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Review on Value Chain Analysis of Kothala Himbutu, *Salacia chinensis*

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Abstract

Kothala Himbutu has high importance with medicinal value. The goal of this analysis is to get information that wanted to map the value chain, give suggestions, and get associated challenges focused on developing productive and globally competitive industries reliant upon the sustainable management of limited natural resources such as Kothala Himbutu. However, there is a gap in the ethnopharmacological literature in terms of understanding what importance a significant analysis of value chains of the underutilized crop, Kothala Himbutu could have. For this study, a mixed-methods approach focuses on a general review of the literature in a systematic online search with a hand search of bibliographies and discussions with respondents such as Ayurvedic practitioners, medicinal plant cultivators, herbal plant collectors, middlemen, Ayurvedic drug sellers, Ayurvedic drug manufacturers, and herbal raw material suppliers. The overall value chain operates with little vertical integration and almost no horizontal collaboration. Downstream activities depended on market demand while upstream activities were on value addition. Consumer awareness of value-added Kothala Himbutu products was insufficient due to the unavailability in the market. Our paper takes a critical stocktake of Kothala Himbutu value chain in Sri Lanka and focused to identify its role in rural medicine and income security.

Keywords: Challenges, Income, Medicinal Value, Underutilized Crop, Value Addition

Introduction

An economically unrecognized large variety of crops contributed a lot to medicines as well as wallets throughout the generations in Sri Lanka which is a global hot spot of biodiversity. Some of the crops which are unrecognized in the scientific literature or unidentified in economics were recognized by the local people throughout the centuries utilizing food, nutrition, health, medicinal, cosmetic, and economic values. The term, the underutilized crop is commonly used to refer to crop species whose potential has not been fully utilized. Rural smallholder farmers have been cultivating and using those crops for a long time.

Value addition by Kothala Himbutu as an underutilized crop in Sri Lanka has a huge potential in developing into a major agri-business where an ever-increasing demand exists due to the expanding herbal drug industry. This situation hinders the potential of the medicinal plant sector to create more employment opportunities and it directly affects the income and livelihoods of those who are involved in the sector. However, Kothala Himbutu industry is being constrained particularly by its nature of high demand and low supply to which the value addition has been recognized as the sole and promising solution. Yet actors are conscious that there are local and export market opportunities for herbal plant products without necessarily being able to identify consumer trends or react quickly to them at their level of operation(FAO, 1993).

An agricultural value chain is important to the survival of human society, the growth of national economies, the wealth and welfare of individual producers. Value chain research focuses on the nature of the relationships between the different stakeholders involved in it. A value chain describes the series of activities required to make a finished product from its original raw material (Chopra and Meindl, 2004). It is also composed of the transactions and processing of a product until it reaches its end market with different kinds of processing, transportation, and branding. Different stakeholders in the value chain are likely to have superior or slighter degrees of power, reflected in the kinds of incomes that each earns and characteristics of the final product (Giuliani

et al., 2005; Kaplinsky, 2000) concerning herbal plant species and their reduced level due to over-collection from natural habitats. Value chain analysis has been used as a tool for understanding socioeconomic profits, disadvantages, and risks for each stakeholder in a chain and the profits of gathering non-timber forest products with a high value (Wynberg *et al.*, 2003) too.

A 'value chain' in agriculture identifies the set of actors and activities (Table 1) that bring a basic agricultural product from production in the field to final consumption, where at each stage value is added to the product. A value chain can be a vertical linking or a network between different independent business organizations and can engage in processing, packaging, storage, transport, and distribution (FAO, 2010).

Value addition of the medicinal plant industry flinches at the grass-root level of cultivation of medicinal plants and primary processing of medicinal and aromatic plants which includes the procedures such as cleaning, drying, and sorting of medicinal plants at the very early phase of collection and harvesting of medicinal plants (Tanya Chhabra, 2018). Post-harvest handling, packaging, measuring (weight), sorting, labeling, transport, pricing and even drying activities seem to be followed without acceptable standards.

Only a limited number of studies exist on value chains of herbal medicines (Hishe *et al.*, 2016). Even though the value chain analysis of Kothala Himbutu will help to design ways of adding value at the producers to live and get the maximum benefits, the transformation of products through value addition has become minimal. Therefore, having a better understanding of the value addition along such channels is vital to develop the sector to a sustainable level.

Objectives of the Current Study

The objectives of this study are,

- To analyze the Kothala Himbutu value chain in the lowland wet zone of Sri Lanka and to identify the opportunities and constraints of stakeholders along the value chain.
- To examine different Stakeholders and their roles along Kothala Himbutu value chain and its contribution to rural medicine and income security.
- To make suggestions to improve the value chain towards a market-oriented Kothala Himbutu production system to meet the increasing demand from the local and export market.

Materials and Methods

Three districts of western two districts from sabaragamuwa and two districts of southern provinces were considered for the study and a mixed-methods approach was employed to collect the data.

A general review of the literature available based both on a systematic online search and a search of bibliographies on the value chain of Kothala Himbutu was conducted. A semi-structured questionnaire survey, discussions with experts, and face to face interviews were carried out randomly to receive an idea about the value chain of Kothala Himbutu and the herbal tea manufacturing process with Kothala Himbutu and current environmental, economic, and social status with using the snowball technique.

Sampling

Since too little was known of the population beforehand (due to the absence of secondary sources) to allow for (stratified) random sampling, use had to be made of non-probabilistic sampling methods (Barry, 2007). In this case, a 'quota' method was used in combination with the snowball method. Under the former, representativeness is sought not by equal probabilities but by arbitrarily fixing a desired number of respondents. An attempt was made to include respondents from various socio-economic backgrounds. The combined target sample population was 100 which included cultivators (60), collectors (2), traders (10), processors (5), and consumers (23).

Only primary data have been made used in the study.

Primary Data

Primary data collected from different actors along the value chain such as growers, collectors, processors, wholesalers, retailers, and consumers. The survey method and Key Informant Interviews (KIIs) were applied to collect primary data.

Field observations, in-depth interviews with selected value chain representatives such as farmers, wild collectors of herbal raw materials, traders,

Table 1: Kothala Himbutu Value Chain

Input provision	Cultivation	Processing	Marketing	End market
Substrate	Pest control	Sorting/ Grading	Sorting	Wholesale
Preparation	Harvesting	Drying	Weighing	Retail sales
Propagation	Packing	Cutting	Packing	
	Sorting	Grinding	Transporting	
	Storage	Mixing		
	Transporting	Cooking		
		Freezing		
		Packing		
		Labeling		

whole-sellers as well as the consumers in village markets, urban markets, and supermarkets support to conduct rapid value chain analysis which allows us to map the value chain of the underutilized crop, Kothala Himbutu as shown in Figure 1.

We concern to identify the availability of Kothala Himbutu raw materials or value-added products of Kothala Himbutu at particular village markets and at their household places and how it contributes to medicine and household income generation. The operationalization process involved with visiting the selected locations where the product is growing, collecting, trading, and selling which has supported to investigate the products, prices, places, and promotions of Kothala Himbutu raw materials and/or value products of it indoor to determine the nature and behavior of the upstream and downstream agents, qualitatively assess the market opportunities, gain an overview of supply and demand, competitiveness in the market place, product attributes, determine uses, preferences, and expectations for specific products, and define market strategies employed.

Results and Discussion

Identification of value chain of Kothala Himbutu

Based on the long history of medicinal plant usage, users of traditional medicines accept that they are safe for human consumption.

Medicinal plant-based livelihood systems are often mediated by market demand and are a good source of employment and income generation to poor rural communities. The Ayurvedic medicine industry exhibited a capable market and the number of raw materials procured by each of the sample pharmacies showed a rising style year after year.

The demand for medicinal plants has a derived demand based on the demand for the Ayurvedic drug's finished products. The market for Ayurvedic drugs exhibited a steady growth rate and hence the demand for the medicinal plants showed a steady increase, despite increasing prices. The pharmacy, which demanded the highest quantity of medicinal plants, offered the highest price.

Herbal medicines are produced by quite a few small companies, including frequent neighborhood pharmacies that compound ingredients to make their remedies in Sri Lanka too. The buyer can suppose to have some input and power over the quality of the herb material, the sourcing company can ask for crops to be collected at convinced times of the year, dried, and stored in agreement with the buyer's specification by paying a decided price for a guaranteed quantity of herbs. This seems to be a logical and pragmatic approach to satisfying both the demands of international trade and the need to assure consistent and stable price structures and also the future for the growth of Kothala Himbutu value-added production is inextricably linked to its health claims, but it is not only the health of consumers that are affected but also the workers and farmers in the countries of origin too. Since no systematic assessment of the value chain of Kothala Himbutu exists, we systematically compared various routes of how products reach a market.

Kothala Himbutu cultivators, collectors, wholesalers, retailers, processors, and consumers are the main stakeholders considered in this study. This simplified model suggests that individual producers

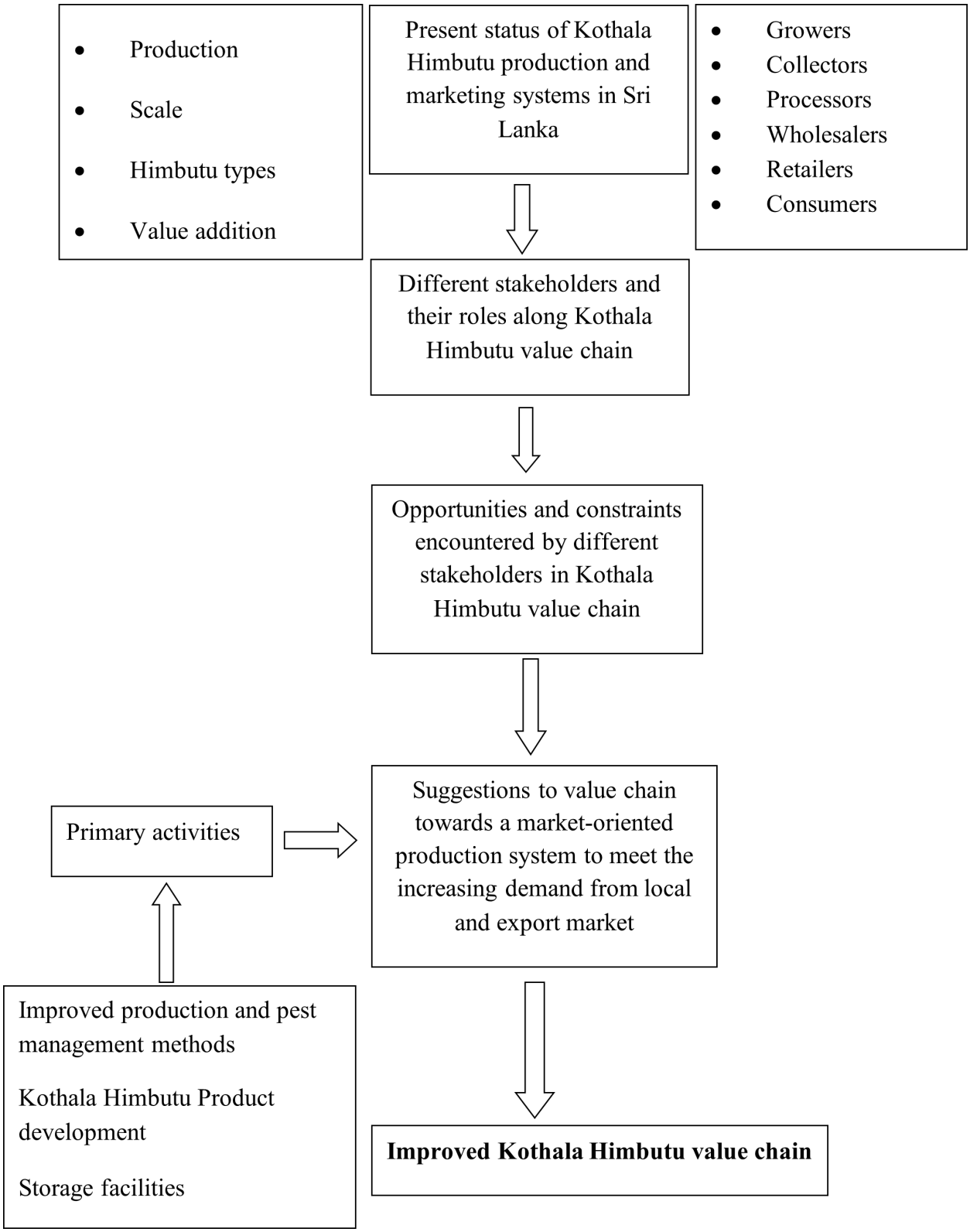

Figure 1: Flow chart of the conceptual framework

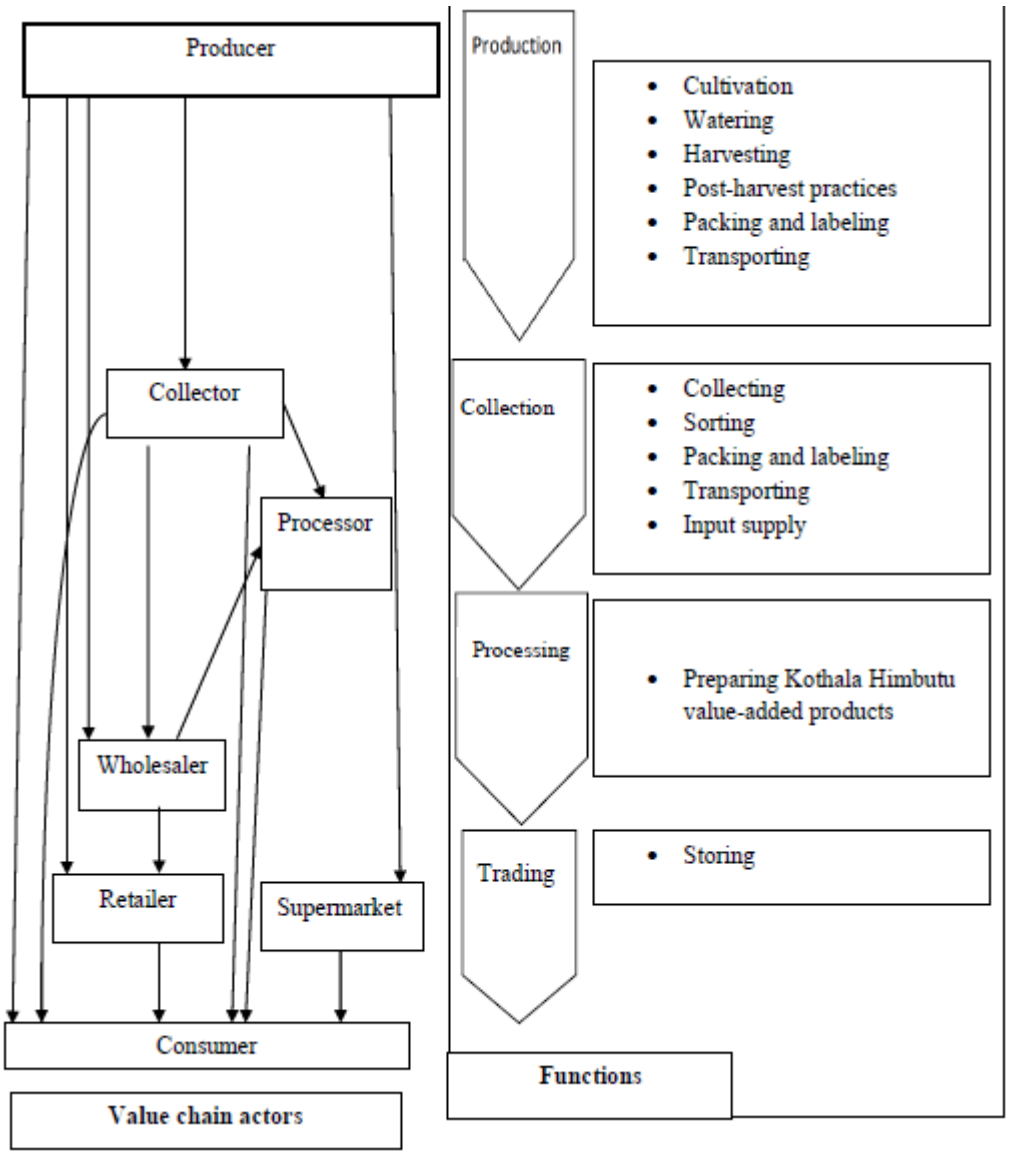

Figure 2: Value chain of *Kothala Himbutu*

who grow and use their own Kothala Himbutu have a reasonable amount of control over quality inputs within the chain, this control is lost as more middlemen and steps are introduced and then recovered with some additional inputs as a vertically integrated chain is established.

Stakeholders of the value chain of Kotala Himbutu

1. **Cultivators/farmers** - The farmers are often the same individuals who cultivate and sell Kothala Himbutu in the market. In this example, there is no 'value addition' due to processing, a crude dried herb (final product) as when it started. Cultivator plays a major role in this value chain compared to the other actors in the chain.

2. **Collectors** - Collector is another important value chain actor in Kothala Himbutu sector. Collecting raw materials, sorting, packing, labeling, and transporting were the main functions of collectors.

3. **Trader/middlemen** - As shown in Figure 1, more complex value chains which are small local networks and on one to one relationships between the partners generally involve middlemen who are likely to procure material from a wider range of primary producers (farmers or gatherers). Middlemen serve as a bridge between the primary producer and the retailer/end-user. They also serve as moneylenders or as suppliers of industrial goods that are sold in the local communities. Major actors in this trade were wholesalers, retailers, and supermarkets. Retailers and wholesalers sell only locally produced products. The supermarkets market both imported and locally produced products. The main customers of wholesalers were retailers and hotels.

4. **Processor** - The producer adds value to the final product through several activities. They are sold these products through government farm outlets like *Helabojun, Ruhunu Rasara,* and *Krushi Liya Saviya.* Processors and wholesaler/exporter/retailer segments of the value chain are much smaller in number. Their enterprises are larger, and their entry costs and risks higher. Increasingly, their livelihoods are based on their ability to source raw material from producers and collectors at competitive quality standards and prices. To maintain this access, they are frequently expected to meet economic, social, and health demands from suppliers.

5. **Consumer/healer** - In its most simple form, the value chain may simply link a healer with his or her patient/consumer. They are the end-users in the value chain. In essence, the healer who has detailed knowledge about these plants and will be able to identify it properly as well as ascertaining that it is of a culturally acceptable composition and quality is the prescriber and supplier of Kothala Himbutu to be used as a medicine.

   The majority of the consumers were diabetic patients. The majority of the consumers are (40%) consumed it just because of awareness of the medicinal value of Kothala Himbutu. In the value chain system examined, it was found that downstream buyers, especially manufacturers and consumers pay most of their money for middlemen's value additive opportunistic pricing due to inherent weaknesses in the chain. It must improve its efficiency through better vertical and horizontal integration, speed up development and adoption of a clear regulatory framework, including product norms and standards build capacity for certification; and promote sustainable production practices. Besides, the industry must establish effective communication between value chain actors to allow them to take action quickly to shifting market demands.

Constraints identified by cultivators

The majority of farmers (58%) have mentioned that difficulty in acquires raw materials (Table 2) which are mature enough to use as a medicine as the main constraint. Due to the unavailability of quality raw materials, farmers have discontinued this cultivation several times. As the second main problem respondents mentioned the increasing cost of inputs.

Constraints identified by other stakeholders

The main constraint of all other stakeholders was the insufficient supply of raw materials of Kothala Himbutu.

Three types of intermediates were identified

Table 2: Frequency (%) of respondents among Kothala Himbutu growers indicating the rank of a particular constraint

	Constraint	Frequency (%)
Constraint 1	Price too low	40
	Production too low	52
	Other	08
Constraint 2	Lack of time/labor	22
	Low quantity/quality of planting material	20
	Other	58

as small scale, independent un-subcontracted collectors who are mainly occupied in supplying the rural retailers; medium-sized traders who buy either at the farm gate level or from smaller intermediates and large scale formally registered traders who are subcontracted by some of the larger processing factories.

While small scale intermediates usually operate individually and independently, the larger ones use labor for transport, collection, distribution, and management.

Sub-contracting schemes are familiar between the larger processors and the larger traders but not between the former and small scale traders. All traders supplying processors though were directly dependent on the supplies from other intermediates. Sub-contracting schemes between larger and smaller traders exist only occasionally.

Four key marketing channels were recognized related to the three types of intermediaries.

1. Primary intermediaries who sell their produce directly to the local market.
2. Primary intermediaries who resell their produce to urban, economic centers and/or to secondary intermediaries.
3. Secondary intermediaries who resell to urban, economic centers or urban processing factories.
4. Factories which supply the island with high value-added products.

Value chain operation of Kothala Himbutu

Structure of the Kothala Himbutu value chain was composed of not many nodes with quite a few vertical and horizontal links representing many agents.

1. **Plant production** - No specific government efforts are targeting Kothala Himbutu nurseries at the moment and also no private nurseries had been identified during the survey too. Propagation thus mainly occurs via seed under natural conditions.
2. **Inputs** - None of the surveyed growers applied any fertilizer, pesticide, water to manage these species.
3. **Production and post-harvest treatments** - All the interviewed retailers and whole sellers received their products from intermediates that sourced it either from the wild or from home gardens. Small or large size processors also do not own farms and depend on production by nature. Processing happens in various stages. The first one consists of extracting the stem bark after which it is converted into raw powder. This powder can then be either further processed or stored for future use. During further stages, this powder is mixed with other herbal powders. This powder mixture can be used to make a range of value-added products. Post-harvest losses were almost negligible as the crops are extremely resistant to pests and diseases. Little treatments were done to preserve quality or extend post-harvest life. The quantity of manufacture which remained unsold and unconsumed within the farmhouse was estimated by respondents to be less than 5%.
4. **Collection, distribution, and transportation** - Packaging is done by them to avoid damage during transport is different from packaging to produce a final product, grade

it, or improve its presentation and shelf-appearance. The most common mode of packaging was packed in polythene bags. The mode of transportation employed depended heavily upon the size of the business. In the case of small scale, independent intermediaries, the most common modes were public transport, their motorbike, or a hired truck. In the case of medium to large scale intermediaries, the most general modes of transport were trucks, personal cars, and/ or motorbikes.

Medicines with Kothala Himbutu need to have a license to sell from the Authority. Every manufacturer of traditional herbal medicine wants to work under the principles of Good Manufacturing Product (GMP), having to list the ingredients of each medicine on the packaging of the finished product along with the accurate quantity. Side effects and warnings of contraindications require to be declared on the package, adding complexity to the value chain. Therefore, the price increments are due to costs incurred through externalities, middlemen, and with more specialized cultivation and extraction methods are used.

5. **Consumption** - The value chain consists of the integration of consumers to a national chain or into the international or global market structures. The degree of trading of freshly traded Kothala Himbutu seems to be relatively low. According to the leading processors, they are still mostly considered middle to high-end products often consumed by the urban middle to high-income groups. But the products are becoming popular across all income groups islandwide due to the healing effect of diabetes.

   Well, the organized value chain can increase resiliency to outside shocks, contact new markets, and personal skills for winning marketing which gives a positive impact on improving product quality and being able to diversify through different processing methods, overcoming large distances to the point of sale and achieving more cost-effective means of transport and marketing. By getting market information, can increase the ability to bargain with stakeholders in the value chain, promoting the product to potential traditional healers, consumers, pharmaceuticals and can improve simplicity between collectors, processors, and traders to avoid the focus of the market power in a few hands.

Value chain operation of Kothala Himbutu

Successful marketing can result in improved income collaboration and confidence in stakeholders of Kothala Himbutu value chain.

Knowledge of market demand by taking information about volume and price of Kothala Himbutu, exploring diverse marketing options which depend on access to Kothala Himbutu and transport infrastructure, selling types such as unprocessed or processed, directly or indirectly to customers/ traders/wholesalers, increasing shelf-life of Kothala Himbutu can boost marketing strategies. Sharing knowledge, Kothala Himbutu volumes, re-use and recycling equipment, and experiences with stakeholders, and gain familiarity with existing markets and trading routes will reduce capital investments, help to identify new types of products too. And also will secure a small network of buyers. Product availability, quality such as size, color, transport cost as well as bargaining strength is the major price-determining factors.

Suggestions to improve Kothala Himbutu value chain

According to the survey results, the majority of farmers were agreed on new technologies for pest management, credit facilities, and favorable market price as suggestions to improve their business. The majority of intermediaries have suggested that the continuous supply of Kothala Himbutu is the most important factor to improve this value chain. The majority of consumers have strongly agreed with the suggestion to have more availability of Kothala Himbutu tea bag products in shops.

To strengthen Kothala Himbutu subsector in Sri Lanka, we need educational and research institutes on releasing scale-up suitable varieties, increase awareness about the nutritional and medicinal values of Kothala Himbutu, generating market information, facilitating licensing, establishing standard and quality control mechanisms, and link producers to potential market and encouraging food processing companies to add value to Kothala Himbutu for local and international markets identified as other requirements. Kothala

Himbutu farmers can earn more by linking to hotels, restaurants, and supermarkets so that they can increase their income. Conducting market research and organizing the production system was identified as the strategies which can be used to link the farmers to markets.

Key identified issues and problems in Kothala Himbutu value chain

1. Key issues and major problems related to the production and transportation

   Leading agro-processors signaled that demand for Kothala Himbutu processed products were good but that they faced unreliable and often limited supplies. No farms were identified and production was highly scattered across the island. This situation was mentioned by processors as being a major impediment towards developing a market strategy around the product.

   However, the absence of regulation of Kothala Himbutu trade-in aspects such as collection, processing, and storage provides no such guarantee, and environmental pollution, misidentification, and adulteration can provide further grounds for concern. This has an impact on the quality of a product, how this quality is monitored, and how value is generated from it. It also may have important implications on the sustainability of use and impact on a species' availability as a commodity.

2. Key issues and major problems related to the marketing

   Due to the geographic spread of the crop, transport costs incurred by intermediaries are very high, and direct market access to urban and peri-urban markets by growers is limited. No socio-economic research has been conducted thus far. The exporting of Kothala Himbutu value-added products so far has been constrained to the ethnic markets and this only in relatively small quantities. Although Kothala Himbutu products, especially tea bags are not very popular domestically and there is no or only limited export.

Opportunities for the leveraged intervention of Kothala Himbutu value chain

1. Product development and strengthening of R & D programs

   To strengthen the broader set of research topics regarding Kothala Himbutu, add activities such as biodiversity assessments with various ethnobotanical surveys, collect information about the nutritional and biochemical composition of Kothala Himbutu value products as these are lacking and programs to identify superior propagation methods and *in situ* conservation methods of *Salacia* species can be initiated.

2. Market development

   Assist in the formation of stable, well vertically integrated supply chains linking agro-processors, exporters, whole-sellers, and retailers with growers by providing marketing and administrative training to members. Research identifying new possible export markets should be undertaken. Creating self-employment for female empowerment can be done. Kothala Himbutu cultivation is a suitable enterprise for women empowerment, especially for housewives to improve household income and can reduce the problem of rural unemployment. Kothala Himbutu value products can be marketed as non-diabetic food. Marketing of Kothala Himbutu tea bag has less risk compared to other enterprises because it has an increasing demand. Government farm outlets such as *Ruhunu Rasara, Krushi Liya Saviya* are providing a market place for processors of Kothala Himbutu value-added products.

Conclusions

It can be concluded that Kothala Himbutu is in a reasonable position to capitalize as a source of addressing rural medicinal value. The value chain was short and composed of downstream agents; cultivators and collectors and the upstream agents, traders, primary processors, wholesalers and retailers, and consumers. Opening and ending nodes were less complex compared to the middle. The value chains for Kothala Himbutu have some unique characteristics, which seem to have had little impact on the discussion about value chains in the socioeconomic. This is a market often dominated by small and medium-sized enterprises, and one which is governed by diverse regulations relating to the product quality and health claims, which vary widely throughout the

world. There also is a gap in understanding the impact that the gathering or growth of such products has for local household economies in the value chain. Conversely product requirements and quality standards, as well as other regulatory requirements, have an important impact on the value chain. The results of the current study point out a strong requirement for sustainable conservation and scientific validation of available knowledge regarding medicinal plants before they are applied industrially. It also provides a practical example of economic potential and research on medicinal plant species, which may help policy planners at the national and international levels in linking livelihood and socio-economic development with natural resource conservation.

Recommendations for future studies

It is recommended that:

- Organizing extension and awareness programs to improve cultivator's knowledge and necessary skills on Kothala Himbutu.
- Facilitating farmers with good storage, processing facilities and building capacity for certification standards
- Better vertical and horizontal incorporation between stakeholders in the value chain adoption of a clear regulatory framework and sets of product norms and standards
- Establish successful communication between value chain actors to allow them to take action quickly to shifting market demands

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