



Research Article

VALUE CHAIN ANALYSIS OF NON-WOOD FOREST PRODUCTS

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Received: March 02, 2020; Revised: March 12, 2020; Accepted: March 13, 2020; Published: March 15, 2020

Abstract: Non-Wood Forest Products are products from forest which is important for addressing poverty issues for the marginalized, forest dependent communities as an alternative source of income. Hence the present study was conducted with the objectives to identify and document the production of various NWFPs in the study area, to identify the potential service providers and for mapping the value chain of NWFPs. The study was conducted in Salem Forest circle of Tamil Nadu. The study uses both secondary and primary data. The sample size of the study was 130. Simple average, percentage analysis was used. The major NWFPs present in the study area was tamarind, gallnut, phoenix grass, shiyakai (*Acacia concinna*), amla, curry leaf, kalakai, wood apple, palmyrah, honey and thandrikai. Among these, tamarind and gallnut were the major NWFPs collected by forest dwellers from the forest and hence value chain analysis was done for these two products. The value-added products were deseeded tamarind fruit, tamarind seed powder and gallnut powder. The stakeholders involved in the value chain were producer, village traders, primary wholesaler processor, secondary wholesaler, retailer and consumer. The total value addition for per quintal of tamarind fruit was Rs. 3709 and it was Rs.1103 for gallnut. The results of Acharya approach and Shepherd approach revealed that marketing channel II and channel I was efficient for tamarind fruit and gallnut respectively. The non-existence of organized market, a greater number of intermediaries in marketing of tamarind fruit, leads to low share to farmers from consumer price.

Keywords: NWFP, Value Chain, Tamarind, Gallnut

Citation: V. Karthick, *et al.*, (2020) Value Chain Analysis of Non-Wood Forest Products. International Journal of Agriculture Sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 12, Issue 5, pp.- 9621-9625.

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Academic Editor / Reviewer: Dr Vijayachandra Reddy S

Introduction

Forests are the major source for timber, fuel wood, fodder, medicine and non-timber forest products (NWFPs) to the rural people for their subsistence livelihood as well as an alternative source of income [1,2]. Non-Wood Forest Products (NWFPs) have always been significant part of the survival and income for forest people and rural populations. NTFPs include fungi, moss, lichen, herbs, vines, shrubs, parts of trees, lac, fibres, floss, mushrooms, edible tubers and medicinal herbs. NTFPs are mainly used for food and medicinal purposes and both cases can be used for domestic consumption and traded commercially. Substantial quantities of NTFPs are extracted on a daily basis for diverse use, as well as subsistence purposes like food, fodder, fuel wood, household articles and implements [3]. NTFP collection and selling is an important source of income for forest dwellers and rural poor. Income from NTFP's varies from state to state ranging from 5.4 to 55 percent. Moreover, 60 percent of NTFP's is consumed as food or as a dietary supplement especially during lean season by forest dwellers. In addition, local communities do not get their full income from NTFP collection [4]. They often get only collection charges even for products that have a very high market value and the profits from collected products goes to middleman viz., contractors, traders, industry etc. With this background the present study was conducted with the objectives to identify and document the production of various NWFPs in the study area; to identify the potential service providers and mapping the value chain of selected NWFP's; and to suggest suitable strategies for efficient value chain management.

Material and Methods

The study was conducted in Salem forest circle of Tamil Nadu.

The Salem forest circle is one of the oldest forest circles in Tamil Nadu (1882) which covers an area of 1,61,723 ha. It consists of three forest division viz., Salem, Attur and Namakkal. The study was conducted in all the forest divisions. The study was based on empirical fieldwork using both quantitative and qualitative data, from primary and secondary sources. Secondary data on major NWFP's and their supply in the study area was collected from official records of Forest Department. The primary data was collected through pretested interview schedule during 2018. Key informant interviews were conducted with NTFPs collector/harvester, processors and traders by using open-ended questionnaire. Informal meetings were held with individuals from the District Forest Officer(DFO), Forest Range officer, Forest Guard. The total number of sample respondents was 130 (80 VFC members, 10 traders, 5 processors and 35 consumers)

Tools of Analysis

Simple average and percentage analysis were used to describe the socio-economic profile of the NTFPs collectors', value addition and problems in collection of NTFP in the study area. To study the marketing efficiency price spread analysis, Acharya approach and Shepherd approach was used.

Acharya Approach

$ME = FP / (MC + MM)$

Where, FP-Price received by the farmer per quintal; MC-Total Marketing cost per quintal; MM- Net marketing margin

Shepherd approach

$ME = CP / (MC + MM)$

Where, CP-Consumers purchase price; MC-Total Marketing cost per quintal; MM-Net marketing margin

Results

The major NWFP's present in Namakkal forest division were tamarind, phoenix grass, gallnut, palmyrah, shiyakai (*Acacia concinna*), honey and korai grass. In Salem forest division, tamarind, gallnut, amla, curry leaf, kalakai, wood apple, honey and thandrikai were the major NWFP's collected by the forest dwellers. In Attur division, curry leaf, gallnut, tamarind, phoenix grass, bamboo and neem were the important NWFP's. The list of NWFP's present in the study area was given in [Table-1]. Since tamarind and gallnut were the major NWFPs collected by the forest dwellers in the study area, these two NWFP's were selected for mapping their value chain.

Mapping the value chain of Gallnut

The value chain actors and their function and Gallnut in the study area were identified using generic worksheet cross functions. The common actors in the tamarind value chain were VFC members, village traders, wholesaler cum processor, secondary wholesaler, retailer and consumer. Each actor in the value chain performs more than one function.

VFC members

The VFC members are the first level of actors in the value chain. In the study area all the VFC member are not doing any value addition activities. They sold the collected tamarind to local traders or to the wholesaler after collected from the forest area through auction.

Village traders

Among the trader's, village traders are involved in value addition activity. The village traders procuring the tamarind fruit from VFC members at farm gate price bearing cost on collection, transportation and packing material. A less percentage of village traders involved in value addition activities and rest of them were sold the tamarind fruit to wholesaler cum processor.

Wholesaler cum Processor

Wholesaler cum processor was the next actor in the value chain. They collect the major portion of the tamarind fruit from the VFC. The main aim of the processor is converting the whole tamarind fruit into deseeded tamarind fruit. During processing 38 percent of deseeded fruits were obtained from 100 kg raw tamarind fruit, 29 percent were seed, 25 percent were husk and 8 percent were the fibre. The tamarind seed powder is blended with wheat flour to make bread and biscuits. It also used as cattle feed and elephant food. The powdered husk was blended with coconut shell to produce agarbathi. The husk and fibre obtained from tamarind also used in bricks making as fuel energy.

Secondary wholesaler

The secondary wholesaler in the value chain usually collects the deseeded tamarind fruit from the processor. They do not involve in any kind of value addition and incurred only marketing cost.

Retailer

Retailer usually collects the deseeded tamarind fruit from secondary wholesaler or local traders. Some retailers directly collect from processor. Retailers also did not add any value addition and incurred only marketing cost.

Consumer

Consumer was the last actor of value chain in the study area. The main aim of consumer was to attain maximum utility by purchasing and consuming deseeded tamarind.

Marketing channel and Price spread Analysis

Identification of marketing channel was the pre request to study the marketing aspect of tamarind (Fig 1) and Gallnut (Fig 2). The tamarind collected by the VFC

was sold to the local trader or wholesaler and processor. Further wholesaler sold it to the retailer to reach the consumer. There are three marketing channels were identified in the study area for deseeded fruit tamarind.

Channel I

Producer (VFC)-Wholesaler cum processor-Secondary Wholesaler-Retailer-Consumer (93 Percent)

Channel II

Producer (VFC)-Local traders cum processor- Retailer-Consumer (5 percent %)

Channel III

Producer (VFC) – Consumer (2 percent %)

From the total NWFP collector's 93 percent of the VFC members were selling their produce through channel I. The price spread for each marketing channels were assessed to know the marketing functions performed by different intermediaries and it was presented in [Table-2]. The price spread was Rs.127 in channel I and it was Rs.108 in channel II. The farmers share in consumer income was 24.77 percent in channel I and 32.39 percent in channel II. The results of acharya approach and shepherd revealed that channel II is more efficient than channel I.

Gallnut

The gallnut was widely used in tannery unit for softening the leather products and also used in traditional medicine. Around 98 percent of the collected gallnut was sold to the leather industry and remaining two percent was used in traditional medicine. The gallnut was sold to consumer in the form of dry fruit and powder. In the study area around 85 percent of the gallnut was sold in the form of powder. The Gallnut were marketed through four marketing channels, viz.,

Gallnut Powder

Channel I

Producer (VFC/ Farmer) – Wholesaler cum Processor – Consumer (87%)

Channel II

Producer (VFC/ Farmer)-Wholesaler cum Processor-Retailer-Consumer (2%)

Gallnut Fruit

Channel III

Producer (VFC/ Farmer) - Local traders - Wholesaler – Consumer (7%) (Fruit)

Channel IV

Producer (VFC/ Farmer) – Wholesaler – Retailer – Consumer (4 percent)

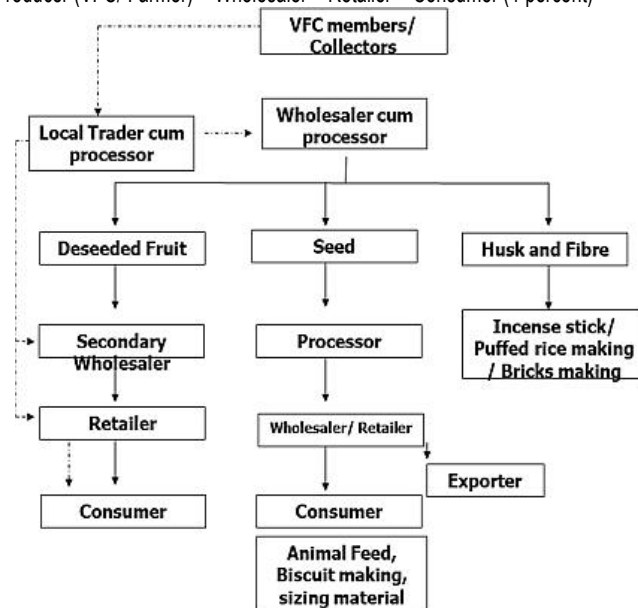


Fig-1 Value chain map of Tamarind

Table-1 List of NWFP's in the Salem Forest division

SN	Name of NWFP	Botanical name	Parts of the plant used	Purpose for which it is used
1	Tamarind	<i>Tamarindus indica</i>	Fruits	Culinary purpose
2	Gallnut or Kadukai	<i>Terminalia chebula</i>	Fruits	Tanning, medicinal
3	Phoenix Grass	<i>Phoenix sylvestris</i>	Whole plant	Brooms making
4	Seekakai/Shigekai	<i>Acacia concinna</i>	Pods	washing and cleaning
5	Soapnut	<i>Sapindus emarginatus</i>	Fruits	Washing
6	Avaram bark	<i>Cassia auriculata</i>	Bark	Tanning
7	Amla	<i>Emblica officinalis</i>	Fruits	Pickle, Medicinal
8	Athikai	<i>Ficus spp.</i>	Fruits	Medicinal
9	Curry leaves	<i>Murraya koenigii</i>	Leaves	For masala
10	Wood apple	<i>Feronia elephantum</i>	Fruits	Edible
11	Kilakkai	<i>Carrisa carandas</i>	Fruits	Edible, Pickle, Chatni
12	Custard Apple	<i>Anona squamosa</i>	Fruits	Edible
13	Ber	<i>Zizyphus jujuba</i>	Fruit	Edible
14	Murukkan leave	<i>Butea frondosa</i>	Leave	Eating plate
15	Palmyrah	<i>Borassus flabellifer</i>	Fruits/leave	Edible, Thatching, fence.
16	Thanikai	<i>Terminalia bellirica</i>	Fruits	Medicinal
17	Neem	<i>Azadirachta indica</i>	Seeds	Medicinal, oil
18	Mango	<i>Mangifera indica</i>	Fruit	Edible
19	Illuppai	<i>Madhuca latifolia</i>	Fruit	Medicinal
20	Sundakkai	<i>Solanum spp</i>	Fruit	Edible
21	Korai	<i>Cyperus spp.</i>	Grass	Mat making
22	Naval	<i>Zyzygium cumini</i>	Fruit	Edible
23	Jack	<i>Artocarpus heterophyllus</i>	Fruit	Edible
24	Lichens	<i>Fungi species</i>	Whole plant	Edible
25	Broom Grasses	<i>Thudaiappam</i>	Leaves/Stem	Thatch, broom
26	Vettiver	<i>Vetiveria zizanioides</i>	Roots	Essence

Table-2 Price spread and Marketing Efficiency for Tamarind Fruit

SN	Efficiency	Channel I	Channel II
1	Farmers Price (Rs/Kg)	43	42
2	Consumer Price (Rs/Kg)	170	150
3	Price Spread (Rs/Kg)	127	108
4	Farmers share in consumer rupee (Per cent)	24.77	28.07
5	Shephred approach	1.33	1.39
6	Acharya approach	0.33	0.39

Table-3 Price spread and Marketing Efficiency for Gallnut

SN	Efficiency	Channel I	Channel II	Channel III	Channel IV
1	Farmers Price (Rs/Kg)	11	10	10	13
2	Consumer Price (Rs/Kg)	29	61	20	43
3	Price Spread (Rs/Kg)	17	51	10	30
4	Farmers share in consumer rupee (Per cent)	43.1	20.11	51.6	28.75
5	Shephred approach	1.87	1.28	2.24	1.46
6	Acharya approach	0.8	0.26	1.16	0.42

Table-4 Value Chain analysis of Tamarind

Stake Holder	Source	Purchase price	Processing/ Marketing charges	Processed output	Processed Product (Kg/Qtl of fruit)	Price /kg	Value (in Rs.)	Gross Return (in Rs.)	Total cost	Value added	Per cent
VFC member				Whole fruit						1600	30.14
Wholesaler cum processor	VFC Member, village trader	1600	1620	Deseeded fruit	38	140	5320	5941	3220	2721	51.25
				Seed	29	18	522				
				Husk and fiber	33	3	99				
Secondary Wholesaler	Processor	5320	114	Deseeded fruit	38	157	5966	5966	5434	532	10.02
Retailer	Secondary wholesaler	5966	38	Deseeded fruit	38	170	6460	6460	6004	456	8.59
Consumer	Deseeded fruit	6460									
Net Value addition (Rs/Quintal of Tamarind fruit)										5309	100
										3709	

Table-5 Value Chain analysis for Gallnut powder

Stake Holder	Source	Purchase price	Processing/ Marketing charges	Processed output	Processed Product (Kg/Qtl of fruit)	Price /kg	Value (in Rs.)	Gross Return (in Rs.)	Total cost	Value added	Per cent
VFC member/Farmer				Whole fruit						1325	54.4
Wholesaler cum Processor	VFC Member, Farmer	1325	279.8	Whole fruit and Powder	95	28.5	2707.5	2707.5	1604.8	1102.8	45.6
Consumer	Wholesaler cum Processor			Gallnut powder							
Net Value addition (Rs/Quintal of Tamarind fruit)										2427.8	100
										1102.8	

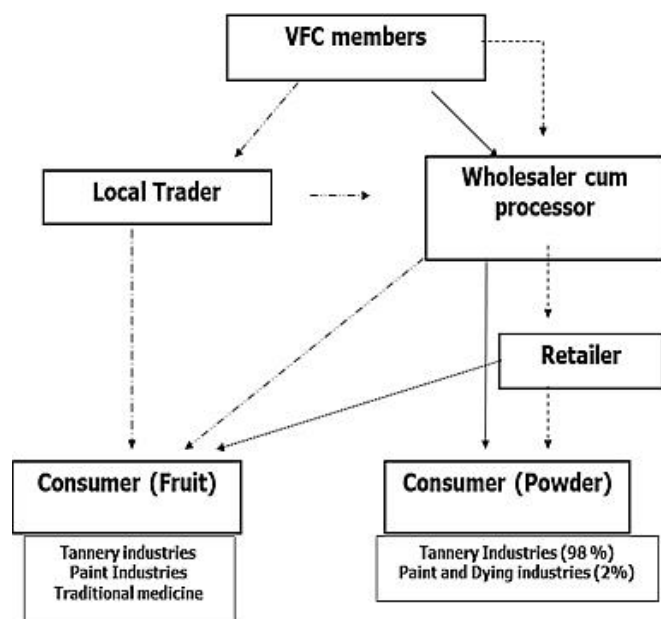


Fig-2 Value chain map of Gallnut

The farmers/VFC members (87 percent) were selling the gallnut through channel I. Gallnut powder was the final product in channel I, which was sold to the tannery industries (Ambur and Peranambut in Vellore district, Tiruchirappalli and Dindigal Districts). The price spread was Rs.17.08 in channel I and it was Rs. 9.43 in channel III. Gallnut was sold as dry fruit to the consumer in channel III. The farmers' share in consumer price was 51.60 percent in channel III and 43.10 percent Channel I.

Value Chain Analysis

Value addition for tamarind fruit and Gallnut is presented in [Table-4 &5]. The value chain comprises of stakeholders such as VFC member, village traders, wholesaler cum processor, secondary wholesaler, retailer and consumer. Average price received by the VFC member was Rs. 1600 per quintal (30.14 Percent of raw fruit). The wholesaler cum processor purchase raw fruit from the VFC members at Rs.1600 per quintal and the marketing cost was Rs. 1620. By processing the wholesaler cum processor gets 38 kgs of deseeded fruit, 29 kgs seed and 33 kgs of husk and fibre from one quintal of raw fruit. The seeds were sold to the seed powdering units or to other trader from Thirupathur taluk form vellore districts or traders from Andhra Pradesh at the rate of Rs.18/kg. The husk and fiber was sold to the traders at Rs.3/kg in Dharmapuri and Krishnagiri districts of Tamil Nadu and it was used as raw material for agarbathi making and as a fire wood in puffed rice, bricks making unit. The price per kg of deseeded fruit is Rs.140. From the processor the processed fruit are procured by the secondary wholesaler (Erode, Tirupur, Coimbatore, Trichy, Dindugal, Chennai and Pondicherry) at Rs.140 per kg in Salem lee bazar market through auction and sold to the retailer at Rs.157 per kg. The value addition of secondary wholesaler is 10.02 percent. The retailer sells it to the consumer at Rs.170/kg. The total value addition was Rs. 3709 per quintal of tamarind fruit.

The stakeholders in the value chain of gallnut comprises of producer, local traders, wholesaler, processor and consumer. The value addition rate at wholesaler cum processor level was 45.64 percent. The total value addition per quintal was Rs.1103.

There was a lack of local market for tamarind, gallnut and people were selling it to the interested buyers who fix price which were usually lower than the market prices. The other constraints in marketing of NWFP are poor links to markets, inadequate market information and weak bargaining power.

Conclusion

From this study it is concluded that, the major NWFP's present in the study area was tamarind, gallnut, phoenix grass, shiyakai (*Acacia concinna*), amla, curry leaf, kalakai, wood apple, palmyrah and thandrikai. Among these, tamarind and gallnut

were the major NWFP's collected by forest dwellers from the forest and hence value chain analysis was done for these two products. The value-added products were deseeded tamarind fruit, tamarind seed powder and gallnut powder. The stakeholders involved in the value chain were producer, village traders, primary wholesaler processor, secondary wholesaler, retailer and consumer. The total value addition for per quintal of tamarind fruit was Rs. 3709 and it was Rs.1103 for gallnut. The price spread was Rs.127 in channel I and it was Rs.108 in channel II. The farmers share in consumer income was 24.77 percent in channel I and 28.07 percent in channel II for tamarind fruit. The results of Acharya approach and Shepherd revealed that channel II is more efficient than channel I. The farmers' share in consumer price for gallnut in channel I was 43 percent and it was 52 percent in channel III. The results of efficiency analysis revealed that channel I is efficient for marketing of gallnut powder.

The results of the study revealed that there was no practice of processing the tamarind fruit at VFC level as it does not require any sophisticated equipment's for processing. Hence, attention was needed in creating awareness among the VFC members on processing and also providing yard facilities for doing the processing activity on their own. The non-existence of organized market, a greater number of intermediaries, the low share in the consumer price discourage the farmers to collect and go for value addition. This may be strengthened by recommending certain policy issued by the State Government (Strengthening of the existing LAMPS in the forest fringe area for procurement, fixing the sales price). Complete value addition of gallnut was done by the intermediaries. Hence, they received the major share of consumer price. The value addition of gallnut to be done by VFC, creating necessary facilities viz., storage godown, drying yard, small scale processing unit and giving capacity building programme on value addition of gallnut. Further market linkages to marketing institutions viz., TRIFED, KVIC, LAMPS may be established to market the value-added produce.

Application of research

The results of the study will be helpful to the researchers for conducting further research in forest products and helpful to the policy makers for framing suitable policy options on conserving forest products and improving the livelihood of the forest dependent communities.

Research Category: Agricultural Economics

Abbreviations: NWFP- Non-Wood Forest Products;

NTFP- Non-timber Forest Products; VFC- Village Forest Council

Acknowledgement / Funding: Authors are thankful to Forest College and Research Institute, Department of Agricultural Economics, Tamil Nadu Agriculture University, Coimbatore, 641003, Tamil Nadu, India and District Forest Officers of Salem and Namakkal Districts.

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Research project name or number: Value Chain Analysis of Selected NWFP's in Salem Forest Circle

Author Contributions: All authors equally contributed

Author statement: All authors read, reviewed, agreed and approved the final manuscript. Note-All authors agreed that- Written informed consent was obtained from all participants prior to publish / enrolment

Study area / Sample Collection: Salem Forest Circle, Tamil Nadu

Cultivar / Variety / Breed name: Non-Wood Forest Products [Tamarind, Gallnut, Phoenix Grass, Shiyakai (*Acacia concinna*), Amla, Curry Leaf, Kalakai, Wood Apple, Palmyrah and Thandrikai]

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

Ethical Committee Approval Number: Nil

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