of the total population of the country. Of that, about 90 percent live in rural areas where apart from the farm work, they are primarily dependent on the NTFPs for their livelihood. The tribal community of India collects NTFPs estimated to be worth around Rs two trillion annually. In addition to this, NTFP also manages large number of small enterprises in the processing as well marketing. The Madhya Pradesh, Maharashtra, Andhra Pradesh, Chhattisgarh and Orissa state accounts for more than 75 percent of NTFP products in India.

Marketing Chain of NTFP

It comprises of different actors including Primary collectors commonly the forest dwellers or tribal communities, Local traders (collects the raw material from primary collectors), Wholesalers (supplies raw material to different small scale industries), Small scale industries (process the raw material and sell to the industries), Large scale industries (convert into a product for sale) and lastly the consumer. Many intermediaries have been introduced to the market chains resulting in the huge spread of NTFP market web. These include different unauthorised traders at local, regional, state, national levels; commission agents; retailers; suppliers and exporters.



The marketing channel is in-efficient in the case of Non-Timber Forest Products as it is too complex and a large portion of margin is being enjoyed by intermediaries/middlemen and farmers/collectors are unable to realize real benefit. Considering the socio-economic and environmental significance of NTFPs, it is important to promote integrated value chain approaches for long term sustainability of NTFP sub-sector.

The majority of NTFPs sold by the local/primary collectors to the middlemen don't undergo any basic value addition. The processing and value addition is largely done by the intermediaries and brand companies. Capacity building of the primary collectors on identification of right species, collection time, cleaning, follow non-destructive harvesting techniques, sorting, drying, storage, packaging and value addition would enhance their income and increase the value and quality of the product. There is thus, a need for a more holistic approach to tap the potential of NTFP's contribution in the tribal/rural economy.



Sustainable Enterprise Development in NTFP's

Capacity building of the primary collectors and implementing of value addition in large scale innovative and sustainable livelihood models for rural poor families are the need of the time. Holistic approaches to bringing about sustainable livelihood options in tribal regions have been very effectively done by organisations like SRIJAN. They have pioneering experience in promoting many community-owned value chain models for enhancing the livelihood of the rural poor. They are trying to maximize the benefits and margins of farmers/collectors in the value chain.

SRIJAN has already promoted the innovative sustainable enterprise model in Dairy, Pomegranate, Soy and Custard Apple. SRIJAN's NTFPs based enterprises model are Developing community-based enterprise - women SHGs and FPOs and expanding their participation in the value chains, Sustainable Harvesting practices and Management of Natural Resource base ,Technologies and infrastructure for processing and Value addition and Understanding end market and marketing (Meeting market requirements, Quality, Standard and Branding)

Similar models could be replicated and scaled-up into other NTFPs with some modifications as per geographic conditions and need. Such models have good potential for large scale impacts on livelihood and income generation of communities and overall sustainability of NTFP sub-sector.



02

CUSTARD APPLE-A MAGIC FRUIT

Originated in the Andes mountains of South America, Cherimoya/Custard Apple is grown in tropical areas with high altitudes. Due to its creamy texture, it is known as Custard Apple. Also referred to as the magic fruit of the 21st century and the fruit of the poor as it is found mostly in tropical forests where tribal and indigenous communities live. The fruit has many medicinal and nutritional properties, this fruit has its own unique benefits.



Benefits of Custard Apple

1. High in antioxidants

The fruit is loaded with antioxidants which fight free radicals in your body. It also contains kaurenoic acid, flavonoids, carotenoids, and vitamin C.

2. Elevation of Moods

It is an excellent source of vitamin B6 (pyridoxine). Vitamin B6 plays an important role in the creation of neurotransmitters, including serotonin and dopamine, which help regulate your mood

3. Benefits eye health

Cherimoya is rich in the carotenoid antioxidant lutein,

4. Regulates Blood Pressure

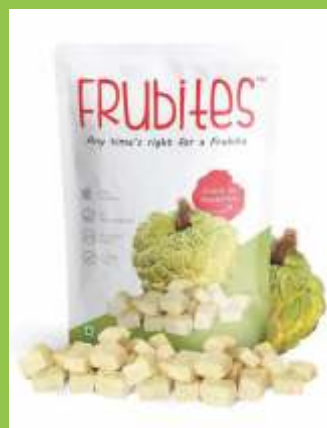
High in nutrients that help regulate blood pressure, such as potassium and magnesium.

5. Promotes good digestion

One cup (160 grams) of cherimoya offers almost 5 grams of dietary fiber, which can promote optimal digestive health.

Available Products of Custard Apple in Indian Market

Custard Apple is mainly eaten as a fresh fruit and its pulp is used for preparing deserts, beverages and ice cream. Fresh fruits have round the year demand and Custard Apple pulp especially has a high demand in festivals and summers which starts from December to July. As it is a highly perishable fruit, it is very important to have sufficient value chain interventions for the distribution of fruit and also for value addition. The tribal regions of India lack infrastructure facilities and they also face various socio-economic issues and challenges during the collection of the produce.



Custard Apple Production in India

India is one of the major producers and exporter of custard apple. Custard Apple production and Area is increasing in India every year. The Custard Apple is seen growing largely in wild with a negligible area under cultivation in our country. According to Reports by APEDA, an estimated area of about 1.15 lakh hectare is under custard apple in India. Grown in over 40,000 hectare in AP, in 35,000 hectares in Maharashtra, 20,000 hectares in Karnataka and 20,000 hectares in Rajasthan. The Custard apple growing regions in India also include Gujarat, Madhya Pradesh, Bihar, Assam, Odisha, Uttar Pradesh, Telangana and Tamil Nadu.

Custard Apple Area and Production is increasing in India per year. In 2013-14 total area of Custard Apple as 22000 hectare and production were 165000 ton, in 2014-15 it as 30,000 hectare and production as 228000 ton, in 2015-16 total area as 35 hectare and production as 271000 ton. Total production in 2017-18 is 298000 ton. The State wise production in 2017-18 was as below.

Sr. No.	State	Production in MT (ooo'MT)	Share (%)
1	Maharashtra	92.32	30.98
2	Gujarat	61.18	20.53
3	Madhya Pradesh	56.74	19.04
4	Chhattisgarh	39.58	13.28
5	Telangana	15.91	5.34
6	Karnataka	14.45	4.85
7	Andhra Pradesh	11.35	3.81
8	Rajasthan	6.12	2.05
9	Kerala	0.19	0.06
10	Tamil Nadu	0.10	0.03
11	Others	0.07	0.02
Total		298.014	

Source: APEDA India

Price volatility of custard apple in Indian market is very high. According to APEDA, the export trader in India generally gets a rate of average Rs 80-90 per kilogram. Frozen pulp of custard apple is having rate of Rs. 150 to Rs 250 per kilogram (1 kg fruit gives approximately 200 gm pulp). Through the above comparison of price, we can understand that the tribal communities/collector gets a very low price for his produce and a major factor responsible for it is the highly perishable nature of custard apple.

03

SRIJAN'S EXPERIENCE in CUSTARD APPLE VALUE CHAIN

As Early as 2013 SRIJAN found quite good prospects for development and strengthening the value chain of Custard Apple in Tribal regions. SRIJAN started work for tribal families and addressing the issue in Custard Apple value chain in Madhya Pradesh and Rajasthan nearly 6 years back in 2013.



The four key building blocks of SRIJAN's NTFPs based enterprises model are:

1. Developing community-based enterprises–women SHGs and FPOs and expanding their participation in value chains
2. Sustainable Harvesting practices and Management of Natural Resource base
3. Technologies and infrastructure for processing and Value addition
4. Understanding end market and marketing (Meeting market requirements, Quality Standard and Branding)

Similar models could be replicated and scaled up to other NTFPs with some modifications as per geographic conditions and need. Such models have good potential for large scale impacts on livelihood and income generation of communities and overall sustainability of NTFP sub-sector.

Processing and value addition is important so as to increase the share of collectors/tribal communities in the value chain. Therefore SRIJAN came to the conclusion that capitalizing on the commercial value of custard apple has immense potential for enhancing livelihood and employment opportunities for tribal and rural communities.

With the technical knowledge support from Maharana Pratap University of Agriculture and Technology, SRIJAN implemented a successful pilot of custard apple processing and value addition in the tribal pocket of Pali district of Rajasthan and later replicated in another tribal pocket of Chhind -wara district of Madhya Pradesh.

The model is in-built with practical and easy solutions and thus it has emerged as a successful and replicable model. Currently it is being replicated by many government agencies and NGOs in many parts of India. The initiative promotes sustainable livelihood of tribal and rural communities and also takes care of conservation of forest and ecological balance.

Under the initiative SRIJAN has promoted the village level collection center which provides fair pricing, grading of produce and timely payment to the producers. The central processing unit takes care about value addition where ripening, scooping, pulping and hardening work takes place. The produce is then sold to institutional buyers through Farmer Producer Company.

The initiative emphasises on participation and decision-making power in the hand of community, which helps the community to grow . This also provides a promising and sustainable business model for FPOs.

Pilot-support from MPUAT, Udaipur, Machine Installation, Pilot Started in Rajasthan

2013

2014

Introduction of Operating Procedure, Institutional Market Linkages

Scaling up of Program in Other Locations (Madhya Pradesh)

2015

2016

Program Support for Marketing and Processing in Pali and Chhindwara

Scaling Up to the tune of 50 MT of pulp production, larger infrastructure

2017

2018

Standardization of Processes, Innovations in the Processes and Marketing Management, Spreading to new States Telangana, Maharashtra

Going forward, need to innovate the product, integrate more technical support through food-technology, get the processing units certifications and improve market linkage with large buyers.



Timely harvesting, processing, value addition and marketing using improved technologies is very important to harness the full potential of this magic fruit Custard Apple. These processes definitely will help in generating an increase in income. The frozen pulp of custard apple is used for Ice creams and Kulfi by major brands like Vadilal, Havmor, Top N Town, Dinshaw's, Scoops, Natures' and other local ice cream makers nationwide. A large portion is also used by the catering and foodservice industry to prepare various custard apple delicacies items such as Sitafal-Rabdi, Basundi, Shakes etc.



SRIJAN has developed a report on Effective Standard Operating Procedures for Custard Apple Value Chain on practices around custard apple. This will help Smallholder farmers/tribal families, practitioners, professionals and executives of organizations as well as Farmer Producer Organizations (FPOs) to have a better understanding of the different components of entire custard apple value chains with a view to providing resources to support. SOP's help achieving efficiency, quality output, consistency and uniformity of performance while reducing errors.

04

Effective Standard Operating Procedures for Custard Apple Value Chain

Steps of Standard Operating Procedure of Custard Apple

1. Preseason Preparation.
2. Procurement Process
3. Processing and Value addition
4. Marketing

05

PRE-SEASON PREPARATION

Steps of Pre-season Preparation

1. Business planning
2. Estimation of fruit production
3. Cleaning of the Processing unit
4. Preventive Maintenance of Unit
5. Village Level Collection Centre Meeting
6. Board Meeting

1. Business Planning

Business planning helps to assess the capital required for planned business turnover, resource planning regarding human resources, infrastructure etc. While preparing the business plan, it is important to review the previous year's business performance and experiences.

Business planning needs to begin at-least 3-4 months before the harvesting season. The Business goals are fixed based on the demand and supply assessment will be done by CEO of FPO in consultation with experts, BoDs and key market players. The volume of custard apple to be procured, profit margins and turnover etc are analysed in business plan meetings.

The strategies are designed for achieving the targeted business goals. Board of Directors as well as staff, community leaders, VLCC in-charge who are associated with the FPO takes part in Business Planning meetings. It is important to engage them in all process, as this would create a sense of ownership among them.



2. Estimation of Fruit Production

Estimating the Production Volume is very important for business planning and is estimated at least 45 days before the first harvesting. Attempting to count the entire number of fruits on a tree is not quite feasible. The Basic data needed to estimate the production volume would include factors like Number of bearing trees, number of fruits per tree, size of fruit and droppage rate. The process is followed for each of the cluster. The collected data and information is cross verified by group discussions with local communities and stakeholders.



3. Cleaning of the Processing Unit

Avoiding any chances of contamination is of utmost importance. The hygiene of the processing unit decides the quality of the ultimate product. Cleaning of machinery, equipment as well as the space surrounding the unit is very essential and ensuring close monitoring of the staff and labour's hygiene is also been included in the cleaning activity.

There will be guidelines set forth for the master cleaning schedule for periodical (daily, weekly/monthly) cleaning activities.

The Documented cleaning methods for each type of equipment/machine/parts within and around the processing unit will be maintained. Training of staff and assigning specific responsibility among the staff for each area of the processing unit will also be included in the periodical.

4. Preventive Maintenance of Equipment

Preventive Maintenance of Equipment will help ensure functioning of all parts of the machinery. Failure of equipment will definitely increase the risk of contamination and losses.

Maintenance Manual

A month of advance maintenance before the initiation of processing activities needs to be done. Appropriate action plans also needs to be developed in case of malfunctioning of any important equipment or machinery. Care, Maintenance and calibration of equipments need to be done by appropriately trained personnel. The Maintenance personnel who work in the processing, packaging and storage areas should be knowledgeable and also comply with the hygiene requirements for production staff.

An operations and maintenance manual is even more critical because so many more people and processes are involved. Without a set of of operating procedures laid out, inefficiency multiplies quickly and we also lose consistency of work. Every time an employee needs to perform a new task, there might be a mini training happening over and over. Different employees can complete the same job in inconsistent ways. And, finally, a lack of documented procedures can result in workplace errors, accidents, or injuries that can cost the company a significant amount of money.

A comprehensive operations and maintenance manual have several common parts:

- **Overview:** This section provides a general overview of the physical plant being discussed as well as the components covered in the manual. It includes personnel information, organizational charts, company history, or other background information.
- **Physical building:** This section details important information about one specific facility. Ideally, this information is collected during the construction of the facility itself and contains floor plans, building materials, finish data, building code and specification information, and site survey.
- **Operating procedures:** A comprehensive, detailed explanation of all major operating procedures should be documented so that a new employee can learn quickly and a seasoned technician can double-check work.
- **Maintenance procedures:** The preventive and corrective maintenance programs should be explained thoroughly including schedules, procedures, responsibilities, trouble-shooting and test requirements.
- **Emergency procedures:** It's important to think through emergency situations before they happen because it can be difficult to remember details in the middle of a chaotic situation. This section

outlines all the people, steps, agencies, and other organizations that need to be notified as well as a primer on how to handle crisis communications internally and externally. An Operation and Maintenance manual needs a platform. With today's technology, we should be able to find a platform that allows us to continuously update and change the operation and maintenance manual as needed. Create a consistent, easy-to-read layout and involve managers in manual development. Be sure to ask your front-line managers for input when actually creating the guts of your operation and maintenance manual. Have a system in place to review and implement the best suggestions so that you are always making your operations and maintenance manual more useful over time.

5. Village Level Collection Center (VLCC) Meeting:

Village Level Collection Centres act as an administrative unit for aggregation. As the whole model is based on the community driven approach, it is very important to ensure active participation of community in all the processes especially in decision making and designing new strategies. These meetings also facilitate experience sharing and feedback on the previous season and accordingly the new strategies are designed for up-coming season. 2-3 such meetings are organized and each meeting takes around 3-4 hours. These meetings are organized a month before the actual processing.



6. Board Meeting:

The board meeting involves the presentation of The Business plan of Custard Apple for the season. They also share responsibilities of different activities like harvesting, procurement, storage, processing and marketing. This process facilitates active engagement of board members in different activities and also in creating a sense of ownership among them. It is very important that the board should be very well involved in all the processes so that they may take care of such enterprises with-out external hand-holding support.

06

PROCUREMENT PROCESS

The Seasonality of flowering and fruiting always varied from time to time. But generally we find Custard apple matures in the month of July and August and is available in the market from the months of September and a major volume in the month of October. The Procurement process is elaborate and starts with harvesting and ends with hardening and cold storage.

Steps of Procurement Process

1. Harvesting of Custard Apples
2. Aggregation by Village Level Collection Centers (VLCC)
3. Storage and Maturation

1. Harvesting of Custard Apples

Identification of the fruit that is ready for harvest is of utmost importance. If not harvested at a proper time Custard Apples will not ripen satisfactorily and will remain hard, turn black and slowly decay. The appearance of the fruit changes from lighter green to a dark green, the interspaces of segments turn yellowish white and turn softer. The carpels become fuller and more rounded, particularly at the base of the fruit and they appear to be round in shape and less pointed.

Since Custard apples are very delicate fruits, the fruit needs to be handled with care to avoid abrasions to the skin. The fruit needs to be collected in a sheet or blanket or directly put into a bamboo basket with leaves lined so that the fruits have lesser or no damage. Sunlight is to be avoided falling on the fruits, since they will get unduly heated and they will ripen early. Over ripened fruits should never be left on the trees as these are more susceptible to fruit fly attack. While transporting also similar measures and care needs to be taken.



Mature Fruit

- Lighter Green
- Very Soft
- The interspaces between segments become yellowish white and initiate cracking of the skin between the carpel.
- Carpels become fuller and more rounded, particularly at the base of fruit. (The fruit may also appear rounder in shape and less pointed.)

Immature Fruit

- Dark Green
- Hard to press
- Carpels are less rounded and pointed



2. Aggregation by Village Level Collection Centers (VLCC)

Village Level Collection Centres act as a standard administrative unit for aggregation and are the initial collection point of Custard Apples. VLCCS ensure the timely collection of fresh fruits and provides market linkage facility. The setting up of VLCCs are based on the availability of a minimum volume of products /fruits per season as well as the connectivity of roads and strength of community institution i.e. SHGs.

The Village Meetings assess the interest of the villagers and these facilitate community led decision making process on their wants to have the VLCC in their village or not. These meetings ensure a participatory approach and create a feeling of ownership among the community. The VLCCs are managed and operated by SHGs and there would be a VLCC in-charge and one leader who is selected from the SHG or a family member of the SHG. The rules for the smooth operation of the VLCC are always formulated much in advance and the procurement planning always done in advance with the active engagement of community.

VLCC provides a local market facility for collectors thus they need not travel or transport the fruits to the local market. Collectors are benefitted through fair prices and transparent practices. Timely and secure payments also save time and unnecessary worry. The grading and sorting at VLCC minimize the risk of wastage at the storage facility. VLCC can be set-up with low investment and the facilities could be used also for aggregation of other NTFPs/commodities. There are a sequence of activities that happen at VLCCS and are enlisted and detailed below.

Sequence of activities at a VLCC unit

A. Setting up of VLCCs

1. Selection of VLCC In-charge and Leaders
2. Training of In-charge and Leaders
3. VLCC kit

B. Grading, Sorting and Pricing at VLCC

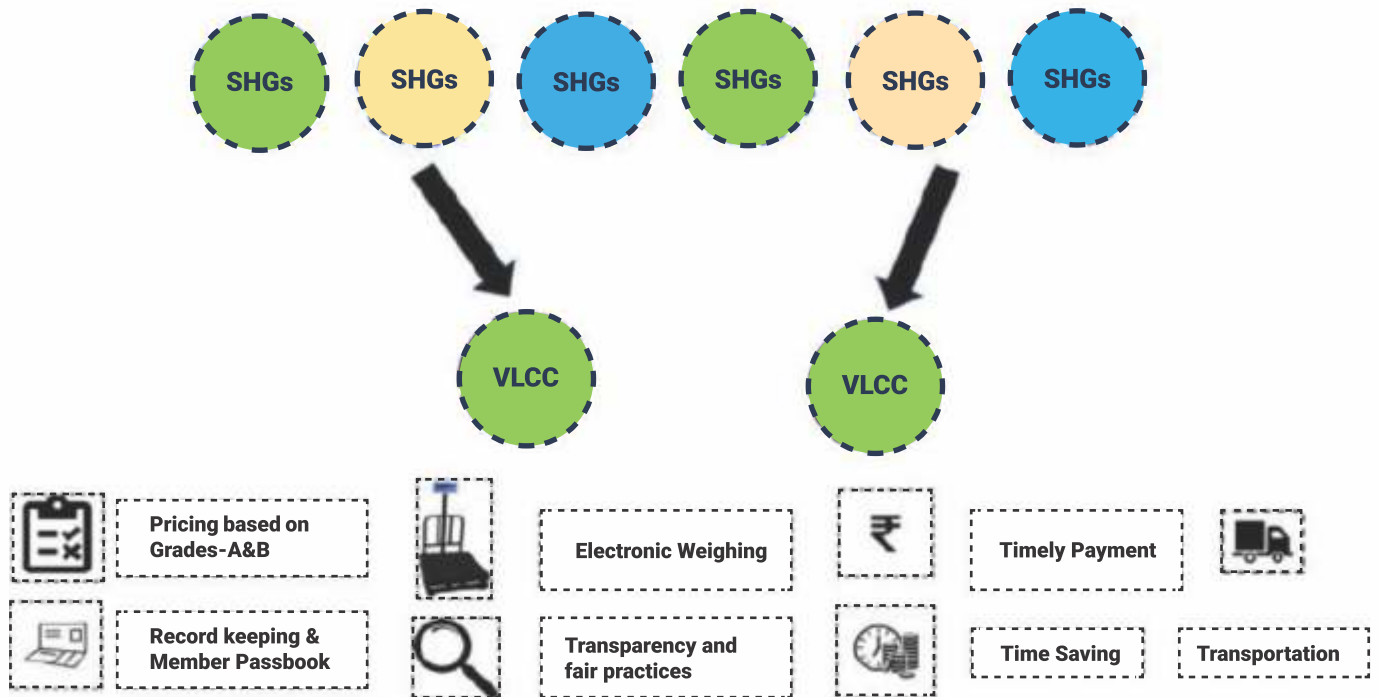
C. Record Keeping at VLCC

1. VLCC sheet
2. Member passbooks
3. Payments

D. Transportation



A. Setting up of VLCCs



1. Selection of VLCC In-charge and Leaders

The community members are responsible for selecting the VLCC in-charge and the leaders who will take care of its operations. The roles and responsibilities are discussed before initiating the selection process. Selection is done based on their ability on general calculation and writing work and also on the basis of their interest in serving the society. One or two in-charge and two leaders are selected for each VLCC and they are paid certain commission for their work.

2. Training of in-charge and Leader

After the completion of the selection process, the training and orientation programme is organized for selected in-charge and leaders. They are trained and oriented on the concept of VLCC and its operation process like grading, sorting techniques, answering queries put forth by its members, record keeping, payment procedures and common challenges faced by VLCCs.

3. VLCC Kit

VLCC always maintains a KIT and that contains report formats, member passbook, pen, calculator, stamp Pad, stapler, flex and a register. Along with this crates and weighing machines are also supplied by FPO to VLCCs. All these helps make work smoother at VLCC Units.

B. Grading, Sorting and Pricing at VLCC

As soon as the fruits are aggregated they undergo grading at the VLCC by the trained women SHG members. The fruits are graded in three kinds and they are :

"A" Grade - >350 gm

"B" Grade - >250 gm

"C" Grade - <150 gm

Only A and B grade are sorted, kept in a crate, weighed and transported for storage and further processing. The prices are also fixed based on these grades.

C. Record Keeping at VLCC

Records keeping help VLCCs run more efficiently. With proper record-keeping in place, data will be kept secure and easy to access. Good records management is good business. There are three records that are maintained in VLCCs and they are

1. VLCC sheet
2. Member Passbooks
3. Payments

1.VLCC sheet

VLCC Sheets are the powerful storehouse of information of member wise and grade wise details of fruits procured. The Sheet comes in handy as a copy is handed over to the route in charge who is going along with transportation. VLCC sheet avoids malpractices related to shortage and missing of fruits during transit. The recorded information also helps in reviewing the performance of members supplying grade A.

Those who are supplying grade B can be sensitized or motivated in turn for supplying Grade A fruit. In addition to this, it also helps in the assessment of VLCC in terms of turn-over or volumes procured etc. The VLCC incharge is responsible for record keeping. The records have to be maintained in the VLCC sheet

2. Member Passbooks

The Members passbook is updated at VLCC level and on the basis of the information recorded the payment is made by VLCC to all its Individual Members.

3. Payments

There are two sheets for payment at VLCC. One contains the sum total of the amount to be paid, this sheet needs to be signed by the person who receives the money and the VLCC In-charge. The second sheet contains the name of the person and the amount of fruit they have sold and the payment they would receive at the VLCC. This sheet needs to be signed by each individual who has sold fruit at the VLCC and then returned back to the route in-charge.

D. Transportation

The collected and graded produce needs to be transported safely to the storage facility and so a route plan is prepared and these ensure the timely supply of collected produce to the storage facility within the day of collection. The route in-charge is responsible for ensuring the execution as well as ensuring the safe transportation of fruits to the storage facility. The crates should be placed properly placed in order and lot wise and safety is to be ensured from damage in transportation.



3. Storage and Maturation

The Custard Apples are brought to the Central Processing Unit 's storage Unit. Central Processing Unit is the space where the maturity of the Custard apple fruits are checked periodically and they are stored at the required temperature. The Processing center should be hygienically maintained. The machines, utensils and crates required should be kept clean regularly. Utensils should be washed with only a certain liquid which is used in the food industry. Adequate ventilation is to be ensured in the storage room and necessary measures need to be kept to keep them neat and clean.

Areas nearby has to be kept free from trash and weeds. The storing areas have to kept free of any products known to emit strong odours. The fruits have to be regularly inspected for damage, disease and decaying. Ensure hygiene practices of workers before entry.

Hand and feet sanitization, wearing proper mask, gloves, head cover, apron and shoes should be made sure. The mask and head cover should be changed on daily basis and apron should be washed at least once in three days. The workers should be trained on safety measures and quality check practices. They are also supposed not to wear ornaments and also encouraged to trim their nails. Visitors are allowed inside only after wearing mask, gloves and cap..First-aid kit should be available at processing facility.

The different sections where the Fruits reach before they go into the processing centre are as follows:

1. Unloading and Stock Verification
2. Storeroom and Ripening Section
3. Sorting

1. Unloading and Stock Verification

Once the crates are unloaded the stock in-charge needs to be weigh each crate and check if the weight written in the VLCC sheet is matching the weighing done at the store. The variances below 5 kg is acceptable as there would be water losses from the fruit after harvesting but if the variance is more than 5 kgs then in that case the route in-charge needs to provide a justification and this is recorded at the storage facility.

2. Store room and Ripening Section



Once the fruits are kept in the store room they are tagged to identify the different lots. Tagging helps to deciding the sorting dates. The ideal storing temperature is around ripening is 25°-30°C for ripening. The fruit crates need to be covered with newspapers to maintain temperature since custard apple comes in winter when the temperature is around 10°C.

3. Sorting

Sorting is a process which involves checking of fruits on daily basis to identify the ripen fruits. All the stored crates in the store are checked and the ripened ones are sent to the processing after noting down its weight. This process is repeated every day. It is important to remove over-ripened fruits from the store room as this may damage other fruits and this may deteriorate the quality of other fruits.



07

Processing and Value Addition

Processing and Value Addition takes place in the storage unit of the Central Processing Unit. The over ripened fruits after sorting are sent to the processing section. There are different sections at the Central Processing Unit to ensure efficiency, cost-effectiveness and hygiene.

The whole process starting from scooping to hardening of packaged pulp should be completed within a very short time ideally under 2 hours to avoid any bacterial growth in the pulp. FSSAI guidelines should also be followed in all these processes.

Steps of Processing and Value Addition

1. Scooping Section
2. Pulping section
3. Packaging
4. Hardening and Cold Storage

1. Scooping Section

Scooping is an entirely manual process wherein the Women scoop pulp from the fruit. Women sit in group of 5 where one woman is engaged in breaking of fruits. The group increases the productivity of women from 80 kg to 120 kg. Scooping needs to be done properly, otherwise the fruit shell will also come along the scooped fruit which results in deteriorating the quality of the pulp.

Uniform scooping should be done which will determine the grit and ensure the quality of pulp and other 4 women do scooping. Similarly, 5-6 group are formed according to availability of labour. The Collected pulp is been send to the pulping room to separate the seeds from pulp. Waste Disposal is also taken care by women and is disposed off in a pit. Proper disposal of wastage should be done at least 50- 100 meter far from the unit and waste materials could be used for preparation of compost.



2. Pulping Section

Pulping can be done by machine or manually. Machine pulping is used for large scale production. The capacity of the machine is 160-200 kg/hr. In the machine-made pulp the presence of segments is around 40 percent. Manual pulping is mainly used for small scale production.

In this process availability of segments in pulp is more than 60 percent. The market demand for handmade pulp is high with higher price. But it takes more time and requires higher production cost. On an average one woman can extract only 5kg pulp daily (i.e. 8hrs) ,

Here the Scooped seeds are shifted to the Pulper Machine, where the segregation of seeds as well as pulp is done. As buyers prefer availability of segments in the pulp this process will ensure that in this process. This new technology is very useful as it reduces the cost of pulp extraction and enhances the quality of pulp.



3 .Packaging

Before packaging, the leftover seeds and grits are removed from the pulp and a preservative called Potassium Metabisulphite, 1g/kg of pulp is added to increase the shelf life of pulp. The preservative should be mixed as soon as the pulp comes out of the machine. A small delay also can affect the quality of pulp. The pulp is weighed and packed in 1 kg and 20 kg packets. Packing is done in LD Plastic pouches which is 65 microns. Packing is done just after mixing of preservatives. There shouldn't be any delay in packing as that may red discolouration of the pulp to red. Every packet must ensure the date of manufacturing on it.



4. Hardening and Cold Storage

Once the packaging of pulp is done, the packets are then placed in the hardening machine at -32 degree Celsius for almost 6 hours so that the pulp is hardened and then it is shifted to the cold room at -18 degree Celsius. During the packaging and hardening processes, utmost care should be ensured to avoid thinner layers at the corners of the packets.

This will result in the pulp becoming red, which is not preferred by the market. To avoid thin layers in corners, plastic trays can be used or packets can be kept in a rack or cartons. Care should be ensured so that each carton does not contain more than 20 packets.



08

MARKETING

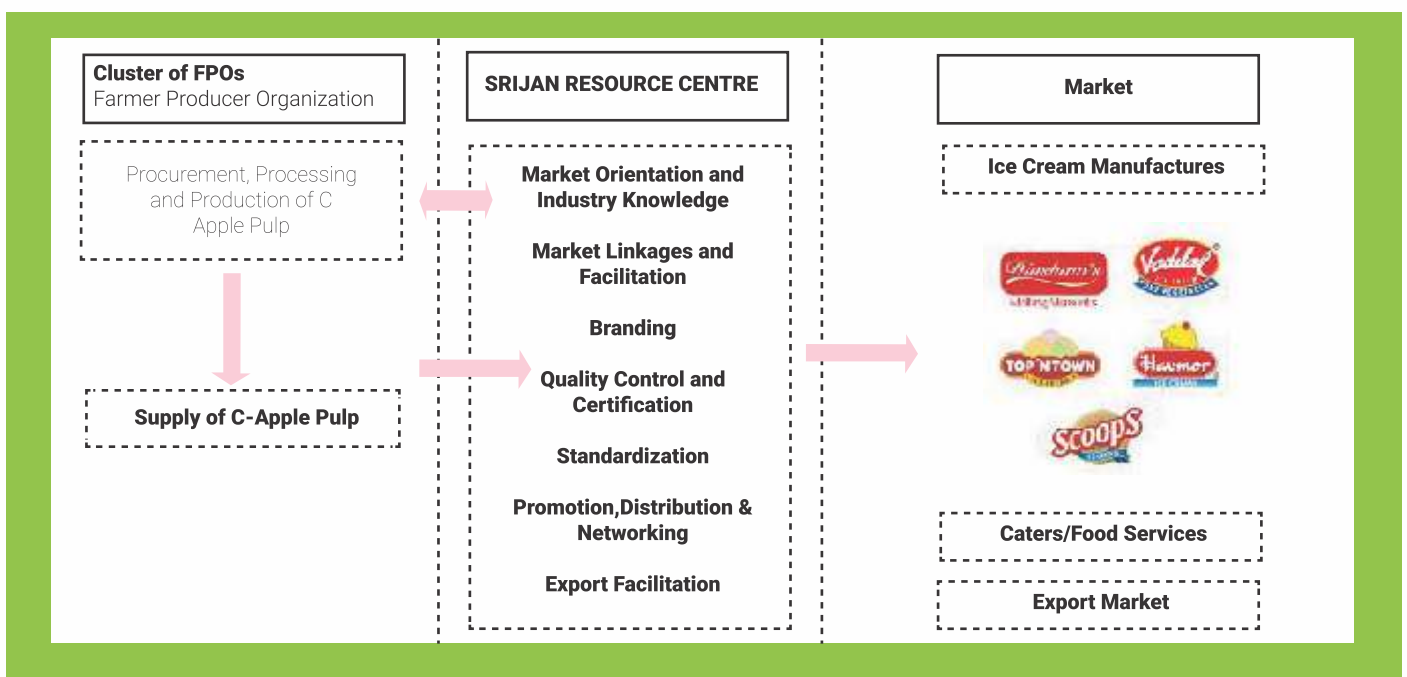
1. Custard Apple Marketing Channels

Custard Apple is largely sold as fresh fruits in the market. The Farmer Producer Organizations engaged in the custard apple value chain activities can market fresh fruits as well as processed pulp since they are always high in demand. The traditional marketing channel is in-efficient as it is too complex and a large portion of margin is being enjoyed by intermediaries/middlemen and farmers/collectors are unable to realize real benefit

The Value-added products have huge scope for marketing in urban areas. There are many players who play key role in marketing of custard apple. They are Custard Apple Collectors, Village Level Middle Men, Traders, Retail shops and Frozen Pulp Processing Units etc. The Custard Apple Pulp could basically be marketed to the Icecream Makers and Caterers. At times the Icecream Makers assist the FPOs in maintaining hygiene standards are also looked after by them in improving quality and upkeeping of good industrial practices.

The Popularity of dishes like Sitafal Cream, Sitafal-Rabdi, Basundi and Shakes are gradually growing which is helping them in getting marketed to northern states as well. The Modern Marketing platforms could vary from Shops in Malls to Super Markets and even online platforms like Amazon and Social media platforms like Facebook to sell well packaged and branded fresh custard apple fruits and its by-products. It is in this context that SRIJAN is trying to maximize the benefits and margins of farmers/collectors in the value chain and also promote Marketing channels.

2. SRIJAN's Custard Apple Marketing Model



SRIJAN is trying to maximize the benefits and margins of farmers/collectors in the value chain. With this objective, SRIJAN has established a resource center which facilitates technical knowledge support for supply chain establishment, processing technologies/best practices, product development, packaging, promotion, quality control, branding and market linkages support etc.

Under the resource centre a marketing platform has been created which aims to facilitate support for ensuring better access to profitable markets. On the other hand, it also helps FPOs to supply healthy, quality and nutritious food products at fair prices for the urban population. Thus, it creates a favourable situation not only to the farmers but consumers too as it would offer fair and market-linked prices to farmers and in turn offers fruits/products at more affordable prices as they would away with the overheads in the form of commission to middlemen. The platform created by SRIJAN, has supported FPOs to have better access to markets and marketing infrastructure. It can be used by any of the FPO, entrepreneurs or those who are engaged in the processing of custard apples or other NTFPs.

3. Do's and Don'ts of Good Marketing Practices

Long Term market relationship: A Long-term market relationship with buyers are very important since this helps in establishing trust, transparency, better quality and efficiency. It is important to take regular feedback from buyers and understand their views about our product which will help us in continuously improving the product. These practices help us in being in a constant network with buyers.

Nearer market: It is important to prefer the nearer markets for sale of pulp as for long distance markets there is risk of quality deterioration.

Buyer visits: Buyer visits to the production and processing sites are very important which helps in building trust, quality assurance and also facilitate further improvement as per industrial best practices and processes.

No adulteration

Availability of marketing material: Availability of Videos, Presentations and Brochures for publicity and networking with potential buyers/consumers.

Competitor analysis: Competitor analysis should be done to assess other sellers' prices, practices and costs etc.

Cost efficiency: Best practices for cost efficiency at all stages should be met, without which it will be difficult to compete in the market with counterparts.

Cold chain: The very critical element of the process and therefore it is important to have agreements.

09

CONCLUSION

Non-timber forest produce (NTFPs) play an important role in supporting rural livelihoods, food security, nutrition, health and subsistence. They derive a significant part of their income from NTFPs and it also supports environmental sustainability and ecological balance. Custard Apple is one of the main Non-Timber forest produce found abundantly in many parts of India. Therefore, capitalizing the commercial value of custard apple has immense potential for enhancing livelihood and employment opportunities for tribal and rural communities, entrepreneurs, community institutions and other NTFP Stakeholders.

SRIJAN being a pioneer in developing and implementing large scale innovative and sustainable livelihood models for rural poor families, has started to work for addressing the issue in custard apple value chain in Madhya Pradesh(Chhindwara) and Rajasthan(Pali) by Direct implementation nearly 8 year backs in 2013 and provided technical support to SRLM (State Rural Livelihood Mission) in Telengana and Maharashtra for promotion of Custard Apple and other NTFP Value Chains. The communities in tribal belts used to collect the fruits from forest area and sell it at very low price because they don't have the knowledge about the value addition and processing.

The technology has been developed in association with the Maharana Pratap University of Agriculture, for standardization of maturity index, proper ripening and storage, mechanized pulp extraction and browning free pulp preservation, as these play an important role in value chain of custard apple. The technology was used to preserve the extracted pulp in its original cream color by mixing antioxidants in combination with low temperature storage.

The SRIJAN Model of Technology has emerged as a successful and replicable model and is being replicated by many government agencies and NGOs in many parts of India.

SRIJAN's expertise in the above said areas would help guide all communities and its stakeholders depending on Custard Apple and its Value Chain. SRIJAN is able to guide on different aspects of pricing, grading of produce to practical training sessions on Value addition like ripening, scooping, pulping and hardening and also on different kinds of packaging. Exposure visit to processing facilities, and technical knowledge in setting up of processing units, business planning and market linkages etc are the other aspects where SRIJAN's expertise would come handy. These trainings from a well established provider like SRIJAN will provide promising and sustainable business models.

The SOP Manual is useful for understanding the custard apple value chain processes and establishing sustainable rural enterprises for enhancing livelihood of tribal and rural communities. We are sure all the stakeholders engaged in promotion of NTFPs based rural livelihoods and value chains will find this Manual useful.



**Further Assistance and Technical Knowledge Support
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