



Food and Agriculture Organization  
of the United Nations

## **Feasibility Study – Appendix 7:**

# **Value Chain Assessment of Non-timber Forest Products in Fiji**

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*For the GCF-FAO Project “Forest Landscape Restoration for Climate Benefits and Resilience (Fiji FLR)”*

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## Executive Summary

Approximately 90% of Fiji's land is customarily owned by indigenous people who rely on the forest for timber (for construction), fuelwood, and non-timber forest products. Non timber forest products are important for household consumption and some commodities such as traditional medicines are being mainstreamed into local markets for income. At the same time, agroforestry is also widely adopted as communities realize its value in the traditional farming systems as it provides food security and income, improves microclimate for crops and livestock, and improves water security. Despite its importance, non-timber forest products are undervalued, with little information about associated SME ventures in the public domain.

Fiji hosts the largest mahogany plantation outside of its natural range, with a total of 75,519 ha on the two largest islands – Viti Levu and Vanua Levu. Pine plantations cover 85,275 ha of forest, predominantly on the drier side of the two largest islands in Fiji. Together, planted forests makeup 150,800ha with management and productive potential that have a direct social, environmental, and economic impacts on local communities. Over the last few years, the forest sector has contributed (on average) 1.2% of Fiji's GDP, with export earnings in 2020 estimated at FJD\$153m (MoF, 2022).

The Government of Fiji recognizes the potential of non-timber forest products. A key part of the Government's National Development Plan focuses on assisting Micro, Small, and Medium Enterprises (SMMEs) and identifying alternative livelihood schemes that will further increase profit margins for small income generation. This vision is shared by the Ministry of Forestry and highlighted as a Strategic Goal under its 13-year Strategic Plan to "Improve the socio-economic impact of the forest and its People." The outcome/impact of this Strategic Goal is the support that the Ministry provides in managing sustainable forest-based economic activity with forest-based industries, increased participation of small forest enterprises and the empowerment of local communities to create employment opportunities.

The Ministry of Forest, Production and Marketing Manager is reported to claim that the cottage industry poses a multi-million-dollar opportunity where locals produce high quality furniture (Fiji Times April 22, 2014) using waste wood from logging operations. Other non-timber forest products that have a market share include Dilo Oil, Virgin Coconut Oil, coconut plyboard or coco-veener, candlenut (Lauci), sandalwood (Yasi) and others.

Conservation International entered an agreement with FAO in Dec 2023 to undertake market analysis of the forest sector to assess the capabilities of MSMEs operating in the forestry and sustainable land use sector in Fiji. This report focuses on value chain analysis of non-timber forest product, identifying and mapping stakeholders involved at all stages of the forest products value chains for selected commodities; evaluation the collaboration potential of forest related SMEs with communities in developing climate-resilient agroforestry; assessing the capacity of forest related MSMEs to enhance/establish value chains for Non-timber Forest Product and analyzing the readiness of forest related SMEs in adopting climate-smart technologies.

Ten NTFP are assessed in this report with key recommendations on immediate and Long-term needs as follows:

Short-term:

1. **Design and develop national policy to support the development of NTFP in Fiji**—such a policy would be pivotal to ensure all of Government support to the development of MSME for NTFP products in Fiji as it would clearly articulate a high-level vision, mission and implementation plan to transition NTFP from status quo to a sustainable co-managed market .

2. **Support access to capital:** develop financing support to support entrepreneurs developing NTFP products in Fiji. The Ministry of Forestry is developing successful focused assistance to timber based MSME as outlined in Output 1 (report under this grant agreement). Similar efforts must be extended to NTFP to support individuals who have invested own funds to kick start NTFP production. The Ministry of Forest may consider working closely with banking institutions such as Fiji Development to develop financing package for the all NTFP commodities. Such an intervention may include the development of incubation centers as participants procure high-end machinery and training to ensure production efficiency of the NTFP commodity of interest.

Long-term:

1. **Integrated NTFP into sustainable forest management include bamboo in forest inventory:** Advocate for the inclusion of bamboo in the national forest inventory to address limited information on the extent of bamboo in Fiji. The sector's growth may depend on existing resources that can be complemented by planted resources
2. **Establish an NTFP Association:** support the formation of an umbrella NTFP Association using hub and spoke model where the NTFP is a hub, supported by commodity-based associations as spokes. Such an arrangement will ensure that all value chain actors are involved in the development of NTFP in Fiji.

## Introduction

Many NTFPs, also known as minor forest products, are harvested from natural populations that are not managed or cultivated in the forest. Sheppard et al. (2020) noted that NTFP is derivatives from the wild and undergo a three-step cycle where (1) they are collected by local communities spontaneously with an opportunistic outlook for utilization; (2) once uses are established, improving efficiency and profitability requires co-management and production – external inputs (such as policies, legislations, technology, and others) are introduced to sustain production; (3) to ensure long-run sustainability, species are cultivated as agroforestry systems where NTFPs are “...grown under trees for subsistence and income” (ibid). Extractive NTFP economies may go through a boom-and-bust cycle, which can be mitigated by domestication or cultivation. In Fiji, this was the case of Yasi, resulting in advocacy by the Ministry of Forestry to cultivate Yasi across Fiji under co-management with landowning communities since 1998.

This report considers NTFPs sourced from Fiji’s forests, representing a subsector market analysis of ten NTFPs to understand value chain actors, gaps, and opportunities for growing each commodity. The ten commodities range from handicrafts to medicine, perfume and oil, food, restoration support, and landscape/agroforestry. All commodities have been established at various development stages, requiring external input to improve efficiency and profitability. Tree nursery and landscape/agroforestry advocate the cultivation of tree species and diversification to alternative timber species through bamboo and native species.

The United Nations Food and Agriculture Organization (FAO) defines non-wood forest products as “products of biological origin other than wood derived from forests, other wooded land, and trees outside forests.” At Conservation International, non-wood forest products (NTFPs) are defined as any product other than timber that is naturally produced in forests and can be harvested for human use without cutting down trees, thereby ensuring the sustainability of our forest resources (Gore, 2018). This definition highlights the NTFPs' sustainable nature, providing reassurance about their environmental impact. NTFP also includes animal and animal-based products sourced from the forest, such as honey. In this assessment, the definition of NTF is aligned with the language used in the National Forest Policy 2007 (GOF, 2007), where the definition of **NTFP is resources of significant value to human society that arise from the forest yet are not based explicitly on the wood produced to secure economic wellbeing to rural communities living in and around forest fringes.**

The Forest Sector in Fiji contributed 1.9% to GDP in 2021-2022 (MoF, 2022. b), of which 0.4% is attributed to NTFP. Limited data about all NTFPs in Fiji is available, and there is no registry of all NTFP operators. Therefore, the assessment is limited in that it does not represent all stakeholders involved in each commodity. Commodities were selected through a Focus Group Workshop, where the names of all the individuals interviewed were collated. A set of questionnaires guided interviews, which are summarized into value chain assessments. A validation workshop/discussion was held with each informant to ensure an accurate representation of the information collated during the interview.

## Literature Review

### Importance of Non-timber Forest Product

Non-timber forest products (NTFP) are also known as minor forest produce (Derebe & Alemu, 2020; Kumar et al., 2022). The role of minor forest products in supporting direct household provisioning is recognized as it transitions to cash income through selling leaves, fruits, roots, bark, construction materials, and others under the banner of income diversification (Hadish, 2018). Once the significance and value of non-timber forest products were realized, research



and policy interest increased across critical sectors such as conservation, livelihood research, forestry, economics, and anthropology (ibid).

Shackleton and Pandey (2014) noted that there are five mechanisms through which NTFP supports human well-being; including (1) direct household consumption; (2) income generation as a supplementary source or as the primary means of revenue generation; (3) insurance for times of misfortune due to climate change and other elements beyond community control (Derebe & Alemu, 2023; McSweeney, 2005; Shackleton & Shackleton, 2004); (4) culture and tradition as part of rituals and ceremonies by indigenous communities (Cocks et al., 2011; Posey, 1999; Cocks and Wiersum, 2003); and (5) cash saving to both households and the state such that the use of NTFP allows households to use scarce cash resources on other needs such as school fees and others (Shackleton & Pandey, 2014).

In India, the dependence of local communities on minor forest products is high such that household consumption and trade have evolved to a stage where NTFP Certification is a slow and ongoing process (Pant et al., 2017) where 27% of the rural population depends on NTFP (Yadav & Dugaya, 2017). In Africa, the dependence of local communities living at the edge of forest areas is as high as 63%, as in the case of Nigeria (Atsu & Okpiliya, 2019), as well as in the Horn of Africa (Derebe & Alemu, 2023). In Fiji, while there is no quantification on the dependence of rural communities on NTFP, FAO (2017) notes the importance of traditional species and traditional gardening systems to local communities living on the fringes of crucial biodiversity areas through supporting food security and habitats in key biodiversity areas.

All minor forest products are free of charge from sources in the forest. Hardish (2018) pointed out that communities would forage for food, medicine, rattan, bamboo, wood, roots, and other non-timber forest products from the forest rather than travel to town to buy commercially produced substitutes. NTFP fulfills multiple functions, including supplying forest products to infant industries and protecting the environment (Atsu & Okpiliya, 2019). Forest-related industries process and market forest products, indirectly providing employment for people and contributing to the national gross domestic product (Akinleye et al., 2006).

Development of the forest sector in Fiji has predominantly focused on timber and wood-based products, as evident in the establishment of large-scale plantations under Fiji's 1950 Forest Policy. Although the National Forest Policy, 2007 presents an integrated co-management framework, there is a disconnect between the Ministry of Forest Implementation Framework and Annual Plans concerning the development of NTFP in Fiji.

Sheppard et al. (2020) presented a conceptual framework that described the transition from traditional timber management to sustainable co-production management for NTFP. The framework is supported by three pillars - forest ecosystems, governance, and social system-reinforced by sub-nodes, including innovation, inventory, accounting and control, trade, policy, cooperation networks, empowerment, and external influences. Issues and possible solutions anticipated under each sub node are listed in Table 1.

**Table 1: Issues and possible solutions - transitioning to sustainable management of NTFP**

| Framework node                       | Issues  | Possible solutions  |
|--------------------------------------|---|---|
| Innovation                           | NWFP are rarely explicit objectives of forest management, the focus remains on wood production, management planning does not reflect the diversity and complexity of NWFP species | <ul style="list-style-type: none"> <li>• Management planning</li> <li>• Integrated solutions: integration of sustainable co-production systems</li> <li>• Explicit objectives to manage for NWFP</li> <li>• Establish policies that mandate and provide support for management</li> </ul> |
|                                      | Land degradation and declining natural populations, traditional land management no longer addresses the needs   | <ul style="list-style-type: none"> <li>• Effective strategic policy</li> <li>• Innovative land management practices suited to changing conditions and demands</li> </ul>  |
| Inventory, accounting and control    | Production figures are inadequate and incomplete, discrepancies in estimates of global economic values  | <ul style="list-style-type: none"> <li>• Need for a global standardised measurement and method of accountancy</li> <li>• Global cooperation and collaboration in establishing standard measures</li> </ul>  |
|                                      | Under regulation and overharvesting of the resource   | <ul style="list-style-type: none"> <li>• Need for NWFP accounting</li> <li>• Target research on sustainable harvest levels</li> <li>• Systems that encourage participation of stakeholders</li> </ul>   |
|                                      | NWFP rarely included in forest inventory and analysis   | <ul style="list-style-type: none"> <li>• Call for adoption of integrated approaches</li> <li>• Requirement for increased awareness of multi-functional/use forest management</li> </ul>   |
| Trade                                | International NWFP markets are complex and risky, NWFP markets are not fully understood   | <ul style="list-style-type: none"> <li>• Targeted research</li> <li>• Explicitly define market structure</li> </ul>   |
|                                      | Much NWFP is traded informally  | <ul style="list-style-type: none"> <li>• Better understanding of non-market values</li> <li>• Targeted research to understand non-market trading</li> </ul>   |
| Policy                               | Political and institutional frameworks are underdeveloped   | <ul style="list-style-type: none"> <li>• Targeted research</li> <li>• Feedback mechanisms from stakeholders to policymakers</li> </ul>  |
| Cooperation networks and empowerment | Those that invest do not reap the benefits  | <ul style="list-style-type: none"> <li>• Feedback mechanisms from stakeholders to policymakers</li> </ul>   |
|                                      | Forest managers lack skills and incentive to manage effectively for NWFP  | <ul style="list-style-type: none"> <li>• Innovation, NWFP development support through research and development, education and training</li> </ul>   |
|                                      | NWFP are sensitive to consumer preference and quality considerations  | <ul style="list-style-type: none"> <li>• Targeted research</li> <li>• Social marketing to advocate participation of stakeholders</li> </ul>   |
|                                      | Property rights affects the availability and sustainability of the resource   | <ul style="list-style-type: none"> <li>• Effective strategic policy</li> <li>• Governance systems that encourage participation at all levels</li> </ul>   |
| External influences                  | Climate change threats to NWFP species, their production and natural environments   | <ul style="list-style-type: none"> <li>• Social and political cooperation,</li> <li>• Effective strategic policy</li> <li>• Integrated solutions</li> </ul>   |

Source: Sheppard, et al. 2020

NTFPs offer livelihood advantages to local communities, regional economies, and national economies, which has led Shackleton and Pandey (2014) to propose eight steps to facilitate the integration of NTFPs into the development agenda for the sustainable benefit of local communities. These include:

- (1) understanding and appreciating the level of available NTFP stocks,
- (2) product research and development on NTFP and sustainable harvest levels,
- (3) development of appropriate messaging of NTFP commodity processing and marketing for use in extension services for NTFPs,
- (4) integration of NTFPs in land management and trade-off decisions,
- (5) incorporation of NTFPs into sectoral policies,
- (6) safeguarding local livelihood needs against the commercialization of NTFP,
- (7) assessment of drivers of unsustainable use, and
- (8) encouraging protection of resource access and use.

The above principles are evident in the development of Pure Fiji (Frodey & Naidu, 2008). The company started on the realization of the abundance of natural resources in Fiji and the wealth of traditional knowledge and skills among women artisans. With appropriate messaging and beautiful packaging, the company was able to penetrate the niche US market of luxurious skin

care products. Raw materials are supplied by 500 local villages and settlements in exchange for weekly cash payments. The company's essential product ingredient is virgin coconut oil, and it is making efforts to diversify into nut oils. The company supports village cooperatives and works closely with women's groups from Lau and Namosi, with a deep understanding of the cultural obligations of local communities (ibid). Regarding market channels and distributors, the company has learned that communication is critical as distributors understand customer preferences and demands. Pure Fiji has capitalized on e-commerce with regular product updates, resulting in rapid growth of its customer base on the internet. The company is an entrepreneurial family-run business with a passion and agility to respond effectively to consumer demands without a business, strategic plan, or annual reports. It has an annual turnover of FD\$5m and is a classic case of new venture creation with many lessons to offer.

### **Economic livelihood based on NTFP.**

The NTFP market has not only emerged worldwide but has also experienced significant growth, estimated to have increased from US\$11 billion in 1995 to a staggering US\$88 billion in 2011 (Sheppard et al., 2020). This exponential growth underscores the increasing importance and potential of NTFPs in the global market. However, in the small and scattered Pacific island countries with low economic density and small markets, investments in physical, human capital, and marketing channels are complicated when the scale of economic activity is so small (World Bank, 2009).

Generally, business development starts with identifying opportunities and developing business plans, as well as the development of marketing strategies based on an understanding of consumer preferences and needs. With new commodity production, capacity building and awareness among all value chain actors (from forest owners to consumers) and cross-border learning are essential to ensure shared value systems by all market players. Coherence through policy and legislation is essential to simplify the rules and procedures that enable the development of innovative uses of natural resources and safeguard their sustainability and resilience.

A value chain of non-timber forest products can offer a viable alternative to traditional cost-benefit business assessment as it provides an opportunity to identify diversified income opportunities in rural areas and increases the forest-based sector's role in creating a strong economy. However, improvements in business development, cooperation, capacity building, awareness raising, policy, and legislation are needed to unlock the full potential of these value chains.

Maguigad (2020) assessed NTFP policies in Cambodia, Malaysia, Indonesia, and the Philippines to understand Southeast Asia's approach to NTFP harvest, utilization, trade, transport, and management. The assessment concluded that despite the growing economic importance of NTFPs, it is not reflected in relevant national policies to promote its development. Such lack of policy and legislative support resulted in extensive unsustainable utilization (ibid). Maguigad (2020) further notes that in countries where the State owns forest resources, governance is more formal through the memorandum of agreement, partnerships with concessions, and others requiring local communities to secure permits for commercial or trade purposes. Similarly, in Fiji, although the land and natural resources on land belonging to indigenous peoples, communities need permits for the commercialization and sale of NTFP, such as sandalwood.

Many countries have relevant policy frameworks for business operations for micro, small, and medium enterprises (MSMEs); however, accessing such financial systems poses an enormous challenge for indigenous peoples and local communities. Often, access to financial assistance for local start-up companies to develop NTFP for livelihood is mooted by non-government organizations (NGOs) or the government. It is also noted that many legal frameworks exist to support value addition and processing of NTFP under various laws beyond

forestry, such as food and drug safety laws, trade laws, access and benefit sharing, and intellectual property rights (IPR). Although financing for NTFPs mainly comes from the government and NGOs, there is increasing and accessible capital from microfinance that MSMEs can avail themselves of. However, application requirements and procedures may be demanding for local communities and disincentivize community forestry enterprises.

The biggest challenge across all countries described in the literature is the general lack of data on NTFPs in formal statistics. Available data may focus on a few significant NTFPs, which may not represent resource access and community interest. Existing policies also have gaps in provisions to improve communities' capacity to sustainably manage their resources.

Assessing livelihood dependency on NTFP and its implications for REDD+ in Myanmar indicated that poor regulations and unsustainable extraction of NTFP are the major causes of forest degradation. However, charcoal making and bamboo extraction were the most significant contributors to household income (Soe & Yeo-Chan (2019). Murthy et al. (2005) recommended research on the ecological aspects of NTFPs, such as distribution, regeneration pattern, growth rates, yield in different forest types, and silvicultural techniques for managing multiple products as well as knowledge related to various harvest mechanisms, all contributing to the economic well-being of the people and biodiversity conservation (Gupta, 2013).

In a similar study, Soe and Yeo-Chang (2019) analyzed livelihood dependency on NTFP and its implications for REDD+. The study was conducted in Myanmar, where the authors identified “poor regulation and unsustainable extraction of non-timber forest products (NTFPs) is decimating millions of hectares of natural forests; overexploitation of forest resources is one of the main drivers of forest degradation.” Further findings from the study revealed that NTFPs contributed the most to total household income, and the main types of NTFPs exploited were charcoal-making and bamboo-selling.

In India, insufficient access to and knowledge of technology to add value to the NTFPs limits communities' return from NTFPs (GSMT, 2020). Many of the tribal villages are remote and often rely on footpaths to link themselves with the outside world; hence, market access is a noted challenge. Current marketing mechanisms for NTFPs are also insufficient, inefficient, and exploitative. Farmers in rural areas lack exposure for craftspeople with the mindset to create new product lines of higher quality and design (ibid). In Cambodia, communities at the border of Protected Areas have better market access (Clement et al., 2014). Creating markets for NTFP in Nigeria engages farmers in more sustainable resource use (Atsu & Okpiliya, 2019).

*Santalum yasi* (Yasi) is one of the standard non-timber products in Fiji and has been exploited from the early 1800s to the present. It produces valuable sandalwood oil high in alpha and beta santols that meet the East Indian sandalwood oil ISO standards in high demand in the Asian markets (Thomson et al., 2020). Wild Yasi is at risk of extinction due to high levels of extraction. The Ministry of Forest has supported smallholder planting across Fiji since the mid-1980s, but the extent of such planting is unknown. Key actors noted by Thomson et al. (2020) include the landowners on which the Yasi plant grows, the buyers, processors, and the Fiji Government – Ministry of Forestry. Critical recommendation from the report notes that all sandalwood sourced from Fiji is sold as *Santalum album*, masking the presence of *Santalum yasi*. The report further recommends that Fiji should invest in **branding the Fiji Santalu yasi** as a standalone product, given the unique natural properties of Fiji Yasi.

FAO (2017) considered alternative livelihoods for communities living on the fringes of three key biodiversity areas in Fiji and concluded the high dependence of local communities on non-timber forest products. The assessment focused on fruits and nuts such as breadfruit, Tahitian chestnut, Beach Almond (Tavola), *Barringtonia edulis* (Vutu), Dilo, Coffee, Bamboo, Turmeric, Medicinal ginger (Cagolaya), Cardamon, Galangal, Candlenut, Cocoa, Coconuts, Yams,

Ginger, Vegetables, Orchids and Flowers. It concluded that Fiji needs to focus on resource development to improve the genetic resources of all species listed above and advance the productivity of high-value, low-volume crops with limited global competition. At the same time, research and development must focus on value-addition processes to ensure a longer shelf life and marketing of traditional and indigenous fruits and nuts found in Fiji.

### Micro, Small and Medium Enterprise: NTFP Conceptual Framework

Fiji's National Policy on Micro Small Medium Enterprises (MSME) defines micro business turnover as no more than \$50,000, while small businesses are those with a turnover between \$50,000 and \$300,000. Medium enterprises are defined to have an annual turnover of \$300,000 - \$1,250,000. The National MSME policy aims to improve access to financing and business services to ensure "A Brighter Economic Future for all Entrepreneurs" across all sectors in Fiji. Its mission is to develop and promote entrepreneurial culture, encouraging MSMEs to grow with comparative advances. The policy casts a broad scope of critical areas to focus on, including alignment with other national policies such as the national development plan, the development of research, design, and development of relevant policies, legislations, strategies, and processes to improve ease of doing business, especially by vulnerable segments of the population.

The Ministry of Forestry recognizes the potential opportunity that non-timber forest products present to diversify the commodities and sources of foreign revenue to Fiji's forest sector (MoF, 2021. a). However, the market for non-timber forest products in Fiji is at its initial development stages where the Ministry of Forestry is committed to investing in the Research and Development of NTFP to diversify the forestry sector's economic performance and develop alternative commodities through NTFP for livelihood and poverty alleviation targeted at forest landowners in rural areas (MoF, 2021. a). The Ministry reported a commitment to focus research on six NTFPs: agarwood, bamboo, beach mahogany (dilo), candlenut (sikeci), sandalwood, and coconut veneer (MoF, 12 Sept. 2022).

### Non-timber forest products in Fiji

Local experts assisted in identifying non-timber forest products in Fiji through the Focus Group Discussion Workshop on 6 February 2024. Figure 1 presents a non-exhaustive list of non-timber forest products.

Annex 1 outlines a Fact Sheet brief of selected commodities shared and discussed at the focused group discussion on 06 Feb 2024. The list is non-exhaustive, as new commodities may arise over time. Six broad categories were identified: handicraft, medicine, food, perfume and oil, restoration, and landscape-agroforestry.

The categorization of NTFP has followed the following rationale.

**Handicraft:** The handicraft sector has a long traditional history but remains a young industry (Huffer, 2020) with significant potential to provide diverse and sustainable livelihoods for our Pacific communities through production and sale. Handicrafts are essential for most of their local and traditional functions, hence the dominance of local markets. The potential for co-production ventures for handicraft producers across Fiji is a possible avenue for producers. However, this is impossible as the sector has low protection and high exploitation, and producers struggle to effectively supply even their local markets while competing against mass imports. Application of Shackleton and Pandey's (2014) pathway to integrate NTFP into development agenda indicates progress in the incorporation of handicrafts into policies such as the Ministry of Women and Culture Trade Show that aims to safeguard local livelihood needs. There is an urgent need to understand and appreciate the available resource stocks, assess the drivers of unsustainable use and targeted research to further develop sustainable co-management in land management and tradeoff decisions.

**Medicine:** Traditional medicine is sourced from forests using particular species and parts of the tree, such as seeds, flowers, leaves, bark, and roots, to cure various ailments. Until recently, traditional medicine was never sold. Traditional knowledge of medicine is often passed down family lines. Common medicines such as Kura (Nonu drink) have been produced commercially. There is a vibrant local medicinal market but incomplete information on the variety of available traditional medicines. The most popular and internationally exposed local medicine is Kura Juice. Application of Shackleton and Pandey's (2014) pathway to integrate NTFP into development agenda shows progress in the development of messaging of NTFP commodity marketing. There is an urgent need to understand, appreciate available level of resources in the wild, understand drivers of unsustainable use, design and plan restocking and cultivation as part of the wider land use plan and design.

**Figure 1: Non-exhaustive list of Non-Timber Forest Products in Fiji**

|                           |                            |                        |   |              |
|---------------------------|----------------------------|------------------------|---|--------------|
| <b><u>Handicraft</u></b>  |                            |                        | <b><u>Medicine</u></b>  |              |
| Soga                      | Bamboo                     | Makadre                | Charcoal  |              |
| Dyes                      | <b><u>Masi</u></b>         | <b><u>Magimagi</u></b> | <b><u>Kura</u></b>  |              |
| Reed                      | <b><u>Voivoi</u></b>       | Vau                    | Assorted native trees – medicinal uses marketed as Juice Fiji |              |
| Bamboo                    | Wame                       | Sasa                   | Yaqona/Waka   |              |
|                           | Wood carving               | Ratali (Rattan)        | Cagolaya (Medicinal Ginger)                                   |              |
|                           |                            |                        | Lemon Grass   |              |
|                           |                            |                        | Mushroom  |              |
| <b><u>Food</u></b>        |                            |                        | <b><u>Perfume &amp; Oil</u></b>                               |              |
| Honey                     | Turmeric                   | Mushroom               | <b><u>Yasi</u></b>  |              |
| <b><u>Ota</u></b>         | Cocoa                      | Lemon Grass            | Makosoi   |              |
| Coconut                   |                            | Assorted               | Moringa   |              |
| Vanilla                   | Coffee                     | Yams                   | <b><u>Lauci</u></b>   |              |
| Assorted native fruits    | Bamboo Shoots              | (Tivoli etc.)          | <b><u>Dilo</u></b>  |              |
|                           |                            | Moringa                | Lemon Grass   |              |
| <b><u>Restoration</u></b> |                            |                        | <b><u>Landscape Agroforestry</u></b>                          |              |
| Assorted tree seeds       | Vetiver Grass              |                        | Firewood  | Horticulture |
|                           | <b><u>Tree Nursery</u></b> |                        | Coco-wood   | Ecotourism   |
| Assorted Tree seedlings   |                            |                        | <b><u>Woodchips</u></b>                                       |              |
|                           |                            |                        | <b><u>Bamboo</u></b>  |              |

*\*underlined, bold, and Grey shaded commodities are part of the case study*

**Food:** Local communities forage food from the forest. These include ferns, yams, meat, and others. Honey, Yaqona, and Cocoa are common commodities that have established markets. Many of the commodities under Food fall under the Ministry of Agriculture.



**Perfume and Oil:** Pure Fiji Export Ltd markets perfume and oil in Fiji, one of the most well-developed markets in the NTFP segment. According to Frodey and Naidu (2008), Pure Fiji is a privately held, Fijian-owned company providing quality botanical skin care products targeting the USA niche market. Critical success factors of Pure Fiji are associated with its profound sourcing arrangements with rural women in Fiji and its passionate support for the sustainable development of local environments, resulting in harnessing an international reputation for its environmentally friendly botanical products targeted at the rich and famous, particularly in the USA. The company started with an investment of \$8000 and currently boasts a return above FJ\$5m. The other central learning from Pure Fiji is the strategic selection of suppliers and high-end niche markets that started Pure Fiji Export Ltd., such as Air Pacific (supplying Amenity kits), Royal Tonga Airlines, and Sheraton Resorts (Frodey & Naidu, 2008).

**Restoration:** The Ministry of Forestry has encouraged communities to germinate tree seeds and plant 30 million trees by 2035. Coupled with an influx of funding from multilateral and bilateral sources to adapt and mitigate the impacts of climate change, there has been a push to plant more native species to restore degraded areas and sequester carbon. This has resulted in the need to plant more native tree species, placing strain on supplies from Ministry of Forestry nurseries. To solve this problem, the Ministry of Forestry, through its Extension Division, began an extensive program to train communities on seed collection, propagation, and nursery management.

**Tree Nursery for Restoration:** The Ministry of Forestry has encouraged communities to germinate tree seeds and plant 30 million trees by 2035. Coupled with an influx of funding from multilateral and bilateral sources to adapt and mitigate the impacts of climate change, there has been a push to plant more native species to restore degraded areas and sequester carbon. This has resulted in the need to plant more native tree species, placing strain on supplies from Ministry of Forestry nurseries. To solve this problem, the Ministry of Forestry, through its Extension Division, began an extensive program to train communities on seed collection, propagation, and nursery management.

**Landscape and Agroforestry:** Poor and unsustainable land use practices have contributed to the degradation of agricultural lands, including forest edges. Deforestation and land degradation in forests and peripheries of forest frontiers continue to be a challenge that calls for forest and landscape restoration mechanisms to address climate change and restore forest ecosystems while supporting local community livelihoods.

Some of the commodities listed above are widely recognized, such as virgin coconut oil, while others are at various stages of market development. The value chain assessment advocated in this work will aim to reduce poverty by integrating adaptation to climate change, particularly for rural resource owners. Therefore, specific contextual analysis of the value chain is vital as rural products and services are affected by specificities such as poor accessibility, marginality, fragility, and diversity (Hoermann et al., 2010).

## Methodology

Given the many NTFPs outlined in Figure 1 and the limiting timeline, the team had to select a few commodities that would undergo detailed value chain assessments using the following tools;

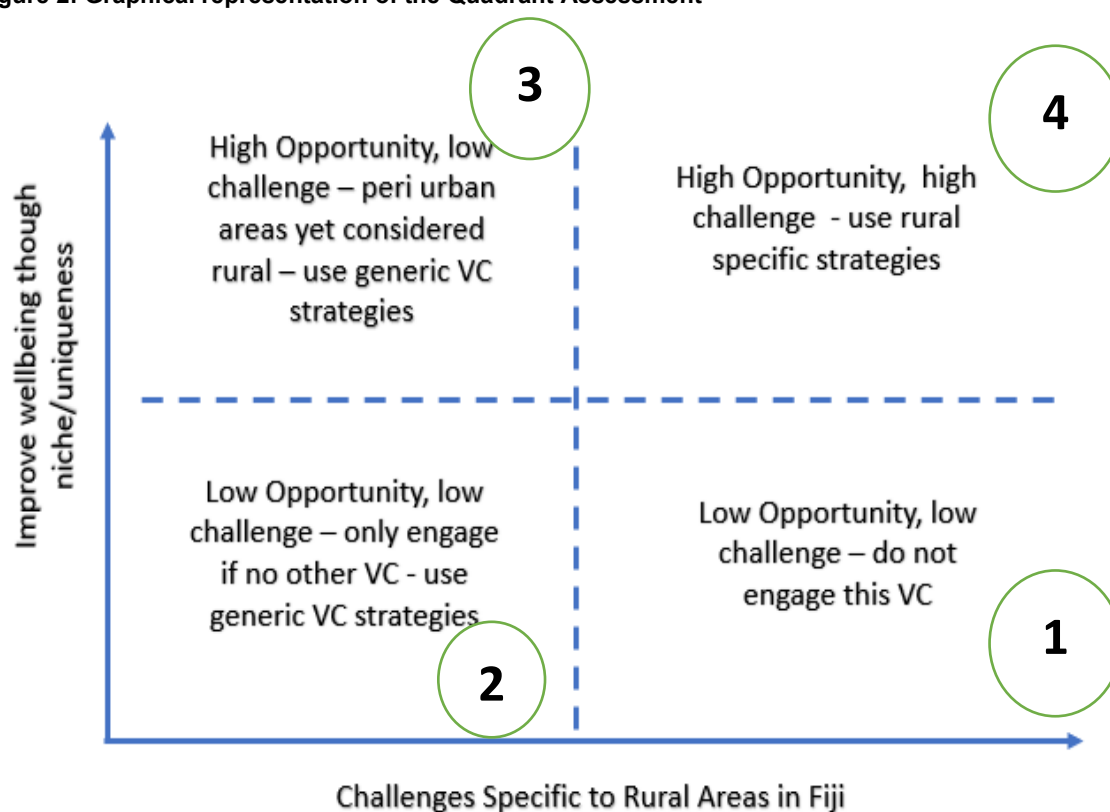
1. A quadrant assessment where each commodity is placed in each quadrant of a graph that reflects the degree of challenges and the opportunity that the NTFP may create to improve well-being in rural areas.
2. Identify critical criteria that reflect consumer preferences for the selected commodity which would contribute to the successful development of the NTFP market in Fiji. The

matrix for critical success factors is then clustered to provide insight into potential strategies that the commodity may prioritize for success.

A graphical representation with two axes was used, where the x-axis represents challenges specific to rural MSMEs in Fiji. The y-axis represents an opportunity to improve well-being through the implementation of NTFP intervention in rural areas (see Figure 4). Participants were asked to place the name of the commodity in the quadrant that fits the level of challenges and opportunity.

NTFP commodities perceived to have low challenges and high opportunities are placed in Quadrant 3; those with high level of opportunity and challenges are placed in Quadrant 4. See Figure 2.

**Figure 2: Graphical representation of the Quadrant Assessment**



Matrices outlined in the literature (Henning et al., 2008; Tetra Tech, 2021) guided the development of suitable criteria for the NTFP's success. The matrix, appropriate and relevant to the Fiji NTFP forest subsector, is outlined in Table 2. These success criteria also indicate the critical strategy NTFP could adopt to achieve sustainable growth. The matrix is part of the questionnaire, and practitioners are asked to rank their perceptions of the importance of each thematic area.

**Table 2: Matrix for Criteria of Success for NTFP**

| Thematic Area | Non-timber Forest Product Specificity              | Core Manifestation criteria  |
|---------------|--|--|
| Accessibility | Accessibility (high value/high quality/low volume) | <ul style="list-style-type: none"> <li>• Remoteness</li> <li>• Distance to markets</li> <li>• Efficiency of infrastructure</li> <li>• Weight/volume of products</li> <li>• Availability of communication infrastructure</li> </ul> |
|               | Affordability                                      | <ul style="list-style-type: none"> <li>• Is there a limitation to Access to raw material</li> <li>• Is the final product affordable in the marketplace</li> </ul>  |

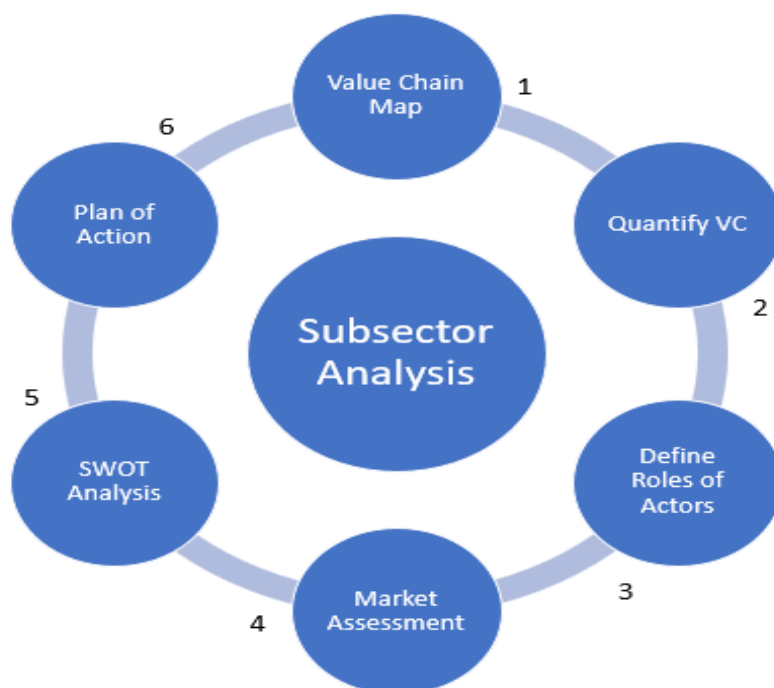


| Thematic Area                     | Non-timber Forest Product Specificity  | Core Manifestation criteria  |
|-----------------------------------|--|--|
| Niche                             | Access to technology and availability to market (Opportunity for Value Addition)   | <ul style="list-style-type: none"> <li>• Improved access to financial services for improved technology</li> <li>• Ability to identify gaps and deficiencies.</li> <li>• Identification of appropriate technology</li> </ul>  |
|                                   | Growth opportunity (Unique/niche market)   | <ul style="list-style-type: none"> <li>• Presence of unique/niche products or services due to location-specific diversity (in the form of products, culture, or knowledge)</li> <li>• Potential for pro-poor income increase</li> <li>• Existence of backward linkages (in terms of both investment and knowledge transfer)</li> </ul>   |
|                                   | Ability to produce consistent supply (Inclusiveness and Capacity Needs)  | <ul style="list-style-type: none"> <li>• Equitable participation of poor/disadvantaged groups as producers or laborers</li> <li>• Strengthening women's negotiating power within markets and enterprise</li> <li>• Gender training for women and their families to increase women's power in the family.</li> <li>• Strengthening support networks in the community, including protection of women against violence</li> </ul> |
| F. Diversity (economies of scope) | Consumer Demands – is product information available  | <ul style="list-style-type: none"> <li>• Linked to the mainstream market.</li> <li>• Capacity to understand/fulfill market demand.</li> <li>• Negotiation capacity</li> <li>• Ability to bear market risks.</li> <li>• Development of Tikina Based Land use Plans</li> <li>• Adoption of Tikina, Province and National Land use Plan</li> <li>• Development of Policies and regulations supporting NTFP</li> </ul>             |
| Fragility                         | Fragility (sustainable resource management)  | <ul style="list-style-type: none"> <li>• Potential for economies of scope through diversified but interlinked activities</li> <li>• Improved facilities for women in markets and measures to counter discrimination</li> <li>• Vulnerability to irreversible damage</li> <li>• Carrying capacity for sustainable supply of raw material</li> </ul>   |
|                                   | Impact of Climate Change on access or raw material (climate resilience) – an environmentally sustainable source of raw material? | <ul style="list-style-type: none"> <li>• Vulnerability to the impact of climate change on resource availability</li> <li>• Ability to resist drought, floods, and tropical cyclones.</li> <li>• Improvements in broader social security, health, and education provision for all women, youth, and vulnerable in society.</li> </ul>   |

Each commodity selected for assessment was treated objectively through value chain analysis. The team gathered data and information about each commodity through a questionnaire where the informants were practitioners involved in producing the commodity. Information gathered was synthesized into the value chain assessment. The value chain assessment adopts the methodology from McGregor and Stice (2014), as outlined Figure 3.

The steps recommended by McGregor and Stice (2014) start with the identification of the value chain map, followed by quantification of the production processes through defining actors in the value chain, followed by market analysis, with recommendations for short—and long-term interventions to improve efficiency for value chain actors. The value chain case study template aligns with that outlined in *Output 1: Report on Comprehensive Market Analysis. Value Chain Assessment of Fiji's Forest Sector, particularly on non-timber-forest-products Small Micro Enterprise, delivered under FAO Grant Agreement No. 66284.*

**Figure 3: Methodology for Subsector analysis used in this assessment.**



All NTFP MSME operators identified by the Focus Group on 06 Feb 2024 are listed in Table 3 listed . These informants were approached and asked to engage in an interview. The data from the interview are used to inform the case study. All who participated in the interview were invited to a validation workshop to ensure the information captured in the case studies is accurate. Notes from the validation workshop are outlined in Annex 3.

**Table 3: Representative of NTFP Operators in Fiji**

| Group                                | Commodity              | Location             |
|--------------------------------------|------------------------|----------------------|
| Abhay Chaudhary-Avril Fiji           | Lauci                  | Baulevu              |
| Gaunavou Cooperative                 | Wastewood              | Nasinu               |
| Seta Qaliduadua                      | Wastewood              | Nasinu               |
| Ministry of Forestry                 | Sandalwood             | Forestry-Colo-I-Suva |
| Drani & Susana                       | Magimagi/Lauci/Dilo    | Davuilevu Housing    |
| William Seetto                       | Kua                    | Vatuwaqa             |
| Peter Chiang                         | Kura                   | Walu Bay             |
| Sitiveni Waqa-                       | Tree seedling-Rakiraki | Rakiraki             |
| Sivnesh (8347817)                    | Tree seedling-Central  | Korociriciri         |
| Apisai Ucuiboi                       | Tree seedling-Central  | Verata-Wailevu       |
| Balbair-Futuristic Farm (7299900)    | Tree seedling-West     | Rabulu               |
| Waisea Vakalevu-Northaland Pure Noni | Noni                   | Natovi               |
| Sukulu Soko                          | Bamboo                 | Wainibuku            |
| Korova                               | Masi                   | Korova/Maritime      |

## Selection of NTFP Case Study

All non-timber forest products are equally important as they contribute to poverty alleviation in rural areas. Communities and households can use the product for direct home consumption where access supply is directed to markets. Each NTFP has the potential to generate new sources of income for rural forest dwellers and provides a safety net or insurance in unfortunate circumstances. Production of NTFP may also be linked to the religious beliefs of rural communities as well as to provide financial security. For these reasons, the team developed a matrix that will rationalize the selection of the entry points to a more profound assessment and understanding of the specific value and market assessment of NTFP in Fiji.

Noting that many non-timber forest products have become common commodities (such as virgin coconut oil), the value chain assessment advocated in this body of work will aim to contribute towards poverty reduction that integrates adaptation to climate change – particularly for rural resource owners. Therefore, specific contextual analysis of the value chain is vital as rural products and services are affected by poor accessibility, marginality, fragility, and diversity (Hoermann et al., 2010).

Additional specificities relevant to Fiji include the availability of skills and human resources, the impact of climate change, access to finance and technology, and the impact of other land use on forest-based MSME. An initial list of criteria was discussed at the Focus Group Discussion on 6 February 2024. The focus group discussion participants consist of forest sector players – government, academia, private sector, statutory bodies, and civil societies – engaged in guided discussion to select the NTFP entry points. Guiding questions to generate discussion included – the critical criteria for the success of NTFP enterprise in Fiji, how we can measure this, how we can integrate the impact of climate change and ensure an inclusive approach.

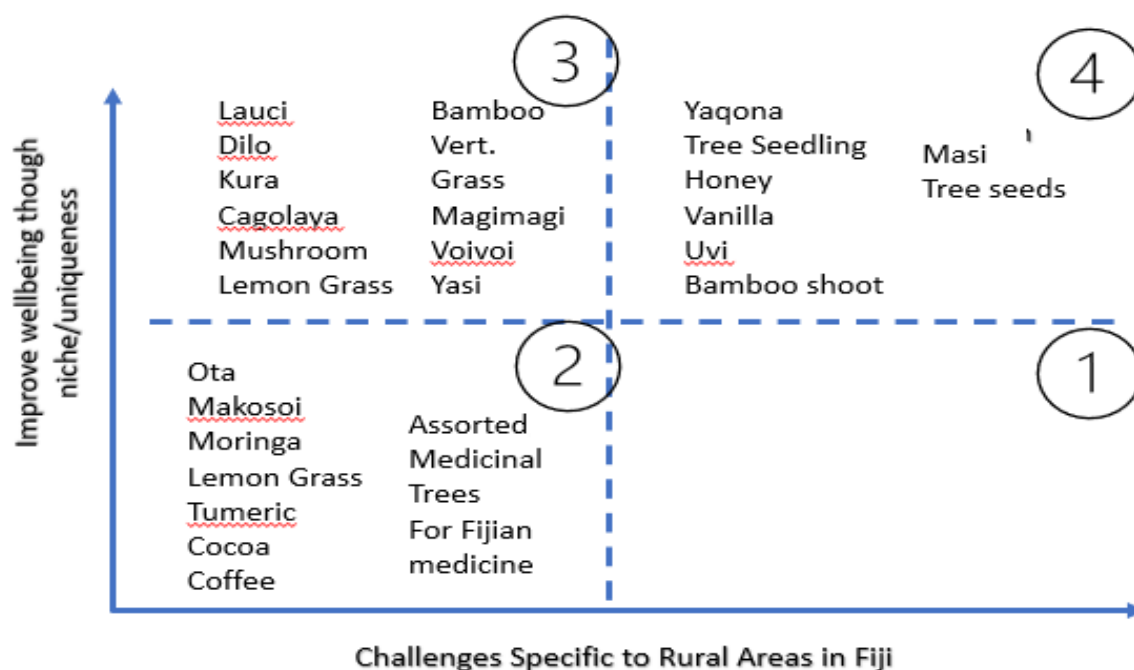
### Ranking NTFP on Challenges and Opportunities

The first tool used a quadrant where the x-axis represents challenges specific to rural MSME in Fiji. In contrast, the y-axis represents opportunity to improve wellbeing through implementation of NTFP intervention in rural areas (see Figure 4). NTFP commodities with low challenges and high opportunities (Quadrant 3) include medicines, perfume and oil, plants for food and handicraft. The local names of these NTFP are Candlenut, Dilo, Kura, Cagolaya, Mushroom, Lemon grass, Bamboo, Vetiver grass, Magimagi and Voivoi. Commodities classified into this group are high in demand and have huge opportunity but face barriers such as supply consistency and quality.

Commodities with high challenges and opportunities include Kava (Yaqona), assorted Tree Seedlings, Honey, Vanilla, assorted Yams (Uvi) species, Bamboo Shoots, Masi, and an assortment of forest tree seeds. These commodities are considered challenging because their markets are volatile and driven by external factors such as international regulations (Yaqona), policy direction to replant trees (tree seedlings), diseases (honey), and others. Market prices for these commodities are high yet unstable. Each commodity is known to have high demand and higher rewards (market price) than those commodities listed in Quadrant 3. The above ranking indicates that the ideal selection for low-hanging intervention would fall where challenges are low and opportunities are high - in Quadrant 3.

Commodities that fall in Quadrant 3 include; Candlenut, Dilo, Kura, Cagolaya, Bamboo, Magimagi, Voivoi and Yasi. See Figure 4.

**Figure 4: Using Quadrant to Rank entry point for NTFP**



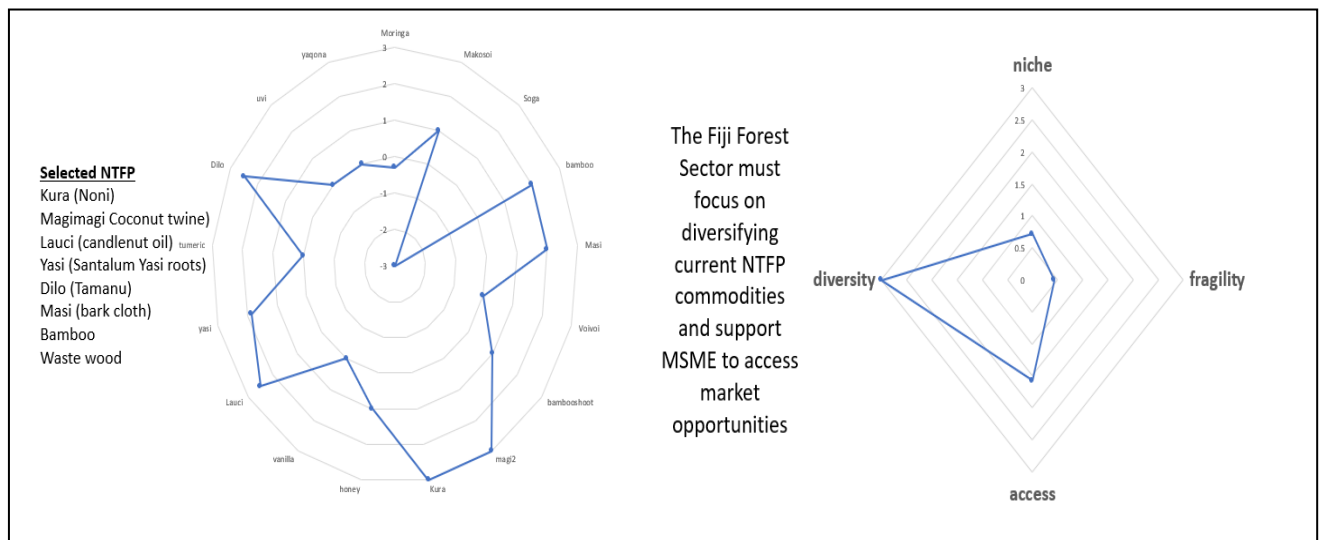
### Ranking NTFP using criteria for success indicators

In considering the criteria for success of NTFP in Fiji, each criterion was considered in detail and ranked. Participants of the Focus Group Discussion were asked to consider each NTFP and rank them against the Criteria for success outlined in Table 2.

Considering the definitions listed above; participants were asked to give scores ranging from 0 to 3 against each NTFP. The outcomes of the scores are mapped into a spider chart (Figure 5) and indicates Yaqona, Uvi, Dilo, Yasi and Candlenut as key commodities that already meet key criteria of success for NTFP and would be considered low hanging fruit for the assessment. However, Yaqona and Uvi (yams) are core agriculture commodities. The Focus Group added these commodities into the ranking process. Value Chain assessment for Yaqona in Fiji is completed (PHAMA, 2020). This leaves Dilo, Candlenut and Yasi as core forest commodities that should be considered for in-depth market assessment. There was unanimous agreement that further examination should focus on the relationship between forest-based NTFP and resource competition from other land uses in the agroforestry landscape as defined under diversity (see Figure 5). In additions it is important to fully understand market situation for each NTFP to affirm demand structure and consumer preferences.

Selection using quadrants and matrices correlate as the common NTFP selected includes Dilo, Candlenut and Yasi.

**Figure 5: Priority NTFP and Indicative Strategy**



## NTFP Case Studies

In alignment with the categorization of NTFPs, the following pages present a detailed assessment of the following NTFPs (see Table 4).

**Table 4: Selected NTFP Case Study**

| Category                 | Commodity Assessed         | Rationale  |
|--------------------------|----------------------------|--|
| Handicraft               | Voivoi<br>Magimagi<br>Masi | Involves over 90% of women in rural and some 50% of women in urban areas |
| Food                     | Ota                        | Involves women folk in rural areas; low challenge not unique             |
| Medicine                 | Kura                       | High demand, low challenges  |
| Perfume & Oil            | Candlenut<br>Dilo<br>Yasi  | High global demands, high potential for local engagement                 |
| Tree Nursery             | Assorted Tree Seedlings    | Involves over 70% of women in rural areas                                |
| Landscape - Agroforestry | Bamboo<br>Wood waste       | At the infancy stage, with high potential                                |



## Handicraft

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### **Pandanus Leaves – Voivoi & mats**

Pandanus leaves or Voivoi is the fibre of the long, sharp blade-like leaves of the pandanus plant. First these leaves are boiled and then laid out to dry in the sun. Once dry the wrinkled leaves need to be smoothed out by pulling them back and forth over a metal rod or file, or freshwater mussels shells. Once the leaves are smooth and straight, they are ready to be cut into thin strips to be used for weaving by using fine mangrove shells. Voivoi is sold in rolls at the markets in its natural colour and in black. Black voivoi is made by boiling the natural voivoi leaves in black dye. Almost every Fijian home features hand woven voivoi mats, as well as for traditional functions like weddings, funerals, birthdays.

The main sources of supply of voivoi and mats are the Lomaiviti group including the islands of Nairai, Moturiki Ovalau, the Lau group, Vanua Levu and Kadavu. Voivoi and mats are however, produced and exchanged with other goods or sold in all parts of Fiji. Producers from the outer islands who come to Suva to sell mats sometimes also bring voivoi which they sell to middle-sellers in Suva. Women in Lomaiviti, for example, supply voivoi to vendors at the main Suva market for \$30 per roll of 100 leaves. The roll is then resold for \$40 by market vendors. The availability of ferry services to Suva allows suppliers to send voivoi, which can then easily be picked up at the wharf or delivered by the suppliers.

In its 2010-2011 Employment and Unemployment survey, the Government of Fiji estimated that 4,650 women were involved in handcraft production compared to 450 men (ADB, 2019). All these producers are part of what is considered the informal economy.

Women Groups from Ra, Ba, Lomaiviti, Rabi, Vanua Levu sell mats, wall hangings and other voivoi products to Rise beyond the Reef an International NGO based in Nadi. RBTR's flagship initiative is the Traditional Contemporary Arts & Crafts Income-Generating Program. RBTR delivers this program in 23 communities in the Yakete District in the Ba Province and the seven villages of the Tikina Nabukadra in the Ra Province, two villages in Tikina Sasa, Macuata, and four villages on Nairai Island. Voivoi weavers in Moturiki and Ovalau and women's groups in semi-urban areas around Viti Levu have "brought" their mat-making skills from the islands to the urban areas (Huffer, 2018).

The above value chain shows how many handicrafts are run by individuals, groups, or associations and also shows the different target consumers. Consumers are divided into three



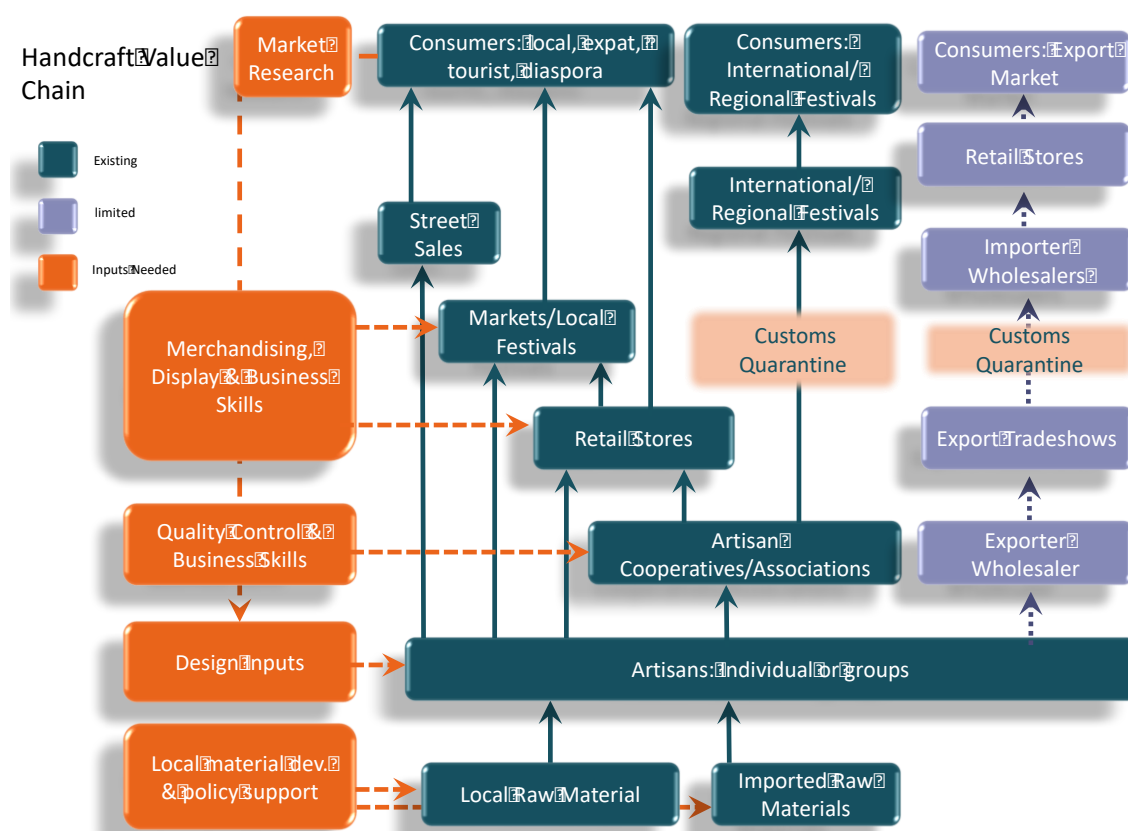
main groups: local, expatriate, tourist, and diaspora. The second group consists of international consumers and those through regional festivals, then retail stores and export markets. Value chain actors are listed in Table 6.

#### VOIVOI & Mats VALUE CHAIN

The main sources of voivoi supply are the Lomaiviti group, including the islands of Nairai, Moturiki, Ovalau, Lau, and Kadavu. Voivoi, however, is planted and used throughout the 14 provinces, including Kiowa. Producers from these islands who come to Suva to sell mats sometimes also bring voivoi, which they sell to middle sellers in Suva. Women in Lomaiviti, for example, supply voivoi to vendors at the main Suva market for \$30 which are resold at \$40 per bundle of 100 leaves.

Details are outlined in Figure 6.

**Figure 6: Handicraft value chain.**



According to the Agriculture Census (2020) the number and percentage distribution of members of agricultural households by forestry task and gender—Forestry Activities shows how women dominate work on the harvesting of voivoi. See Table 5.

**Table 5: Number of Value Chain Actors in Voivoi & Mat production**

|                   | Aggregate Numbers |        |        | Percentage |       |
|-------------------|-------------------|--------|--------|------------|-------|
|                   | Men               | Women  | Total  | Men        | Women |
| Tree nursery work | 82                | 41     | 123    | 66.7%      | 33.3% |
| Planting voivoi   | 10,875            | 11,080 | 21,955 | 49.5%      | 50.5% |
| Planting masi     | 550               | 596    | 1,146  | 48.0%      | 52.0% |

|                                       |       |        |        |       |       |
|---------------------------------------|-------|--------|--------|-------|-------|
| Harvesting of masi                    | 360   | 407    | 767    | 46.9% | 53.1% |
| Harvesting of voivoi                  | 1,893 | 11,368 | 13,261 | 14.3% | 85.7% |
| Handicraft                            | 445   | 7,476  | 7,921  | 5.6%  | 94.4% |
| Selling handicrafts, wild foods, etc. | 262   | 984    | 1,246  | 21.0% | 79.0% |

## Quantification of the Value Chain

Data from many economies worldwide, including from some developing countries, suggest that with some exceptions, the cultural industries typically comprise around 2–3 percent of national-level GDP, and perhaps a slightly higher percentage of aggregate employment (Hartley et al. 2015) using non-timber forest products. The ongoing transition toward higher value-added services in Pacific economies could benefit women. Tourism promotion can help women take advantage of employment and entrepreneurial opportunities while generating economy-wide spillovers for the primary, manufacturing, and services sectors (ADB 2019). In Fiji, a total estimate of 350 small businesses, including handicrafts, report an average weekly income of FJD222. Every year, this amounts to a little over FJD4 million earned or close to FJD11,500 per business based on 52 weeks per year.

Marketing infrastructure is weak, especially for the export sector. Although national institutions, such as the Fiji Arts Council, and industry associations, such as the Fashion Council of Fiji, provide support for creative development, the cultural industries struggle to survive in a difficult economic environment (George, 2014). For the Fijian tourism industry, MSMEs comprise a large part of the non-accommodation segment, such as tour operators and handicraft sellers.

Mats exported in Fiji were recorded as 27 pieces sold at the value of \$189.00 from 2020- 2021 (MoF 2022.a). This however does not capture the mats that are sold online individually. In Fiji one of the main outlets of mats are the Women Expos held in the 14 provinces and the National Women's Expo held every year. In 2017 for example, the three-day National Women's Expo made a combined sale of \$367,565.35 from about 425 women artisans from all parts of Fiji.

The main commercial products from pandanus are woven products, often of high value. Individual mats may be worth more than US\$500 in Tonga, Fiji and Hawai'i. In Tonga, mats made from thin strips of leaves with intricate designs (fala) are important gifts and indicators of wealth. Simpler designs using wider strips (lotaha and papa) are used as everyday floor mats (Thorsby, 2015).

## MARKET ASSESSMENT

The total number of weavers - daulitali businesses throughout the country is listed as 1,261 with the largest number recorded in the Lau group, with a total of 452. Tailevu province, with only seven businesses, has the smallest number of "weaver" businesses in Fiji. The majority, 251, reported 10, earning an average of FJD217 monthly. The total income tally across the country (see table above) is just over FJD 6 million. The total sales in 2013 were 4 million FJD, 5 million FJD in 2014, and 5.7 million FJD in 2015 (MITT, 2017). See Figure 7.

As expressed above, the market is predominantly localised, with a small portion exported to diaspora communities abroad. Annex 4 outlines detailed responses to the Market Assessment.

**Figure 7: Voivoi & Pandanus Mats Value Chain**

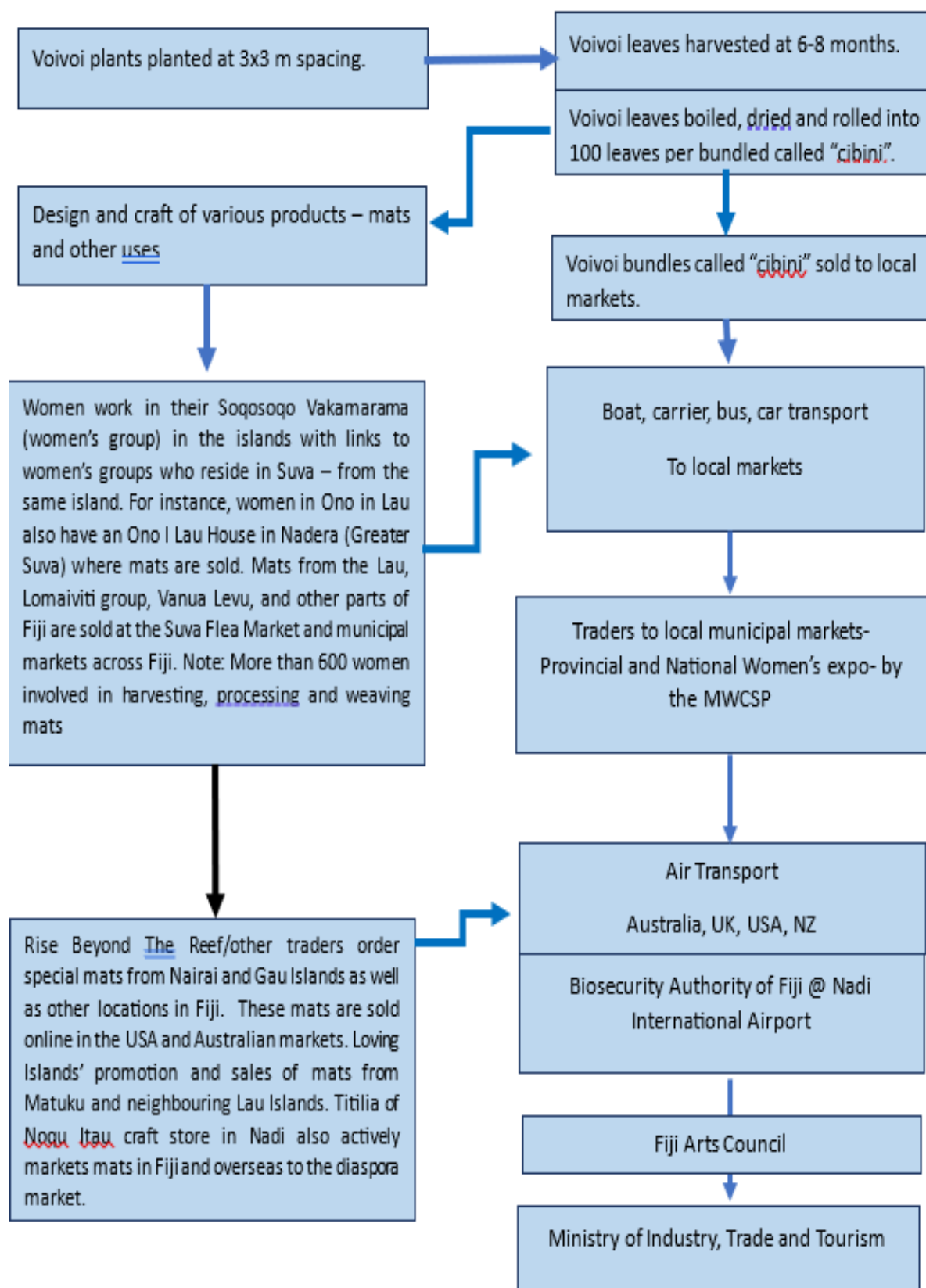


Table 6: Voivoi & Mats Value Chain Actors

| STAGE OF VALUE CHAIN   | MAIN ACTORS  | SUPPORT ACTORS  | Explanation/Value   |
|--|--|---|---|
| <b>Pandanus Producers and Weavers - 2,000 to 3,000 men and women.</b>                                  | Lomaiviti group including the islands of Nairai, Moturiki Ovalau, the Lau group, Vanua Levu and Kadavu. Women in other parts of Fiji also weave and sell mats- Men and women are producers and harvesters of <i>voivoi</i> . Producing as families, in women's groups or as individuals-in rural, semi-rural and urban contexts  | Boats/ferries from outer islands to Viti Levu<br>Transport – carriers, boats, buses to transport mats and <i>voivoi</i> to markets.   | Mat weavers- supply <i>voivoi</i> to vendors at the main Suva/other markets for \$30. The heap is then resold for \$40=<br>500 women x<br>\$40.00=\$20,000.00 |
| <b>Value add activities 1,000 women</b>  | Mat makers, making of <i>voivoi</i> handicrafts- Rise beyond the Reef, Sigavou Studios, Namana Arts, Loving Islands  | Soqosoqo Vakamarama groups, community women groups, Ministry of Women, Fiji Arts Council.   | \$30.00.00  |
| <b>Promotion- more than 500 individuals /15 SMEs</b>   | Rise beyond the Reef, Sigavou Studios, Namana Arts, Loving Islands/etc. Mat weavers also individually sell online using social media platforms   | . Ministry for Women, Fiji Arts Council, I Taukei Affairs – Unit that looks after Dautali.  | \$50 for start-up and maybe \$100 a month<br>\$5,000 a month  |
| <b>Distributors &amp; Marketing 20 major distributors and marketing. 600 individual women artisans</b> | Rise beyond the Reef, Jacks Handicraft, Prouds, Tapoos and other major retailers, tourism outlets in Fiji, My Fiji Stores. Pepe & Pepe, Sigavou Studios, Namana Arts, Loving Islands, Rako- Hotels like the Sofitel, Marriot, etc. They transform nmats into 'signature' products and artwork that are sold through various channels: retailers, hotels and commissions.                               | Women Entrepreneur Business Council (WEBC), Tourism Fiji, Fiji Arts Council, WIPO, Fiji Museum Pacific Island Private Sector Organisation- PIPSO and Market Development Facility-MDF, National Women Expo, Fijian Tourism Expo<br>Tourism Fiji, the Pacific Tourism Organisation - SPTO       | \$50,000 FJD a month  |
| <b>Exporters/Buyers 10 major exporters and local sellers Individual selling- 500 women</b>             | Rise Beyond the Reef, individual mat makers. Small companies like Pepe and Pepe, Sigavou Studios, Namara Arts, Projects Collective, etc sell online or through networks <i>voivoi</i> products and innovative <i>voivoi</i> or mats products<br><br>Tourists, Fijian dispora overseas, other Pacific islanders overseas (Tonga, Samoa)- New Zealand, Australia, Canada, the United Kingdom, and France | <i>Voivoi</i> products-Tourism outlets, hotels, Nadi airport retailers Department of Tourism<br><br>Biosecurity Fiji Limited, the Department of Heritage and Arts (Ministry of Education, Heritage and Arts), the Ministry of Industry, Trade and Tourism (MITT); the Fiji Arts Council (FAC) | \$100,000 FJD a month   |
| <b>Local sellers Municipal markets and to major retailers 600-700 women</b>                            | Municipal markets in Fiji- Suva handicraft center, Flea market in Suva, Major retailers- Jacks Handicraft, Prouds, Tappoo City major hotels and traditional exchange   | Village Profile Unit, Itaukei Affairs Board, Investment Fiji, WEBC, Tourism Fiji, Fiji Museum the iTaukei Trust Fund; the Fiji Bureau of Statistics (FBOS)  | \$20,000 FJD a month  |

When considering factors that the consumers care about through ranking critical criteria for success, the value chain actors noted that consumers care about the carrying capacity of pandanus plants to ensure sustainable supply of raw material as well as ensuring adaptation to the impacts of climate change, ability to resist adverse rainfall and drought conditions;

improvements in border controls to allow more exports as well as supporting the development of improved infrastructure for women in markets (see Figure 8).

To address the above, value chain actors that responded to the questionnaire felt that a strategy on addressing sustainable sourcing of raw material and ensuring socio-environmental safeguard is most appropriate to further develop the voivoi & mats value chain (Figure 8).

**Figure 8: Criteria for Success and Strategy for Voivoi & Mats**



## RISKS

Voivoi & mats are perishable goods and at risk from wet and humid conditions. One of the biggest market risk is associated with supply disruptions resulting from the negative impact of natural disaster such as cyclones and floods. The value chain actors also noted that given the large number of buyers, individual sellers have limited marketing influence and bargaining power hence it is better for producers who sells voivoi products and mats to work collectively as a group. Detailed assessment of risks are listed in Table 7.



A young Pandanus plant.



These pandanus are ready to harvest the leaves,

## SWOT analysis of the Value Chain.

The SWOT analysis is undertaken through the lenses of all value chain actors to identify strengths, opportunities, weaknesses and threats. Gaps are identified and potential solutions listed as Action Needed to respond to the weaknesses/threats and corresponding strength/opportunities. Details are outlined in Table 8.

Table 7: Risks associated with Voivoi &amp; mats

| Risks   | Management of risks   |
|---|---|
| Supply disruptions due to natural disasters                                   | Increase work on mats during dry seasons and not wait for orders.                   |
| Working individually, thus lesser bargaining power                            | Women to work in collectives- use traditional solesolevaki – with coordinators/etc. |
| Resources supply late or unavailable  | Have discussions to improve on resources supply                                     |
| High dependence on boat/carrier transportation- bad weather/costs             | Subsidized transport costs  |
| Little idea of marketing strategies, thus do not get fair prices for products | To work in collective or groups so they can have stronger bargaining power.         |

Main actors in the Value Chain are defined as pandanus growers, weavers or producers and buyers or main market for voivoi products. Supporting actors include groups working with women who produce voivoi products. These groups are government, civil society organizations, Fiji Arts Council and others.

Table 8: SWOT Analysis for Voivoi &amp; Mats

| <b>Value Chain Actor =</b><br><i>Main actor (MA)</i><br><i>Support Actor (SA)</i>                    | <b>Strength and Opportunities</b>  | <b>Weakness and Threats</b>  | <b>Action Needed</b>  |
|--|--|--|---|
| <b>MA : Growers in the different parts of Fiji where voivoi and mats are a main source of income</b> | Voivoi growers are already known and have been in this business for long, thus strengthening what is already there will ensure consistent supply of raw materials.   | The supply of voivoi is not consistent and the quality of the voivoi has declined in recent times. Insufficient and inconsistent supply of raw materials   | Planting of voivoi in commercial farms around the country to ensure sustainable supply.   |
| <b>MA : Producers- women in rural and peri-urban areas in Fiji</b>                                   | There are organizations in Fiji that have experience in facilitating collectives for women mat makers, which the MWCPA can work with   | Women are currently not organized into industry groupings which would help alleviate some of their challenges and give them a stronger voice.  | Need for more collaborative effort between producers and support organizations- to move to more business-oriented structures.   |
| <b>SA : Partners/SMEs, Government agencies, NGOS/etc</b>   | Opportunities for promotion and marketing of voivoi products are dependent on events such as the National Women's Expo and divisional craft fairs.   | There is little understanding of markets, quality control, supply and demand by the thousands of women that are part of the voivoi value chain.  | Training in different provinces on markets, quality control, supply and demand and business literacy training .   |
| <b>MA : Main markets for voivoi and mats</b>   | Main market that rural women are tapping into, is the traditional Fijian life cycle market. They access this market mainly through orders placed by relatives, friends and through word of mouth, online buying and via sales to the Suva Handicraft Center and the Suva Flea market which sell their products | Value chain and participation along that chain is not also well understood thus the irregular supplies of raw materials and the gap in ensuring consistency in supply along the chain to ensure marketability. | Further training on product development is needed, so that artisans are able to meet market demands and include innovative creations to meet consumer changing preferences. |
| <b>SA- Groups of associations working with Women weavers-</b>  | Existing groups like the Soqosoqo Vakamarama in all the 14 provinces can be used to collectively secure finance.   | Lack of finance to expand existing businesses  | The establishment of structured producer groups for different categories of crafts and for different localities   |



| <b>Value Chain Actor</b><br>=<br><b>Main actor (MA)</b><br><b>Support Actor (SA)</b> | <b>Strength and Opportunities</b> | <b>Weakness and Threats</b> | <b>Action Needed</b>   |
|--|-----------------------------------|-----------------------------|--|
| Fiji Arts Council, MTT, Ministry of Tourism  |                                   |                             | Need for market facilitation which includes quality monitoring, price setting and linking products to retail/tourism/export markets. |

*Propose a plan to improve the value chain.*

In view of the above discussion, critical plans of actions are developed to support further development of the voivoi and mat value chain.

In the Short-term, it may be prudent to expose pandanus producers and weavers to financial literacy courses to ensure the ability to quantify and accurately value the resources that are produced and sold. At the same time it will be important to support the conglomeration of weavers into a “collective” to encourage the formation of cooperatives or similar models where producers and weavers can have better bargaining power.

In the Long-term, the Ministry of Forestry is well placed to work with other Ministries of Government such as the Ministry of Women, Children and Social Protection, Ministry of iTaukei Affairs to support the formation of Voivoi Producers Association in each Province that can negotiate markets, prices, and innovative products development for its members.

Detailed suggestions for short and Long-term plans for value chain actors are listed in Table 9.

**Table 9: Short and Long-term Plans for Value Chain Actors**

| <b>Value Chain Actors</b>  | <b>Short-term Plan</b>   | <b>Long-term Plan</b>  |
|--|--|--|
| <b>MA- Producers and Suppliers of raw materials/mats</b>                 | Organize community boats to pick up voivoi and mats on scheduled days. - Coordinate with village communities for transport on carriers, boats, ferry, etc. pick up on specific days for mats and voivoi- Focus on planting of voivoi in areas where there is a high supply of voivoi and mats                    | Further training on product development is needed, so that artisans are able to meet market demands and quality assurance standards<br><br>Introduce commercial planting of Voivoi to enable producers to meet increase in demand.   |
| <b>MA- Mat makers/users of voivoi for handicraft</b>                     | Marketing strategies, quality control and financial literacy training to be introduced to communities where women weave and sell products<br>Get women weavers to get organized, not only as part of the Soqosoqo Vakamarama, but as business groupings- so they can pool resources and have a collective voice. | Training products to be developed to address marketing , quality control, business development./etc Training materials to be developed.<br><br>Form Mat Weavers Association, or cooperatives in each province especially where many women weave. Associations can then negotiate markets, prices, innovative products development. |
| <b>SA-Retailers, SMEs, RBTR, etc.</b>                                    | Provide retailers with better options and more marketable voivoi products  | To negotiate with a wholesaler to produce for hotel/overseas markets outlets   |
| <b>SA- Ministry of Women. Forestry Department, Ministry of Trade and</b> | Start to work with all stakeholders in the handicraft industry- and network with other mat makers  | Improve coordination of assistance and development work that address mat making and handicraft in general  |

| Value Chain Actors   | Short-term Plan | Long-term Plan |
|--|-----------------|----------------|
| other government agencies, the<br>Private sector, SMEs and NGOs. |                 |                |



## Masi (Tapa Cloth)



Masi and other handicrafts are usually traded in the tourism market in Fiji. Tourism expenditure in Pacific SIDS (PSIDS) totaled 1.4 billion in 2023, an average of just over US\$1000 per visitor. PSIDS saw a 2.2% increase in international tourist arrivals between 2009 and 2013, and in 2017, an annual increase of 8.4% (Tyllianakis et al., 2019).

In Fiji, the total number of small businesses, which include handicrafts, report an average weekly income of FJD222 (Huffer, 2018). Every year, this amounts to a little over FJD4 million earned or close to FJD11,500 per business based on 52 weeks per year. An estimated 561 masi businesses reported monthly income at an average of FJD251. Another 313 businesses reported earning an average of FJD1,113 FJD yearly (ibid). The breakdown of the data by province, district, and village enables a detailed understanding of where the businesses are and their average income. For example, in Vatulele, all businesses (masi making) reported an average income of FJD247 weekly and a median income of FJD300. In comparison, in Lau, only 20 businesses reported earnings every week. The majority, 251, reported earning an average of FJD217 per month. The total income tally across the country is estimated at just over FJD 6 million annually.

Masi is made from the paper mulberry tree, *Broussonetia papyrifera*. There is a long and rich history of using the inner bark of the paper mulberry tree to hand-make masi (or tapa cloth), a cloth used for traditional ceremonies among many Pacific island cultures. When masi is produced, the outer bark remains unused and is discarded. Vatulele Island is the most prolific at bark cloth production, with whole families partaking in masi making.

Practiced almost exclusively by women, masi-making is one of the Pacific Islands' most essential and diverse art forms. Making masi requires much hard work. Fijian women strip the bark, soak it in water for a few days, and then beat the strips with a wooden mallet (called *ike* in the local dialect) into sheets of varying thickness and size. Then, the edges of the smaller pieces of cloth are overlapped, felted, or glued until the masi is the desired size.

Fijians use the sap of the mangrove trees to create the paint or dye to decorate and make cultural markings on the masi. To make black paint, the soot of burned candlenut fruit is added to the mangrove sap. Red clay from the earth is added to the mangrove sap to make red or brown paint.

Tapa cloth or masi is used for different cultural ceremonies, and the type of masi worn indicates one's status. For instance, *masi kuvui*, the smoked brown masi, is used for chiefs, weddings, and other life cycle ceremonies.

#### *Masi VALUE CHAIN*

The leading masi makers in Fiji are from the island of Vatulele, where there are 176 masi businesses, with the majority situated in Taunovo and the neighboring chiefly Ekubu village. Less than 50 print design (locally known as *kesa*) artists from Namuka-i-lau in Veisari, Suva, practice this art. They print masi and fashion their bark cloth into costumes, wall decorations, and small crafts. Masi works by the Matemosi in Namuka-i-lau can be seen at the Fiji Museum and Namana Fiji Arts on the Coral Coast. Korova masi makers in Suva, who are original Moce Islanders in the Province of Lau, work with their kinsmen and masi makers on the island of Moce in Lau. They sell directly to Rise Beyond the Reef (RBTR) based in Ba. They also sell to informal markets through relatives and friends.

Currently, a wide range of products sold in the tourism and retail markets are made with masi, including wrapping for bags, clutches, folders, coverings for tissue boxes and jewelry boxes, and wall hangings and small decorative objects. A local retailer - Pacific Destinations, considers masi as one of the most marketable craft products. However, the sustainability of masi is a challenge that is currently not being addressed as there has been no evaluation of the amount, quality and sustainability of masi plants.

There is no specific measure or ongoing monitoring of exported or locally sold masi and this could be due to the fact that masi production and masi making is mostly undertaken by women in the informal sector where there is no statistical data or analysis of production costs and sale. There is no accurate record of the volume of masi sold in the local market nor sales record for external markets.

Key actors in the value chain include the producers, processors, traders, transportation and logistical support as well as consumers. The categories of main and supporting actors are listed in Table 10. Value chain map for masi is outlined in Figure 9.

**Table 10: Value chain Map of Actors for Korova Masi makers, Suva**

| Value Chain Actors                       | Category of Actors  |  |
|--|---|--|
|  | Main Actors   | Supporting Actors  |
| <b>Producers</b>                         | customary landowners, Moce in Lau Island (white masi), Vitawa & Narewa (Rakiraki, Burewai, Lodonu, Nananu, Totoya, Matuku (masi bark) | Producers transport their raw or semi-processed harvest by public transport truck or boat to the nearest collection point for sale to traders. |
|  | Middlemen check the quality of products at the village level  | Shipping and Transportation  |
| <b>Processors</b>                        | Korova Masi Makers – print designs on masi pieces   |  |
| <b>Transport &amp; Traders/Exporters</b> | Rise Beyond the Reef<br>Others  | Gounder Shipping   |
| <b>Consumers</b>                         | Online buyers   | Local buyers (informal)<br>Handicraft Market Vendors   |

At the policy level, several key Ministries work together to support Masi production. These include the Ministry of Agriculture, Forestry, Women, iTaukei Affairs, and Trade.

The Ministry of iTaukei Affairs (MTA) is responsible for developing, implementing, and monitoring government programs focused on the governance and well-being of the indigenous people in Fiji. The Ministry directly links the Government, iTaukei institutions, and its administration across the fourteen provinces. The Ministry records and keeps a database of the number of handicraft businesses throughout the country. At the same time, the Fiji Arts Council is responsible for coordinating, preserving, developing, and promoting cultural arts. As a result, the Fiji Arts Council coordinates local and international exports where local artists working with music and production masi products can showcase their produce. They also organize international trade expos.

Producers are predominantly smallholder customary landowners, such as communities in Moce Island in the Province of Lau, which produce white masi, and the villagers of Vitawa and Narewa in the Province of Ra. Masi production is generally practiced in many villages throughout Fiji, with the principal producers from the island of Vatulele in the Province of Serua and Moce Island in the Province of Lau.

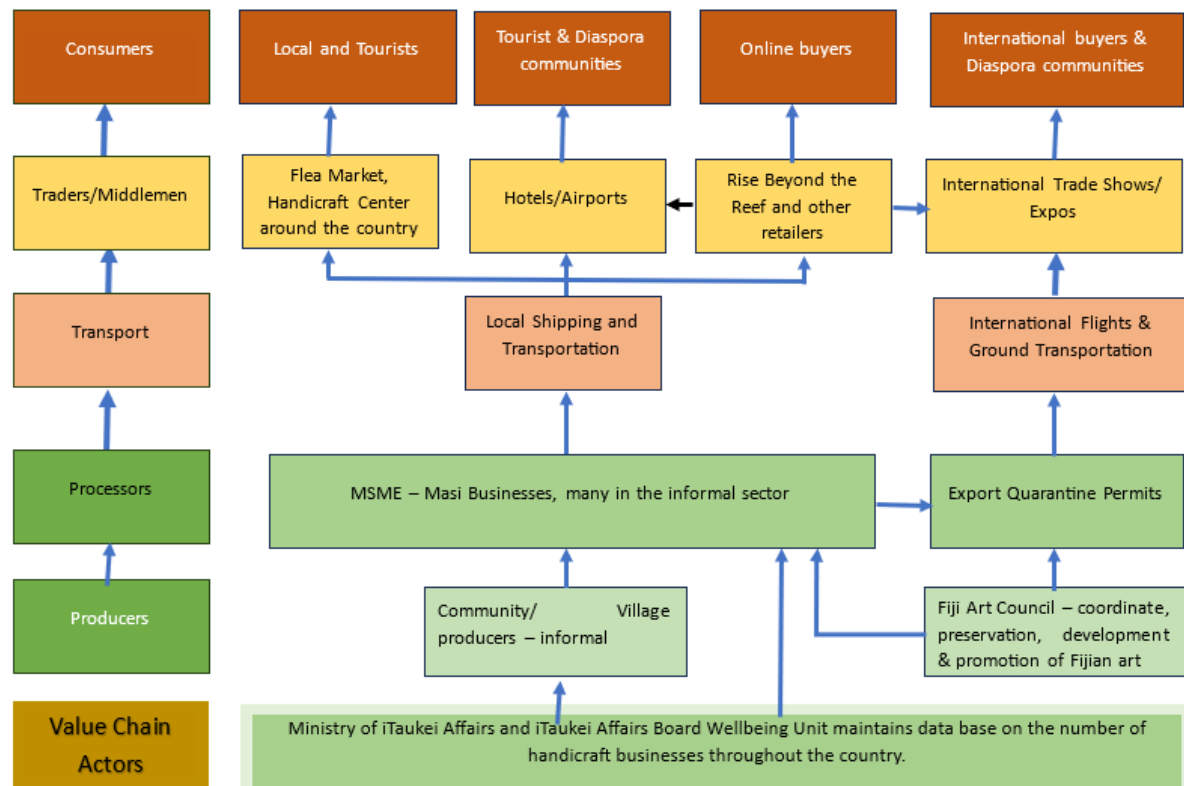
Processors are defined as those who print designs and markings on the masi pieces. These secondary producers use not only masi but also dyes and traditional knowledge to depict significant designs on the masi. Producers are the contact for formal and informal traders.

Supporting actors between the producers and the traders are the transportation companies, including local road, air, and ship transportation. Sales cannot be accurately assessed because the trade is mostly in the informal sector in Fiji. Local stocks to meet international



demand are still low, as in other cultural handicrafts. Most external users or buyers of masi are Pacific islanders, especially Fijians, Tongans, and Samoans living in the USA, NZ, Australia, and France. Thus, the current supply meets existing demand and any increase in demand will require an increase in *masi* or mulberry trees planted.

**Figure 9: Value Chain for Masi**

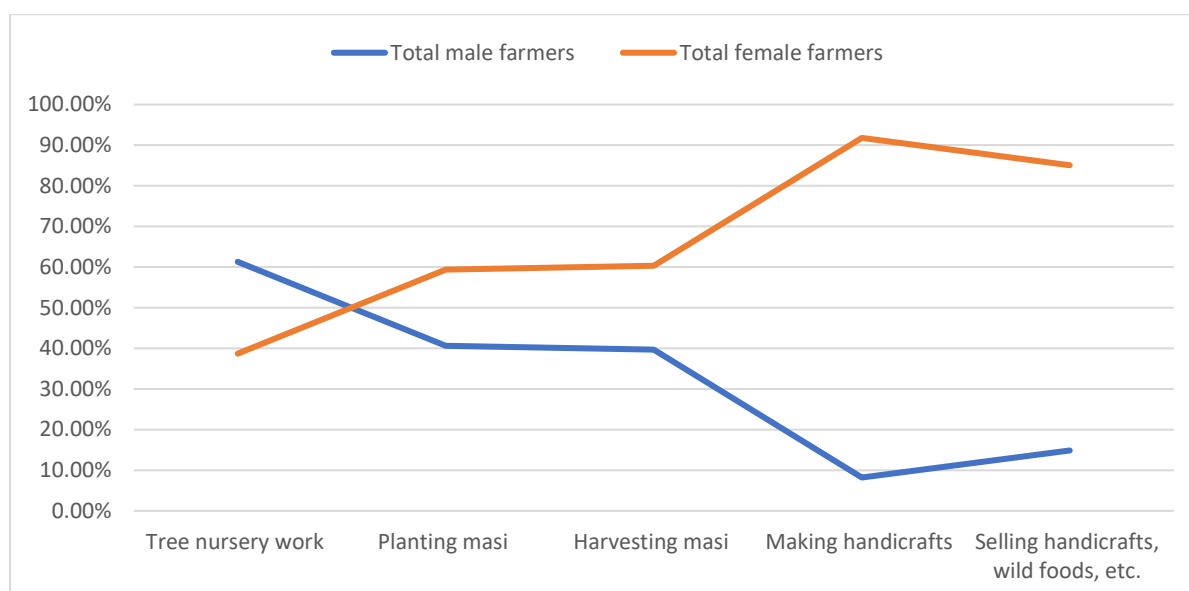


#### *Quantification of Masi Value Chain*

Masi is made from mulberry trees where the bark is peeled and processed into masi pieces; the trees, when harvested, are available at FJ\$30.00 a tree. Producers sell white (unprinted) masi from Moce Island at FJ\$40.00 for a 6ftx2ft (\$40-\$80 depending on quality). In Vatulele, masi producers plant and produce their own masi thus costs are factored into the completed product. A picture of the aggregate gender involvement of men and women in masi production is outlined in Figure 10.

Masi producers are based on small businesses that interact with larger registered businesses such as the Sigavou Studios, Loving Islands, Rise Beyond the Reef, and Christine's Creations in Nadi. These trade houses are considered distributors and marketing agents for masi producers and processors. At the same time, some traders such as Jacks Handicraft, Prouds, Tapoos, and other major retailers and tourism outlets in Fiji transform masi products into 'signature' products and artwork sold through various channels. These channels may include retailers, hotels, and commissions such as My Fiji Stores. Pepe & Pepe, Sigavou Studios, Namana Arts, Loving Islands, Rako- Hotels like the Sofitel, Marriot, and others.

**Figure 10: Inclusive participation among Masi Value Chain Actors**



Source: Forestry Department Annual Report 2020-2021

Masi processors in Vatulele, Korova (see Table 11) and others use mangrove dyes mixed with clay to make crown color or candlenut ash to make black dye. Clays are sold in “fist sizes” at FJ\$10 each. Pre-made dyes are also sold at FJ\$20 per litre (sourced from Culanuku Village, Galoa. Apart from soot from candlenuts, soot from kerosene and old pieces of masi are also used. Vatulele dogo (mangrove based) dye is also sold among processors for \$50 a bag. Dye makers estimate earning FJ\$500 annually.

In Vatulele, all of the businesses (masi making) reported on a weekly basis with an average income of FJD247 and a median income of FJD300 per week. The women who produce masi promote their masi products on social media. At the same time the Ministry for Women organize National Expos to support local promotion of masi products. Other supporting actors to masi producers and processors include Pacific Horticultural and Agricultural Market Access, Ministry of Tourism, Village Profile Unit in the Itaukei Affairs Office, Investment Fiji, Tourism Fiji, Fiji Museum, and Fiji Arts Council.

**Table 11: Korova Masi Producers & Processors Value Chain Actors**

|   | No. of people involved                                     | Costs   | Volume in a month/ Domestic and export demand | Level of production that can be met  | Transportation distance, pricing, margins, wastage                                      |
|---|--|---|---|--|---|
| <b>PRODUCERS In Moce island</b>                         | 30 households- 50 men and 80 women                         | Pieces of white masi sold to Korova and other buyers- \$40/\$60 a piece. 30 HH- 8 pieces a month= \$7,200 to \$14,400 a month | 240 -300 pieces                               | No analysis available on how much volume can be met.<br><br>800 pieces a month | \$7,200 -\$900.00 costs of transportation a month= \$6,300.00 = \$210.00 a month per HH |
| <b>VALUE ADD ACTIVITIES (Korova Processors in Suva)</b> | 120 women- making masi, dying, drying, painting, pounding. | Cost built into cost of masi when sold  | 240-300 pieces a month for the community      | 800 pieces a month   | As above  |
| <b>PROMOTION</b>  | Done by individual masi makers= 130                        | 130x 30= \$3,900  |   |  | Most promotion is online  |

|                                   |  |   |                 |               |   |
|-----------------------------------|--|---|-----------------|---------------|---|
| <b>DISTRIBUTION AND MARKETING</b> | Individual sellers, SMEs, RBTR, retail shops/Airport/tourism outlets, National and provincial Expos 120 individual sellers and 80 outlets in total | \$20,\$30,\$40, \$50-Bundes of mature masi- White masi- 6x2 ft \$60.00= 60 x 300 pieces- <b>\$18,000.00</b> | 400-500 a month | 800 a month   | Transport costs, quality handling/etc \$4,000.00          |
| <b>EXPORTERS/ EXTERNAL BUYERS</b> | Fijian, Samoa, Tonga, etc Diaspora overseas.500  | 200 pieces x\$600 FJD= \$120,000 FJD = \$240,00 FJD   | 200 pieces      | 1,000 a month | Air freight, biosecurity/etc \$120,000FJD x 10% =\$12,000 |

### MARKET ASSESSMENT

Of the estimated 176 businesses that are registered masi producers, it is projected that the total number of individuals involved in masi is estimated at 5,000 along the masi value chain across Fiji with concentration in Moce and Vatulele Island.

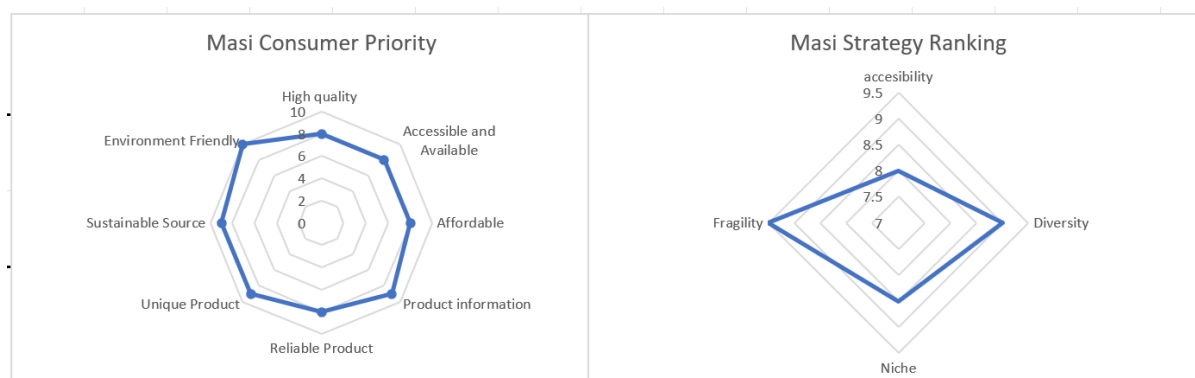
Moce Island masi producers deliver white plain masi pieces to their urban relatives who operate out of Korova, Suva as masi print designers.

As expressed in the above discussion, the market is predominantly localised with some directly exported to diaspora communities abroad and larger portion repackaged into many commodities for the tourist market. Detailed responses to the Market Assessment is outlined in Annex 4.

Factors that the consumers care about include ensuring environment friendliness of raw material, sustainably sourced material as well as developing unique products for masi such as the design and craft products. In addition, from the traders perspective, improvements in border controls are important to allow more exports with acceptable quarantine standards (see Figure 11).

The value chain actors that responded to the questionnaire felt that the strategy must focus on fragility and diversity. Fragility addresses sustainable sourcing of raw material while safeguarding vulnerability to irreversible damage. Economies of scope linked to market mainstream of core commodities that reduce cost and increase profit margin are important for masi production.

**Figure 11: Consumer Priority and Strategy for Success for Masi**



### RISKS

Masi in its many forms are perishable goods and at risk from wet and humid conditions. Similar to voivoi and other handicraft, one of the biggest market risk is associated with supply

disruptions resulting from the negative impact of natural disaster such as cyclones and floods. The value chain actors also noted that given the large number of buyers, individual sellers have limited marketing influence and bargaining power hence it is better for producers who sells masi products to work collectively as a group. Detailed assessment of risks are listed in Table.

**Table 12: Risk Management for Masi Value Chain**

| <b>Risks</b>  | <b>Management of risks</b>  |
|---|---|
| Supply disruptions due to natural disasters   | Increase work on masi during dry seasons and not wait for orders.                 |
| Low profit margin- thus, the quality of masi can be affected                                      | Have quality controls in place  |
| Working individually, thus lesser bargaining power  | Women to work in collectives- use traditional solesolevaki –with coordinators/etc |
| Resources supply late or unavailable<br>High dependence on boat transportation- bad weather/costs | Work on resources supply<br>Subsidized transport costs                            |

#### *SWOT analysis of the Value Chain.*

Masi is a valuable commodity that is traded in the tourism industry and reaches international destinations through social media marketing platforms.

Market facilitators link producers, processors, and design creators of Masi products to the marketplace. Producers that are linked and in partnership with such facilitators have a direct connection to the marketplace; for instance, in the case of Rise Beyond the Reef, they bring in design artists of international reputation to connect processors and creators of masi products. They also connect the processors with market distribution through promotion and advisory services on product development, quality control, pricing, and branding. The major weakness along the masi value chain is a lack of information on costs, pricing, consumer preference, and feedback on product design. To address this, there is an urgent need to train market facilitators who can further assist masi producers and processors to improve product development, quality monitoring, price setting, and linking products to retail/tourism/export markets.

Numerous government agencies and regional organizations such as the Pacific Horticulture & Agriculture Market Access (PHAMA) and South Pacific Tourism Organisation (SPTO) are involved in supporting MSME enterprises for a wider range of reasons, with the common element being poverty elimination and gender inclusiveness. From the processor's perspective, key challenges include their inability to set the price for goods with larger retailers or with friends and relatives, lack of capital and room to store raw materials, lack of visibility of, and understanding about the masi value chain as a subsector within the public, private and CSO sectors. To the producers, access to storage capacity will ensure sustainable resource planning and scheduling such that there is no need to rush to buy raw materials when orders are received. To address this, it will be important for the various Ministries and related institutions that support masi production to support access of producers and processors to capital. Detailed SWOT analysis is listed in Table 13.

**Table 13: SWOT Analysis and Actions Needed to support Masi production**

| <b>Value Chain Actor</b><br><i>Main actor (MA)</i><br><i>Support Actor (SA)</i> | <b>Strength and Opportunities</b>   | <b>Weakness and Threats</b>   | <b>Action Needed</b>   |
|---|---|---|--|
| <b>MA: Producers/ Value add</b>   | Market facilitators act as the link between creators and producers and the marketplace; they connect creation and production with | Prices in masi has not changed much- when you sell to certain buyers only<br>Producers do not have access to consumer feedback and, as such | Need for training on market facilitation which includes product development, quality monitoring, |

| <b>Value Chain Actor</b><br><i>Main actor (MA)</i><br><i>Support Actor (SA)</i> | <b>Strength and Opportunities</b>  | <b>Weakness and Threats</b>   | <b>Action Needed</b>   |
|---|--|---|--|
|   | distribution, promotion, and marketing by providing advisory services on product development, quality control, pricing, branding and expertise on market demand and expectations.  | have little opportunity to respond to the values and interest of different consumers.   | price setting and linking products to retail/tourism/export markets.   |
| <b>MA: Value add-the masi makers/designers</b>                                  | Many of the MSME are run at community and household level.   | Rapid rates of urban drift, the art form and knowledge surrounding Masi making is at risk.  | Skills training to be a part of the incentives offered for the expansion of the masi industry  |
| <b>MA: Suppliers</b>  | Most women are part of the Soqosoqo Vakamarama, Indigenous women groups in communities. and can work through these organizations – or form masi maker's collectives. Those in the Rise Beyond The Reef system are linked with small arts and crafts businesses benefit from exposure to product development, business, and financial training.   | There is little opportunity for women, whether they are producing as groups or as individuals, to be exposed to innovation and new product development, and to be 'led' to markets.   | Encourage Masi makers to form collectives and work together.<br><br>Incentives to link exporters to farmers in new areas.  |
| <b>MA: transportation &amp; Logistics</b>                                       |  | High shipping and packaging costs when products are sent over long distances or overseas.   |  |
| <b>SA: Suppliers to Markets</b>   | One of the most sought after items locally and especially for the Fijian Diaspora communities in other countries.  | Mulberry trees not planted as a commercial crop. There is large reliance on Masi trees from Moce and Vatulele on wild stock. Shipping services to and from Lau are inconsistent causing supply disruption to the value chain.   | Plan and support the planting of mulberry trees in commercial farms.<br>Seek Government support to improve inter-island shipping services.   |
| <b>SA: Legislated Institutions that support MSME of handicrafts</b>             | Fiji Arts Council, Ministries involved in handicraft making to help set prices, regulate prices<br><br>Masi is a valuable commodity traded in the tourism industry and reaches international destinations through social media marketing platforms. Numerous government agencies and Regional organizations like PHAMA, SPTO, etc., are already involved in handicraft sales locally/globally. | Access to the raw material, -low buying prices by large retailers and some buyers - even those in the Fijian customary market sometimes buy below market prices.<br><br>Lack of capital and room to store raw materials so that there is no need to rush to buy raw materials upon receiving new orders<br><br>Lack of visibility of, and understanding about the masi value chain and as an industry within the public, private and CSO sectors: | Develop mechanisms to ensure payment of fair price, traceability and transparency along the value chain<br><br>Undertake training needs assessment along the various actors in the value chain<br><br>Develop training to respond to training needs with special emphasis on the formal leadership opportunities such as business planning for women to help access markets. |
| <b>SA: middle sellers in Suva</b>   | Lack of copy right protection  | Copying of designs by middle sellers at the Flea Market/etc   | Develop legislation to safeguard Intellectual rights   |

### *Plan to improve the value chain.*

In view of the above discussion, key recommendations are developed to support further development of the masi value chain.

Short-term



1. **Assess and establish cost models:** It is essential to reassess the cost structure of masi pieces and the finished masi product with specific designs printed on the masi. Such cost assessment may be done with Moce/Komova and Vatulele to ensure alignment of basic prices of the end product.
2. **Establish commercial masi plantations:** There is concern for the sustainability of the supply of raw materials. Producers replant mulberry trees but at a small scale. It is therefore important to secure support of the Ministry of Forestry and the Ministry of Agriculture to advocate the planting of masi trees as part of landscape restoration work.
3. **Access to capital:** Producers and processors have great difficulties in accessing capital. As a result, masi production has maintained the “small business model” at household level.

Long-term:

1. **Skills training:** Ministry of Forestry is well placed to work with other Ministries of Government such as the Ministry of Women, Children and Social Protection to develop training modules on financial management and design targeted for handicraft artisan.
2. **Institutional support:** Institutional support through a coordinated approach will be prudent to phase out the different approaches to develop masi. The two key masi producing areas – Vatulele and Moce in Lau need special attention to upgrade facilities and production processes through feasibility assessment on subsidies and incentives targeted at value chain actors such as storage facilities, interisland shipping and others.

Detailed suggestions for short and Long-term plans for value chain actors are listed in Table 14.

**Table 14: Short and Long-term Options for Value Chain Actors**

| Value Chain Actors | Short-term Plans   | Long-term plans   |
|--------------------|--|---|
| Producers          | <p>Do community trainings in both Moce and Korova on financial literacy training, product development, quality handling, quality control, pricing, cash flow and budgeting.</p> <p>Renegotiate prices with RBTR and other buyers.</p> <p>Planting of mulberry trees where there has been removal of trees. Reafforestation plan to be started in Vatulele, Moce and other areas where masi is source from.</p> | <p>Training of trainers, and training of SMEs owners on market facilitation which includes product development, quality monitoring, price setting and linking products to retail/tourism/export markets</p> <p>Development of commercial farms for mulberry trees on Viti Levu.</p> |
| Processors         | <p>Organize women into collectives to pool resources and work together and sell products together.</p> <p>Organize men and youths in the villages to work together in planting and maintaining mulberry trees.</p> <p>Once women are organized in collectives, they have to appoint coordinators, who can help monitor progress of work to be done</p>   | <p>Network with other masi makers and formalize Masi makers associations and draw up SOPs and MOUs to ensure transparency and accountability in supply, marketing and distribution.</p>   |

| <b>Value Chain Actors</b> | <b>Short-term Plans</b>   | <b>Long-term plans</b>  |
|---------------------------|---|---|
|                           | <p>Up-skilling training on masi making to be undertaken at community level.</p> <p>Undertake a cost benefit analysis of masi production and marketing.</p> <p>Ready cash incentives to be available at farm gate to ensure high quality masi and quick turnaround in meeting of orders.</p>                                     | <p>Long-term revival of masi making skills- to be conducted in all masi producing areas in the country.</p> <p>Identify partners who work in the craft space to assist with capacity building/training, marketing before other forms of buying e.g. Farm gate buying.</p>   |
| Institutional support     | <p>Available capital to processors to support stocking of white masi and dyes to facilitate ease and efficient turnaround of masi production in response to market demands</p> <p>Coordinated approach by government agencies, NGOs, the private sector in the production and marketing of masi from the different sources.</p> | <p>Establish MSME capital to support the growth of masi producers and processors</p> <p>Phased approach to coordination between the different approach to be done through an identified time period.</p> <p>Look at ways where costs along the value chain can be subsidized by the Government through direct fiscal policies and appropriate tax incentives.</p> |

## Magimagi – Coconut twine



*In Lau, men are involved with magimagi production at all stages of production. Finished magimagi product, ready for market. Natural color is brown while dyed magimagi is black.*



Magimagi (coconut twine) is one of the cultural products that continue to be manufactured and traded in both contemporary and commercial spaces as well as for cultural uses, where certain clans manufacture the twine for use specifically in cultural ceremonies. However, magimagi in more modern times can be found in clothing, in visual art products and as decorative embellishments in décor in rooms and other décor products. Its uses in modern contexts are very diverse and creative, which means that this is a Pacific cultural product that will always find relevance in many uses into the future.

Magimagi is produced from special coconuts named magimagi or coconut sinnet. The magimagi is known throughout the Lau Group, especially Fulaga, Ono-I Lau, and Cicia. Magimagi coconut trees take about five years to bear fruit. The husks from the nuts are braided and woven into a strong, thin rope "as thick as a cod line." The Magimagi coconut grows in the Lau group as a scarce natural resource, which is weaved into artistic beauty by the people of Cicia, Matuku, Lakeba, Fulaga, and other islands in the Lau group. One of the significant challenges currently faced by the people of Kabara in Lau is the need to review Magimagi's current selling price in the local and international markets to ensure the economic viability of production.

Magimagi is produced and marketed mainly through the informal sector, so there is little data on demand and supply. Like other handicrafts, there is not enough industrial demand to work on a national supply-and-demand model for the craft.

#### *VALUE CHAIN MAP – Magimagi*

Production of magimagi is done mainly by men and involves intricate traditional knowledge and skills. Each village in the Province of Lau produces small amounts of magimagi, primarily for personal use. Commercial production is recorded from Cicia, Moce, Kabara, and Fulaga. The team connected with magimagi producers of the Selavo Organics of Cicia Island, Lau.

As of March 2024, the amount in stock, annual sales, and projections have been low, as the trade is focused on a unique craft that targets certain Pacific island diaspora and the tourism industry. From 2020 to 2021, 68 pieces of magimagi were produced and exported for \$2,040.00 (MoF 2022.a).

Selavo Organics in Cicia primarily sells directly to customers—some products, like magimagi, have specific customers from Hawaii and the USA (Tongan Community). An estimated 50% of sales are outside Fiji, and the other 50% are directly sold to local buyers. Actors involved with Selavo Organics magimagi production are listed in Table 15.

Value chain map for Selavo Organic Magimagi production is outline in Figure 12.

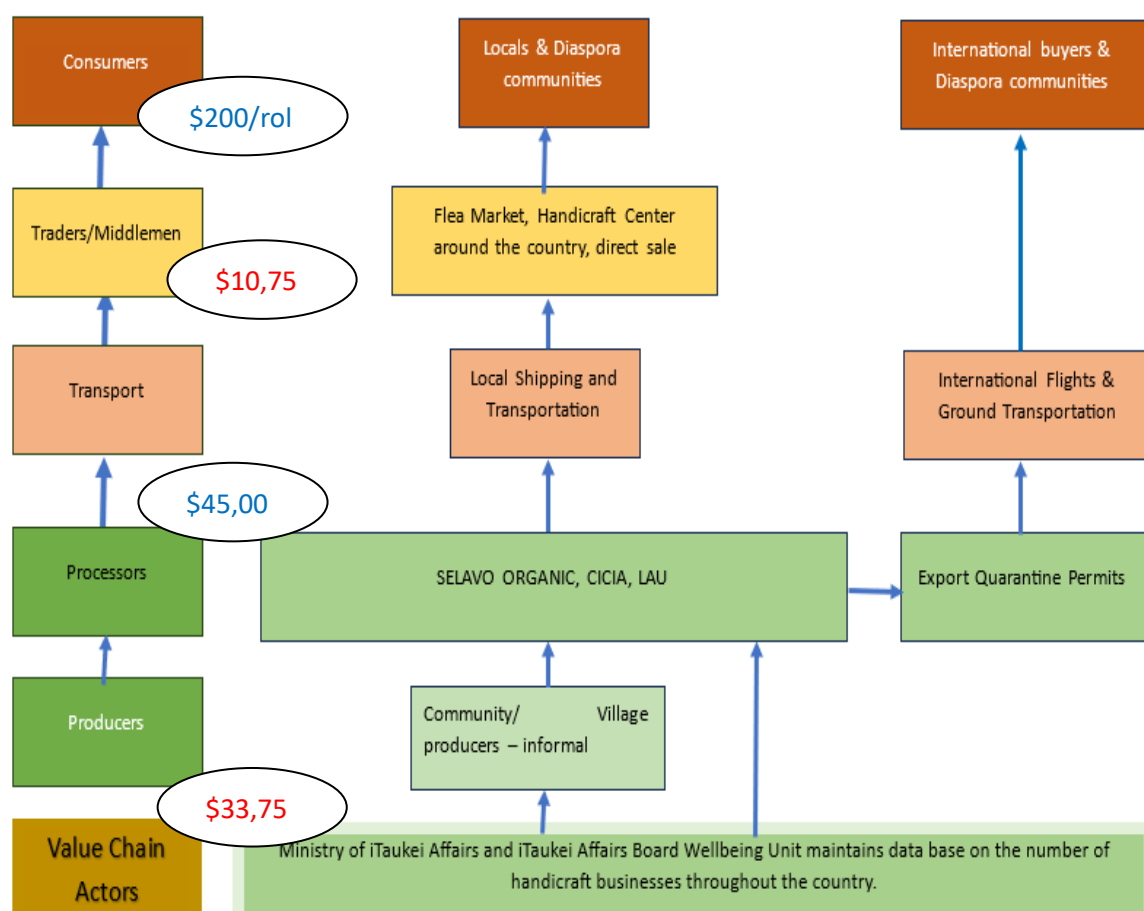
**Table 15:** Value Chain Actors - Magimagi

| Major Actor (MA)  | Roles of MA              | Support actors                                | Roles of SA                             | Costs involved  |
|---|--------------------------|---|---|---|
| Producers-<br>Families- men and women (paid to do the work)<br>6 in Cicia | Collection of green nut, | Boats, carrier costs within Cicia and to Suva | Transporting coconuts from the villages | \$ 20 a day for 5 days=\$100 a week-<br>\$400 a month<br>Costs of transport<br>\$400.00 |



| Major Actor (MA)   | Roles of MA  | Support actors   | Roles of SA   | Costs involved   |
|--|--|--|---|--|
| Processors-2   | Husking, baking, drying, weaving   | Help from young men to husk, bake coconuts   | Husking and baking  | \$400 a month/individual   |
| Marketing- & Promotion<br>Individually done online<br>Selavo Organic<br>Other Producers<br>selling in line | Marketing on social media,<br>In organized Expos                                       | Loving Islands, Ministry of Women, Forestry Department, Ministry of Trade, Tourism Fiji, the Private Sector, NGOs. | Facilitate shows, online marketing, policies and regulations to facilitate trade. | \$2,000 a month, costs of marketing and promotion, attending shows, etc. |
|  | Selling locally at shows, expos, social media platforms used to export internationally | Loving islands, Ministry of Women, Forestry Department, Ministry of Trade, Tourism Fiji, the Private Sector, NGOs  | Support local and international selling of magimagi                               | \$2,000 a month, costs of freight, biosecurity, etc.                     |

Figure 12: Value Chain for Magimagi as Selavo Organic



#### QUANTIFICATION OF THE VALUE CHAIN

Magimagi is sold in rolls ad \$200-300 per roll. Rolls are sold in 50m and 100m.

Value adding for magimagi involves dying the same to change its color to black. The dyes used are made of the same raw materials as the masi dyes, using mangrove sap and candlenut fruit ash.

An estimated 10 MSME entities trade magimagi in the Lau group of islands. Table 16 provides a detailed quantification of the Magimagi Value Chain.

Table 16: Quantification of Value Chain Actors

| Value Chain Actors                | No. of people involved   | Costs   | Volume in a month/<br>Domestic and export demand | Level of production that can be met  | Transportation distance, pricing, margins, wastage  |
|-----------------------------------|--|---|--|--|---|
| <b>PRODUCERS</b>                  | 3 households/ a few magimagi makers in Kabara, Fulaga, Lakeba, etc.<br><br>15 magimagi makers  | Collecting and husking, baking nuts= \$20.00 a day<br>\$2 meter – finished products 100 metres-\$200.00 | 5 rolls in a month- \$1,000, Fue                 | No analysis available on how much volume can be met.<br><br>5-6 pieces a month | \$1,000 in a month- Costs is about \$200.00<br>Transport costs/etc \$200.00   |
| <b>VALUE ADD ACTIVITIES</b>       | Only a few magimagi makers are left<br>15  | Cost built into cost of finished magimagi when sold   | Up to 15 rolls per community-                    | 20 rolls, Fue 20 a month   | \$6,000.00  |
| <b>PROMOTION</b>                  | Individually- 15 Loving islands and other SMES- 10 SMEs  | 15 rolls x 15 people x \$200 a roll   | 225 rolls  | 300 pieces   | \$15,00 Promotion costs   |
| <b>DISTRIBUTION AND MARKETING</b> | Individual sellers, SMEs, retail shops/Airport/ tourism outlets, National and provincial Expos- Most promotion is online -Done by individual magimagi makers makers= 15 in Lau- Sold on social media platforms mainly to USA, Hawaii, NZ and Australia | 300 pieces<br><br>15x 15 pieces each x \$300 a roll   | 1 roll=\$200<br>225 pieces<br>Plus fuel.         | 15 magimagi makers x15 rolls each x \$200 a roll                               | Projected sales=\$45,000.00<br><br>Transport costs, quality handling/etc \$15,000.00                                |
| <b>EXPORTERS/ EXTERNAL BUYERS</b> | Fijian, Samoa, Tonga, etc. Diaspora overseas.500   | 15x 15 pieces each x \$300 a roll   | 225 rolls @ \$300 FJD a roll                     | \$65,000.00  | \$65,000 FJD minus costs- \$15,000=\$50,000.<br><br>Air freight, biosecurity/etc. costs \$50,000 FFJD- \$25,000 USD |

### Market Assessment

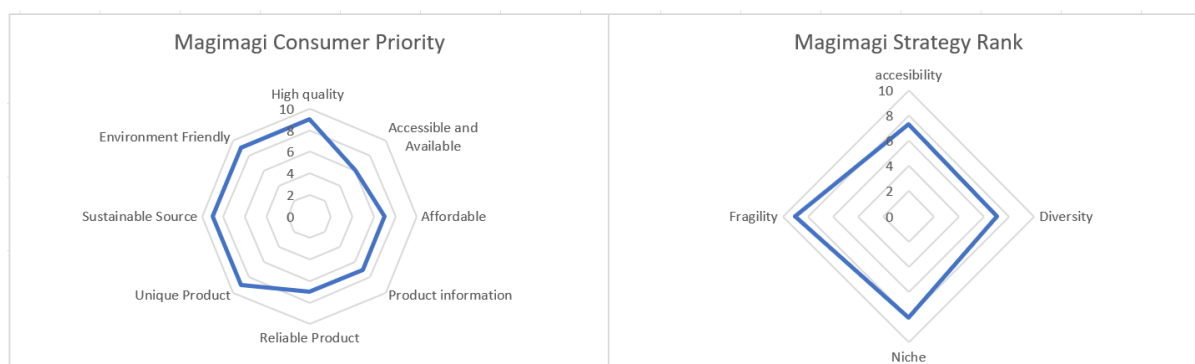
Primary producers collect the green coconuts, husk them, and bake the twine. Based on the experience in Selavo, Cicia, and Lau, it can be assumed that, on average, 5-6 rolls are produced between 15 producers on each island in Lau per month. Each roll consists of 100m of twine, which is sold at FJ\$2.00 per meter.

Criteria of success for magimagi consumers include environmental and sustainable sourcing as well as being uniquely strong. The strategy to maintain this fragility where value chain actors will ensure sustainable resource management and resilience to climate change (see Figure 13). Detailed responses are listed in Annex 4.



*Magimagi used in a whale tooth – the most valuable traditional artefact*

**Figure 13: Consumer priority and Strategy for Magimagi**



### SWOT analysis of the Value Chain.

Magimagi is a niche product traded to artisans who use it as part of the raw materials used to produce artefacts such as the handle of the whales tooth – an artefact used in traditional Fijian ceremonies. Current producers are among the older generation and there is an urgent need to transfer the technology to youths. Details are listed in Table 17.

**Table 17: SWOT Analysis for Magimagi Value Chain**

| Value Chain Actors  | Strength and Opportunities   | Weakness and Threats   | Action Needed                       |
|---------------------|--|--|-------------------------------------|
| Main actor (MA)     |  |  |                                     |
| Support Actor (SA)  |  |  |                                     |
| <b>MA/Producers</b> | Elders in the village have the expertise and skill sets to make magimagi. The opportunity is in upscaling to meet the demand, as | No transfer of traditional knowledge of magimagi, dilo making. | Undertake training for young people |



| <b>Value Chain Actors</b><br><i>Main actor (MA)</i><br><i>Support Actor (SA)</i> | <b>Strength and Opportunities</b>  | <b>Weakness and Threats</b>  | <b>Action Needed</b>   |
|--|--|--|--|
|  | magimagi makers are getting old and not many young people are skilled in making magimagi   |  |  |
| <b>MA/Producers</b>  | The demand will increase as we produce magimagi that is special artefact for communities from Lau, Tonga, Samoa. Another target group are the diaspora in other communities from these island countries. | In the last 5 years there has been increased demand but they do not always have products ready to meet demand.       | Upscaling to meet the demand and working together with those in the communities increase supply.   |
|  | There is a lot more awareness of the benefits of using traditional artifacts.  | Because magimagi is a traditional handicraft, those involved do not network or have some collaboration or networking | Magimagi making, like other handicrafts, requires a coordinated approach between partners, particularly between government ministries and services, the private sector, civil society, development partners, and regional agencies |
|  | Magimagi trees are plentiful in the surrounding villages.  | Aging trees, declining supply. Poor tree management. Quality standards of markets and competing countries            | Establish targeted work to revive the planting of magimagi coconut trees and ensure sustainability.  |
|  | Magimagi production is now carried out in the islands eg Cicia Selavo organics.  | Logistics and transportation to Suva and the costs involved.   | Encourage targeted investment into magimagi centers in rural /maritime locations- E.g. Cicia   |

### *Plan to Improve the Magimagi Value Chain*

Given the above discussion, proposed plans to support the magimagi value chain are as follows. Details are listed in Table 18:

#### Short-term

1. **Transfer of knowledge:** Since knowledge of making magimagi is at threat of being lost, it is prudent to organize magimagi training for youth to allow the transfer of knowledge from current magimagi producers to interested youths.
2. **Undertake cost modeling for all value chain actors:** Coordinate benefit-cost assessment for each stage of the magimagi process to capture the real cost of production and ensure that market prices are profitable to all value chain actors.
3. **Set up magimagi makers' collectives or associations:** this will ensure collaboration in addressing logistics, seeking markets, selling, and exporting.

#### Long-term

1. **Institutionalize knowledge transfer:** In the Long-term, working with universities or vocational institutions will ensure continuous knowledge transfer for the magimagi production process.
2. **Targeted cultivation of magimagi coconuts:** Replanting unique coconut species that support magimagi production is also necessary.

3. **Establish collection centers in Lau: Encourage the establishment of collection centers** to store and coordinate standards and quality control. The sale of magimagi.

**Table 18: Suggested Plans for the Magimagi Value Chain**

| <b>Value Chain Actor</b>  | <b>Short-term Plan</b>  | <b>Long-term</b>  |
|---|---|---|
| <b>MA- Producers/magimagi makers</b>  | Identify elder generation magimagi makers from Cicia and other communities who can still make magimagi as trainers to upskill younger people.   | Develop a training forum to pass down knowledge to the younger generation. Hold continuous training on magimagi making in rural locations in Lau. Have phased Programs and include training of trainers for families involved in magimagi making. This can also address the rural-urban migration of young people |
| <b>MA-Value adding/processing</b>   | Provide village-based training and pay trainer stipends to instructors within different villages. Have coordinators at the community level to help monitor training, quality control, check on orders, etc.<br><br>Start to upgrade processing and collection centers for magimagi and other handicrafts. | Set up processing and collection centers in the outer islands and maritime areas. This will ensure the decentralization of services, and services will be available for processing from source and existing marketing avenues to be used- social media, etc.  |
| <b>MA-Producers</b>   | There needs to be targeted work to revive the planting of magimagi coconut trees, to ensure sustainability  | Have magimagi coconut tree planting be done commercially in islands where magimagi making is still known and in surrounding communities to ensure Long-term sustainability of the product.  |
| <b>SA- Individual sellers, SMES that trade magimagi, the Ministry of Women, Department of Culture and Arts, Fiji Arts Council, Ministry for Trade, the Private sector, NGOs, etc.</b> | Start to coordinate with other magimagi makers in the Lau group – to ensure there is collective or coordinated work in the industry<br><br>There is a need to review current trading price  | Set up magimagi makers collectives or association- this will ensure joint collaboration in addressing logistics, seeking markets, selling and exporting. Ensuring fair price, ensuring transparency and accountability in trading, etc.   |
| <b>Producers/Value add workers In communities.</b>  | Start training on understanding of markets, market facilitation, supply and demand and basic business literacy- to move the business to the next level  | Have training programs coordinated in all magimagi producing communities- to ensure Better understanding of markets, supply and demand, business literacy, networking and ensuring Long-term sustainability   |

## Food



## Ota (edible Fern) Value Chain Assessment

*Diplazium esculentum*, commonly known as the vegetable fern, is an edible fern abundantly found across Asia and Oceania. It is widely consumed and cherished as a dietary staple in many regions. This large perennial fern features an ascending rhizome approximately 50 cm in height, adorned with short rufous scales measuring about 1 mm long. Its bipinnate fronds boast long brownish petioles, with the base of the petioles characterized by a black hue and covered with short scales ("*Diplazium esculentum*, n.d.). The fronds can grow up to 1.5 m, with pinnae measuring around 8 cm long and 2 cm wide.

*Ota*, or young fern, holds deep cultural significance and has been passed down through generations among rural families as a vital source of sustenance. Today, it remains a cornerstone of survival for these families, serving as a prime source of income in local markets (FT, 2016). Women and men from various provinces, including Naitasiri, Tailevu, Sigatoka, Ba, Navosa, Namosi, Serua, and Ra, can often be seen selling *Ota* bundles at the markets at a price of \$1, \$2, and \$3 each.

*Ota* leaves are typically divided into two categories: "*Ota miti*," representing the young ferns, and "*Ota lolo*," denoting mature ferns. A bundle of *Ota miti* typically contains 25 to 30 stalks, while *Ota lolo* bundles may contain around 50 stalks. Vendors usually carry an average of 20 to 30 bundles per trip to the market, with some transporting up to 100 bundles over two market days. For instance, during a market day in Suva on March 16th, approximately 420 bundles of *Ota* were sold, while the Nausori market recorded 380 bundles on March 23rd, excluding sales from Friday.

*Ota* vendors typically gather the ferns from the wild on Thursdays, wrapping them in wild taro leaves to maintain freshness before delivering them to the market on the same day or Fridays. With a shelf life of 4 to 5 days, *Ota* remains in high demand, making it a popular choice among people of various ethnicities in Fiji. *Ota miti*, being the most sought-after variety, can even command prices of up to \$4 per bundle at times.

### Value chain map

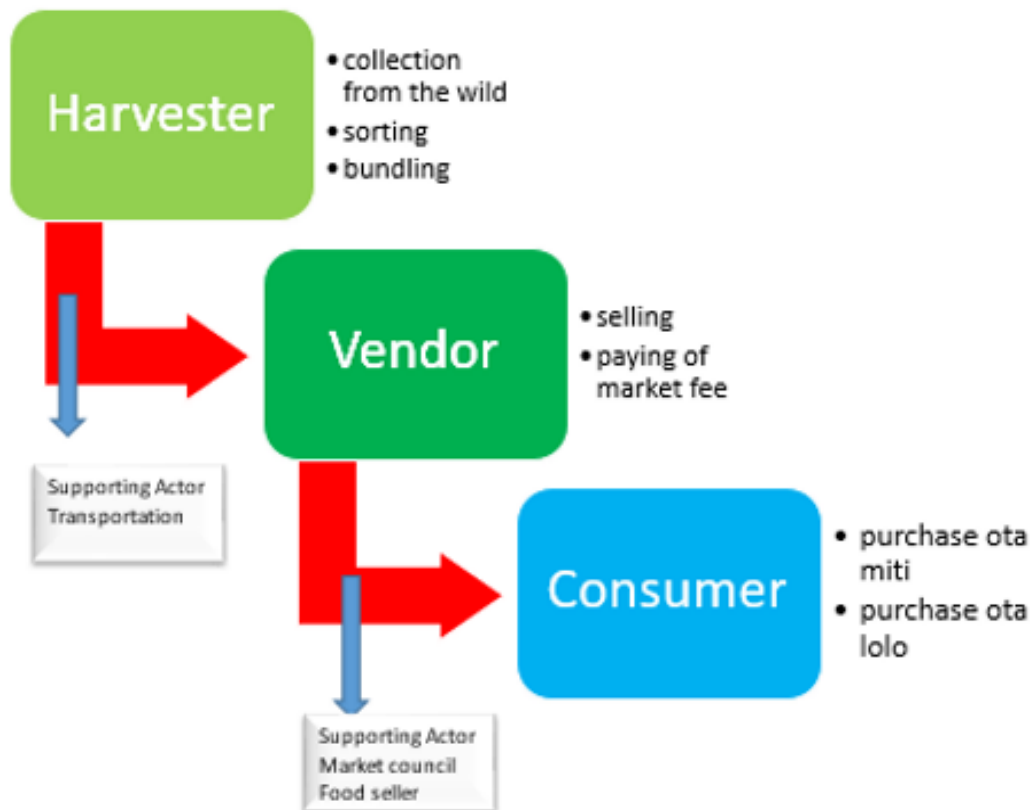
*Ota* harvesting involves men and women from the same family who venture into the wild to collect these ferns. During the gathering process, *Ota miti* and *Ota lolo* are separated and stored in distinct bundles, which adds to the time and effort required for collection. Once gathered, the ferns are transported back to the village for bundling. See Figure 14.

Unlike many other businesses, the *Ota* trade does not involve middlemen. Vendors prefer to sell their produce directly at the market, allowing them to clearly expect their returns. In the *Ota* value chain, three primary actors play crucial roles: the harvester, the vendor, and the consumer. The harvester is responsible for gathering *Ota* from the wild, while the vendor sells the bundled *Ota* at the market. Consumers purchase *Ota* based on their preferences and required quantities.

Supporting actors in the value chain include transportation services, which facilitate vendors' movement from their homes to the market, and market facilities provided by respective town and city councils. These facilities serve as spaces where vendors can sell their products, and consumers can make purchases, contributing to the smooth functioning of the *Ota* market value chain.

Figure 14: *Ota* Value Chain Map





#### *Quantification of the Value Chain*

**Harvester:** When it comes to harvesting or collecting *Ota*, both partners in a household typically embark on this task. They set out after breakfast and return in the afternoon, spending an average of 5-7 hours in the field. The duration depends on factors such as the distance travelled and the quantity of *Ota* gathered. They bring along lunch, which costs approximately \$5. Bundling the harvested *Ota* takes less than an hour at home, after which the ferns are wrapped together into large bundles.

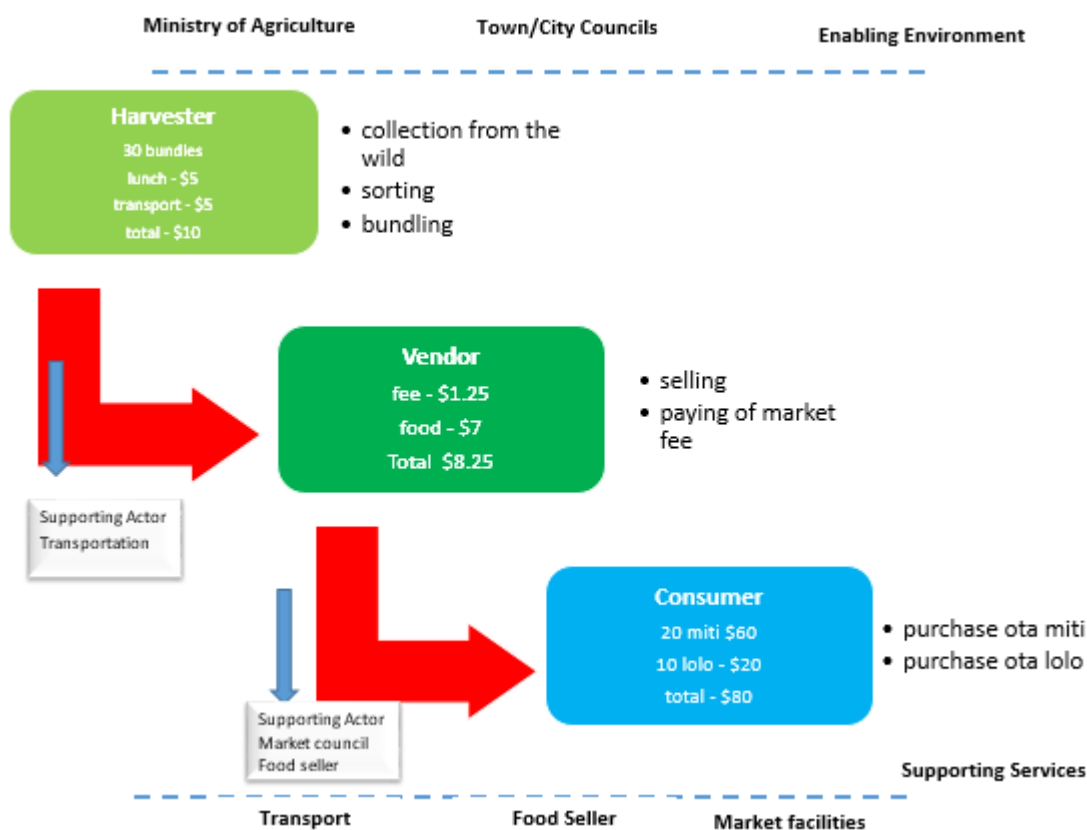
**Transportation:** Public transportation is the primary mode of travel for vendors and their market produce from home to the market. The fare for the vendor is \$3, while it costs \$2 to transport the market produce, resulting in a total cost of \$5. However, these expenses may vary depending on the location, sometimes reaching as high as \$10 to \$15.

**Vendor:** Selling begins as soon as vendors arrive at the market. Once a space is allocated by the market attendant, a fee of \$1.25 is charged until all the produce is sold. Additionally, there are food sellers offering tea for \$2 and lunch for \$5, conveniently served on-site for vendors.

**Consumer:** Consumers have the freedom to choose their preferred vendor and type of *Ota*—either *Ota lolo* or *Ota miti*—at prices typically ranging from \$2 for *Ota lolo* to \$3 for *Ota miti*.

A schematic diagram of the quantification of the value chain is outlined in **Figure 15**.

**Figure 15: Quantification of Value Chain for *Ota***



#### Role and Contribution of Value Chain Actors

The main actors in the *Ota* value chain are listed in Table 19 and include the harvesters, vendors, and consumers. Harvesters collect the *Ota* from the wild, wrap them up in bundles, and transport them to markets to see among local consumers. Each bundle may consist 80-100 fronds of edible fern. It is interesting to note that the harvester is often the same as the vendor. In some cases, the harvester and the vendor come from the same family unit. Consumers are mostly urban dwellers who value *Ota* as a delicacy. The general outlay of all value chain actors are outlined in Table 19.

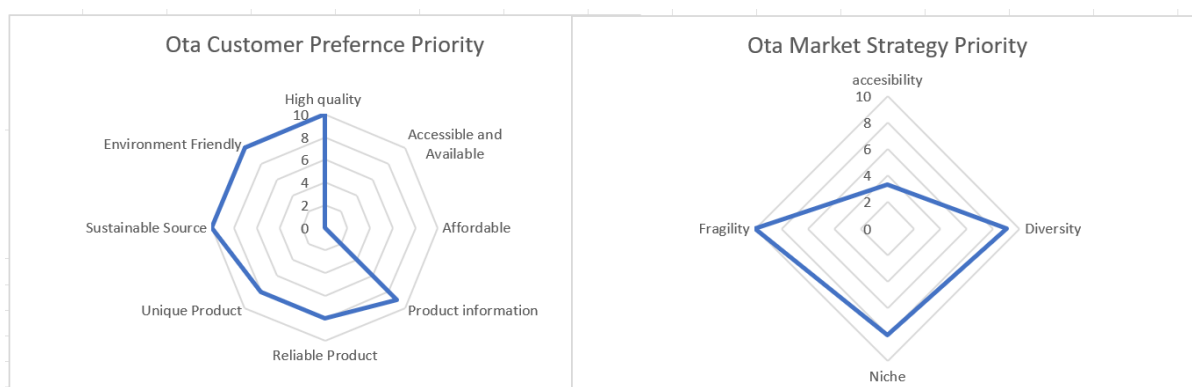
#### Market Assessment

*Ota* holds a significant place in the diets of both urban dwellers and rural communities alike. It is cherished by consumers who eagerly seek it out, particularly for Sunday meals. The demand for *Ota* extends beyond individual households, as hotels in Suva and other urban areas also purchase large quantities for both weekend and weekday menus. Its popularity surges during periods of vegetable shortages or off-seasons when other produce may be scarce. See Figure 16.

Table 19: Role and Contribution of Value Chain Actors

| Actor                     | What the actor contributes to the final product | The cost of the actor's contribution | The reward that the actor receives  | Actor Risk                                 |
|---------------------------|---|--------------------------------------|-------------------------------------|--|
| <b>Main actor (MA)</b>    |   |                                      |                                     |  |
| <b>Support Actor (SA)</b> |   |                                      |                                     |  |
| Harvester MA              | Harvesting of <i>Ota</i>                        | \$5                                  | Final sales less expenses           | Health                                     |
| Transport SA              | Bundling transportation                         | \$5                                  | Fare                                | Expiry of road worthiness and accident     |
| Vendor MA                 | Selling   | \$8.25                               | Final sales less expenses           | Health status and weather                  |
| Food Seller SA            | Provide food                                    | \$7                                  | Sales                               | Food price increase                        |
| Consumer MA               | Purchase of produce                             | \$5                                  | Availability of food for the family | Shortage of supply and power of purchasing |

However, it's important to note that the assessment did not encompass the *Ota* export market. This omission stems from the limited availability of specific data dedicated to *Ota* exports. Instead, export data typically amalgamates various vegetables into broader categories, making it challenging to isolate information specifically related to *Ota*.

Figure 16: Critical Success Factors and Strategy for *Ota*

#### SWOT analysis of the Value Chain

*Ota* is readily available across Fiji's rainforest, growing wild in wet, shady valleys. It is readily available and accessed by women and youth who bundle them for sale at local markets. Despite being readily available, *Ota* is hardly replanted, and current resources are mainly sourced from the wild. Fiji National Food and Nutrition has successfully tested *Ota* replanting techniques and advocated the inclusion of *Ota* into agroforestry systems.

Rural women and youth collect *ota* and transport it to local markets weekly. The National Food and Nutrition Survey (NFNC, 2025) indicated that 7.7% of the population surveyed consumed *Ota* regularly. Vendors or *Ota* sellers aim to bring fresh *Ota* to the market on Saturdays, as it is commonly consumed as a salad at Sunday lunches. The drawback for vendors is associated with market facilities. Details in listed in Table 20.

Table 20: SWOT for *Ota*

| Value Chain Actors        | Strength and Opportunities | Weakness and Threats | Action Needed |
|---------------------------|----------------------------|----------------------|---------------|
| <b>Main actor (MA)</b>    |                            |                      |               |
| <b>Support Actor (SA)</b> |                            |                      |               |



|                      |   |  |   |
|----------------------|---|--|---|
| Harvester<br>MA      | Availability of wild <i>Ota</i><br>Have ownership of the resource | There are very limited place for wild <i>Ota</i>                         | Replanting  |
| Transportation<br>SA | Transport always available<br>Bus and trucks                      | When the bus is full or failed to come as schedule                       | Improve service   |
| Vendor<br>MA         | Ability to sell for long hours                                    | Difficult to sell during rainy season<br>Sickness for sitting long hours | Improve facilities                                      |
| Food seller<br>SA    | Customers always available  | When vendors brought own lunch<br>Other vendors selling cooked food      | Improve on service delivery and quantity                |
| Consumer<br>MA       | Purchasing power<br>Timing for shopping                           | Inaccessible supply (further into valley/forest area) Shortage of supply | Early morning shopping as high chance for fresh produce |

*Propose a plan to improve the value chain.*

Short-term plans:

1. **Establishing Family-Owned *Ota* Farms:** Initiate the cultivation of *Ota* on family-owned farms to ensure sustainable harvesting practices. By taking ownership of *Ota* cultivation, families can control the quality of the produce and streamline the marketing processes.
2. **Marketing Strategies:** Develop comprehensive marketing strategies to promote locally cultivated *Ota*. This may include branding initiatives, participation in local markets, and engagement with potential buyers to increase awareness and demand for *Ota*.

Long-term plans:

1. **Exploring Export Opportunities:** Explore the feasibility of exporting *Ota* to international markets to capitalize on its growing popularity and potentially higher value overseas. This would require market research, establishing export channels, and complying with international standards and regulations.
2. **Research and Development:** Invest in research and development initiatives to extend the shelf life of *Ota* and improve its post-harvest handling techniques. Understanding how to prolong the freshness of *Ota* will not only benefit local consumers but also enhance its export potential by ensuring product quality during transportation and storage.

## Medicine

### Kura Value Chain Assessment

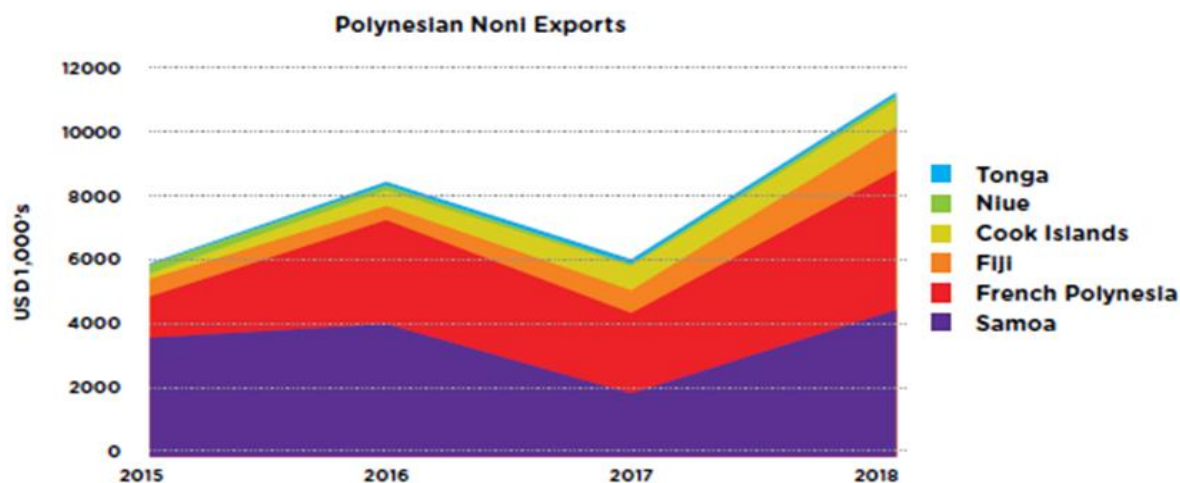
*Morinda citrifolia*, also known as Noni or Kura (Komal, 2020), is a versatile plant in various regions worldwide, originating from Southeast Asia and Australia. Kura (Noni) thrives in diverse habitats such as disturbed forests, dry to mesic forests, coastal areas, pastures, and around villages. See Figure 17 for distribution spans across Eastern Polynesia, Western Polynesia, Melanesia, Micronesia, Indonesia, Australia, and Southeast Asia (Thomson & Berry, 2006).

This resilient plant demonstrates remarkable adaptability, thriving in harsh, dry, and saline coastal conditions and elevations beyond 200 meters. It proliferates and bears fruit year-round, with no specific harvest season. Noni trees can be harvested 2-3 times per month, ensuring a continuous supply of fruit (Dixon et al., 1999).

Renowned for its versatility, Noni is utilized as food, beverage, and medicine, and its extracts are used in soap, body lotion, and shampoo products. Marketed in Australia, New Zealand, Japan, Korea, and Europe, Noni fruit juice is particularly sought after for its purported health benefits, including its use as an alternative medicine for conditions like high blood pressure and diabetes. In Fiji, fermented Noni juice is a traditional remedy for various ailments.

Noni cultivation has been promoted worldwide and is a promising income source for developing countries, given the rising consumer demand. Market demand for Noni juice products from Polynesia alone has doubled in the past five years and shows no signs of slowing down (PHAMAPP, 2020).

**Figure 17: Noni juice export form Pacific Island Countries**



The data shows that competition for Noni juice exports from Polynesian countries is increasing (Table 21). French Polynesia saw an increase in export value of 182% (to \$3.67m) during the same time period; at the same time, Cook Islands increased 239% to \$830k (PHAMAPP, 2020). Fiji's exports grew 171% to \$1.27m or third behind Samoa and French Polynesia. Since 2015, Samoa's market share of exports from Polynesia has dropped from 60% of total market share in 2015 to 40% in 2019, while at the same time, growth is observed in French Polynesia (22% to 36%), Fiji (8% to 12%), and the Cook Islands (4% to 8%). It is expected that within the next few years French Polynesia is expected to consistently overtake Samoa as the most valuable noni juice exporter in the region, while Fiji and the Cook Islands are expected to be

the underdogs that will threaten increasing competition. French Polynesia, Fiji, and the Cook Islands have dramatically increased output in a span of 3 years (2015-2019).

**Table 21: Noni Juice Export Value 2015-2019**

|                         | Export Value (USD x 1000) |       |       |        |        |
|-------------------------|---------------------------|-------|-------|--------|--------|
|                         | 2015                      | 2016  | 2017  | 2018   | 2019   |
| <b>Samoa</b>            | 3,534                     | 3,977 | 1,829 | 4,307  | 4,123  |
| <b>French Polynesia</b> | 1,301                     | 3,267 | 2,500 | 4,375  | 3,674  |
| <b>Fiji</b>             | 470                       | 443   | 747   | 1,172  | 1,276  |
| <b>Cook Island</b>      | 245                       | 462   | 779   | 941    | 830    |
| <b>Niue</b>             | 287                       | 176   | 34    | 182    | 195    |
| <b>Tonga</b>            | 77                        | 122   | 139   | 107    | 125    |
| <b>Total Value</b>      | 5,914                     | 8,447 | 6,028 | 11,084 | 10,233 |

Source: PHAMAPP, 2020. Samoa Noni (Nonu) Market Study. Pacific Horticultural Market Access Plus Program

### *Value Chain Map*

The kura juice producers have adopted a strategic approach to ensure a consistent and reliable supply of kura fruits by cultivating them on their own leased land. This practice allows them full control over the production process, from planting to harvesting, ensuring a steady and uninterrupted flow of raw materials.

Securing lease land is essential for the success of this business, as it guarantees a stable and consistent supply chain. The cultivation of kura seedlings typically takes around three years for the first harvest, while kura cuttings require two years before they can be harvested.

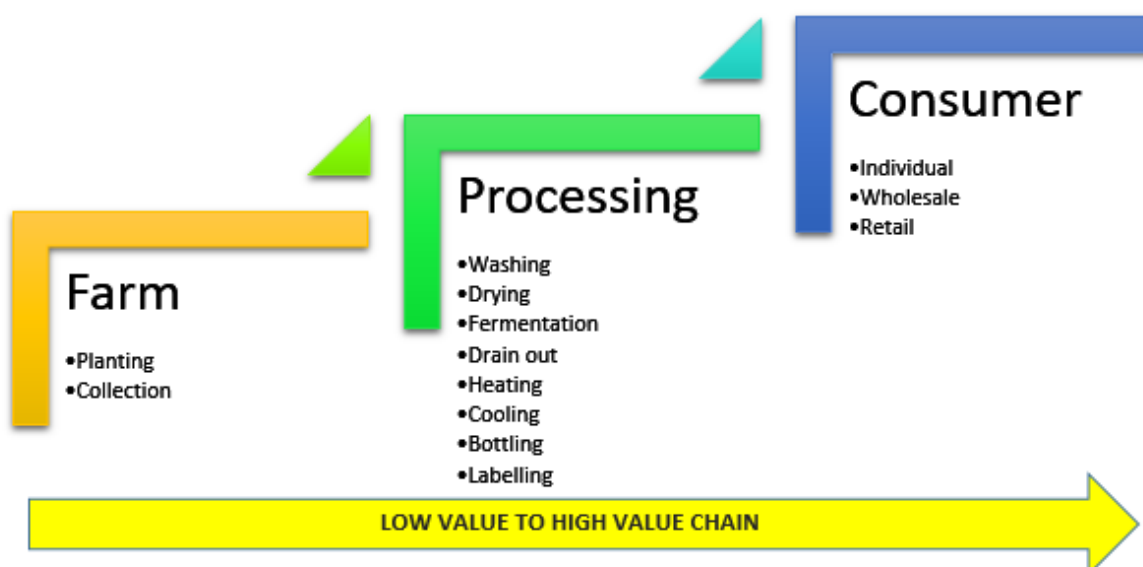
Harvesting is carried out by hand, with ripe kura fruits carefully picked from the plants rather than collected from the ground. Each plant can yield approximately 3 kilograms of fruits for the first harvest, with subsequent harvests ranging from 3 to 5 kilograms per plant.

Following harvest, the kura fruits undergo a thorough washing process before being dried for a few hours, the duration of which depends on the prevailing weather conditions. Subsequently, the fruits are transferred to air-tight storage containers for a fermentation period lasting between 70 to 90 days. Special non-corrosive storage tanks are utilized during this fermentation phase. See Figure 18.

After the fermentation process is complete, the juice is sieved to remove any solid residues and then heated to 60 degrees Celsius for 10 minutes. Following this, the juice is allowed to cool for 2 hours before it is bottled and labeled, ready for distribution and consumption in the market.

This meticulous production process ensures the quality and safety of the final product, providing consumers with a premium kura juice that meets the highest standards of excellence.

**Figure 18: Kura Value Chain Map**



#### *Role and Contribution of all actors*

Kura, a non-timber forest product native to Fiji, has been a significant export commodity for the past two decades and continues to hold economic value. While it grows abundantly in various regions of Fiji, there are currently few Kura businesses operating that are sourcing their raw materials exclusively from their own farms. Interestingly, none of these businesses have opted to source or purchase kura from individuals, groups, or communities outside their own operations. Value chain actors are listed in Table 22.

The involvement of family members is paramount in these kura businesses, with family units serving as the primary actors in the production process. However, it's essential to note that the scale and volume of production may vary between different companies. For instance, larger enterprises like Bula Noni, Royal Noni, and Noni Tea (Fiji) Pty Limited may have more structured operations and higher production capacities compared to smaller, family-run ventures.

**Table 22: Value Chain Actors**

| Value Chain Process | Function and Roles   | Actors   |
|---------------------|--|--|
| Fruit Collection    | Fruits picked from the tree when ripe. Fruits that have fallen to the ground are rejected.   | Family members all involved  |
| Washing             | The collected fruits are washed thoroughly to remove dirt  | As above   |
| Drying              | After washing, the fruits are dried naturally  | As above   |
| Fermentation        | The owner oversees the fermentation process, which involves letting the fruits sit in a container for a specific period to develop the desired flavors and medicinal properties. | Owner leads this process and oversees the engagement of family members |
| Heating             | Following fermentation, the fruits are heated to the required temperature  | As above   |

| Value Chain Process         | Function and Roles   | Actors   |
|-----------------------------|--|--|
| Cooling                     | Cooling process is important to ensure no evaporation when the kura juice is bottled     | Women assists in cooling down for bottling.      |
| Bottling & Labeling         | Once cooled, the juice is poured into bottles for storage and distribution.              | As above   |
| Market Channel Distribution | The final step involves distributing the bottled Noni/ Kura juice directly to consumers. | Advertise through social media and word of mouth |

### *Quantification of the Value Chain*

The assessment focuses on Northland Pure Noni (NPN), a family-owned business operating as a sole trader. This business falls into the low to medium-scale category but shows promise for growth over the next five years. The operation is overseen by the head of the family, with support from his wife and two sons.

Northland Pure Noni acquired a 28-acre plot of agricultural land in Naburenivalu, Namena, Tailevu, primarily for cultivating kura plants. Currently, there are 1000 plants standing, covering 10% of the leased area.

The entire process, from collection to the final product, involves 10 steps. Each step incurs costs and it takes about 3 kilograms of fruits to produce 1 liter of juice. During fruit collection, washing, and drying, all family members participate. The owner handles fermentation and heating, while the wife assists with cooling, bottling, and labeling.

Details are listed in Table 23.

**Table 23: Quantification of Value Chain Actors for Kura in Fiji**

| Value Chain Actor                                   | What the actor contributes to the final product   | The cost of the actor's contribution       | The reward that the actor receives          | Actor Risk   |
|---|---|--|---|--|
| <b>Main actor (MA)</b><br><b>Support Actor (SA)</b> |   |  |   |  |
| Owner (MA)  | Collection, Cleaning, Drying, Fermentation, Drain out, Heating, Cooling, Bottling, Labelling, Marketing | \$8.40 per litre<br>\$1,320 per 100 litres | \$16.60 per litre<br>\$1,180 per 100 litres | Health status - Sharing of knowledge to family member through training |
| Wife (SA)   | Collection, Cleaning, Drying, Cooling, Bottling, Labelling, Marketing                                   | \$8.40 per litre<br>\$1,320 per 100 litres | \$16.60 per litre<br>\$1,180 per 100 litres | Dual responsibility - Fulltime engagement and household chores         |
| Son (SA)  | Collection, Cleaning, Drying,   | \$8.40 per litre<br>\$1,320 per 100 litres | \$16.60 per litre<br>\$1,180 per 100 litres | Age barrier and business minded –full responsibility and ownership     |

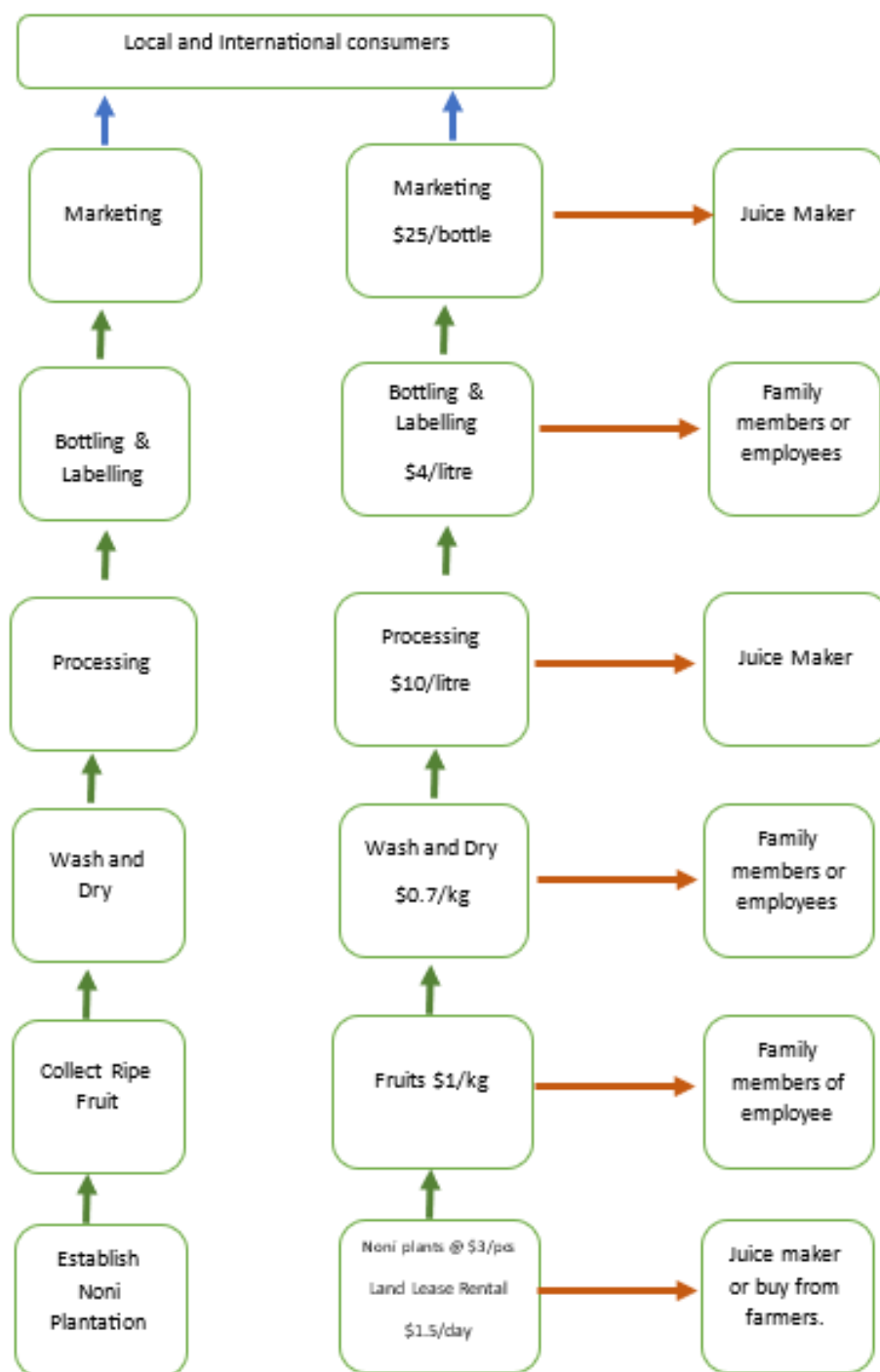
### *Market Assessment*

According to the findings from the interviews conducted, a significant trend was observed in the local market, where 100 litres of kura/noni juice are consistently sold out within a timeframe of 3 to 4 weeks before the next batch is available. This indicates a steady demand for the product within the local community. However, there is a potential challenge looming, as local consumption continues to rise, it may be impacted if the demand for the export market surges. See Figure 19.

Despite this, there are promising developments on the export front. Negotiations are underway for two new export markets, with an anticipated quantity of two containers per month. This expansion into new export markets signifies the growing recognition and appeal of kura/noni juice internationally.

Recent production figures indicate a steady increase, with 151.4 metric tonnes produced in 2019, 153.8 metric tonnes in 2020, and 120.6 metric tonnes in 2019 (MoA, 2019). Major commercial plantations include Royal Noni (80 hectares), Noni Tea (Fiji) PTY Limited with 29 hectares (Nataro, 2017), and Northland Pure Noni (5 hectares), collectively comprising an estimated 39,000 standing trees. Yields are estimated at 80,000 kg of fruit per hectare annually (Thomson & Barry, 2006). However, no comprehensive inventory has been conducted to assess the national stock of Noni trees thus far. See Figure 20 for Kura's market map.

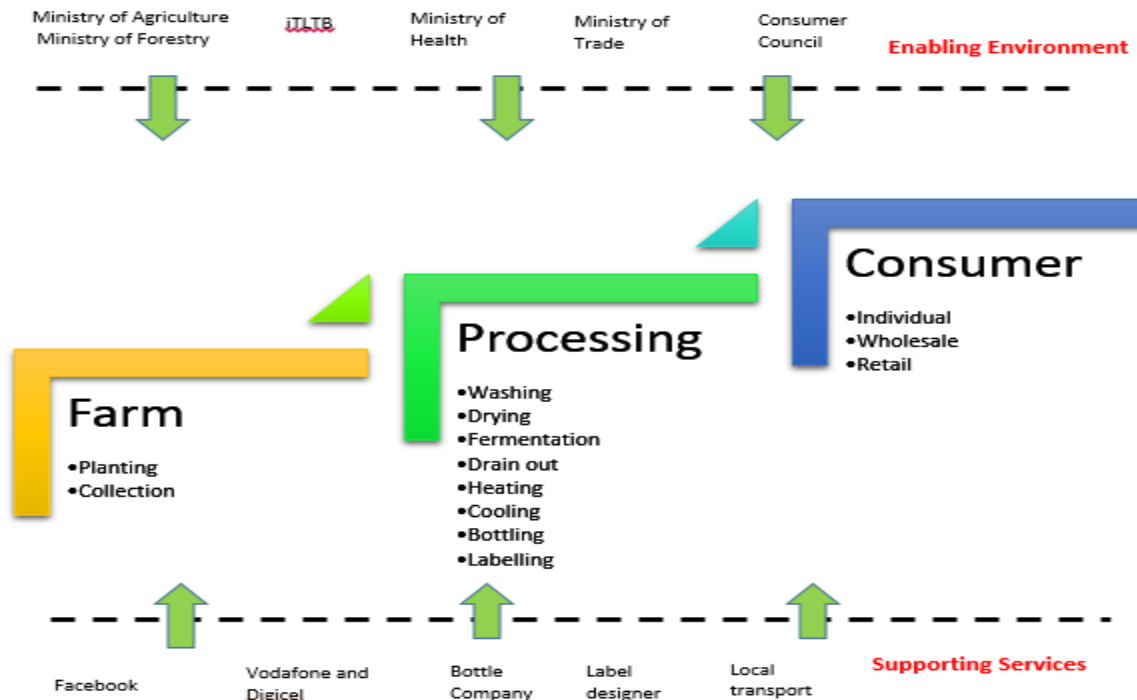
**Figure 19: Kura production process**



Furthermore, an analysis of export data from 2015 to 2019 reveals a consistent upward trajectory in the value of exports. This trend underscores the high demand for kura/noni juice in the international market, providing a positive outlook for the industry's future.

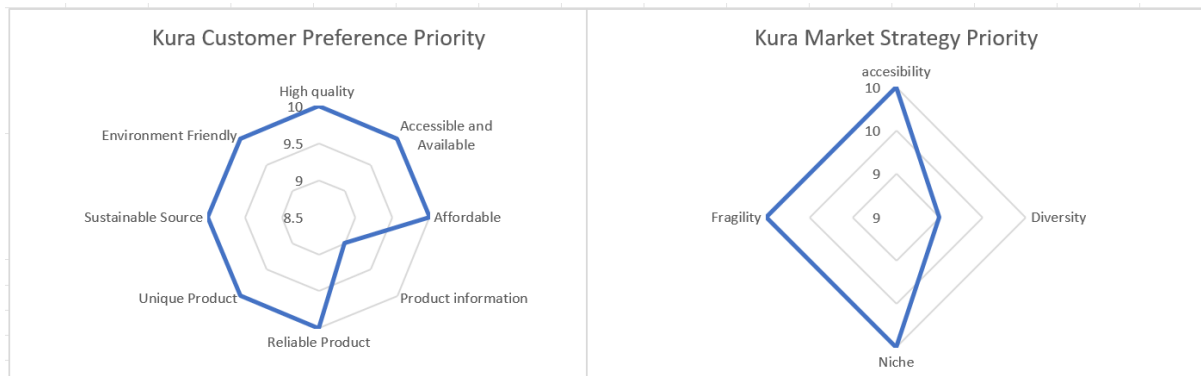
**Figure 20:** *Kura market map*





Consumer preference and strategy are depicted in Figure 21. Critical criteria for success include reliability of access, sustainably sourced, high quality and affordable. Strategy to achieve these include targeting high quality niche product as well as safeguarding fragility and accessibility.

**Figure 21: Criteria for Success and Strategy for Kura**



#### *SWOT analysis of the Value Chain.*

The value chain of Kura production indicates a simple relationship between the owner of the company and the production process associated with Noni/ Kura production. The case study highlighted the benefits of the owner owning the land title on which the Noni plants are planted, eliminating dependency on the third-party supplier of raw materials.

In view of the nature of the operation assessed, it is important to mitigate challenges associated with the sole owner/operator syndrome which calls for training by the owner to share knowledge and skills to workers/employee. Transfer of skills and technology is important to ensure sustainability of the value chain process in the short and Long-term.

At the moment, marketing is based on social media and word of mouth. A communication and marketing strategy is essential to ensure targeted and consistent impact over time.

Details of the SWOT analysis is outlined in Table 24.

**Table 24: SWOT analysis for Kura**

| <b>Value Chain Actors</b>                           |  |                             |  |
|---|--|-----------------------------|--|
| <b>Main actor (MA)</b><br><b>Support Actor (SA)</b> | <b>Strength and Opportunities</b>  | <b>Weakness and Threats</b> | <b>Action Needed</b>                         |
| Owner (MA)  | Land title<br>Knowledge and Experience in kura processing<br>Kura plantation<br>Family support | Health status               | Capacity building<br>Business planning       |
| Employees (SA)                                      | Availability   | Household chores            | Skill Training                               |
| Market Access (MA)                                  | Availability and willingness to support  | Peer pressure               | Communication Strategy<br>Marketing products |

*Propose a plan to improve the value chain.*

In view of the above discussions and the SWOT analysis, it is noted that the sample group is an individual sole trader. Nevertheless, it is assumed that the sole trader represents struggling entrepreneurs developing the non-timber forest product subsector. Immediate actions and Long-term plans for the development of Kura/Noni are listed below.

#### Short-term plan

1. **Advocate for Government Support:** Collaborate with the Ministry of Trade and Micro, Small and Medium Enterprises (MSME) to spearhead the promotion of the Kura industry domestically and internationally. Lobby for the development of a comprehensive Kura policy and institutional framework, which would provide formal recognition and enhance the credibility of farmers and the industry as a whole.
2. **Expand Planting Efforts:** Work closely with the Ministry of Forestry to bolster planting efforts and increase the availability of Kura planting stock. Encourage individuals and communities to participate in Kura cultivation initiatives, leveraging support programs offered by the Ministry of Forestry under their tree planting program.
3. **Establish Standards:** Develop Fiji-specific standards for Kura production, focusing on quality, safety, and sustainability. Encourage all Kura producers to adhere to these standards to ensure consistency and meet the requirements of niche markets, both locally and international.

#### Long-term Plan

1. **Ensure Stability and Sustainability:** Implement measures to ensure the long-term viability and sustainability of the Kura industry. This includes fostering a stable market environment, promoting sustainable cultivation practices, and establishing robust supply chains to maintain consistent production levels.

2. **Research and Innovation:** Invest in research and development initiatives aimed at enhancing Kura cultivation techniques, product quality, and value-added processing methods. Encourage innovation within the industry to stay abreast of market trends and consumer preferences.
3. **Capacity Building:** Prioritize capacity building efforts to empower farmers and industry stakeholders with the knowledge and skills necessary to effectively manage and grow the Kura industry. Provide training programs, workshops, and educational resources to support continuous improvement and professional development within the sector.

By implementing these short-term and long-term plans, we can work towards building a resilient, thriving, and sustainable Kura industry that benefits farmers, communities, and the economy as a whole.

## Perfume & Oils



## Dilo Oil

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Fiji government announced Cicia, as the first of its kind in the South Pacific, to be fully authorized as organic through a partnership with the International Fund for Agricultural Development (IFAD) and the Pacific Organic and Ethical Trade Community (POETCom). Under a Participatory Guarantee System (PGS1) implemented by the Pacific Community (SPC), the multi-scaled initiative ensured that local farmers do not have to pay hefty international certification costs to meet standards of high value export markets. With fiscal support from actors like the European Union and IFAD, the declaration of Cicia as 'fully organic' led development agencies and media outlets to promote the initiative as an exceptional form of policy implementation and a significant step to rural island development. Additionally, development agencies stated that local people would see indirect benefits derived from the strategy. These benefits have mainly been attributed to subsidiary effects of market forces such as building an imagery of Cicia as an "unspoiled island" to potentially develop agri-tourism in the future. The project has also emphasized the goal of furthering the empowerment of women, as women are active participants in the making of coconut oils, soaps, and other products.

Certification labels described above has effectively increased local production at Selavo Organics as demand from local and overseas customers have increased for products such as dilo oil. Other oils produced by Selavo Organics include Candlenut and virgin coconut oil. The certification is also observed to stimulate production on the island's copra mill to generate income for households on Cicia.

Dilo oil is produced in certain coastal locations in Fiji including Lau, Kadavu, Lomaiviti and Rotuma. There are other producers of dilo oil and this include Pure Fiji Company, Keanu Dilo Oil production is based in Lami where dilo nuts are sourced from Natadola area, Kadavu, Lomaiviti islands and many locations across Fiji.

This assessment captured Dilo oil as a single-origin cold-pressed oil sourced from organic producers on Cicia Island in Fiji. Dilo nuts are collected and air dried in the shade for several months before being broken open to release the inner nut for cold press. All (100%) ingredients for the Cicia dilo oil is produced organically in accordance with the Pacific Organic Standards. This value chain analysis is based on dilo oil production and marketing of Selavo Organic, in Cicia Island, Lau which commenced business in 2007.

### ROLE OF VALUE CHAIN ACTORS

Dilo processing at Selavo Organic involves the seed collectors, the processors, promotion and marketing as well as the land transport, and supporting organizations such as the Ministry of Women, non-state actors and other MSME such as Loving Islands. Details are outlined in Table 25.

**Figure 22: Value Chain Map Selavo Organic Dilo Production**

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<sup>1</sup> See Reference for details

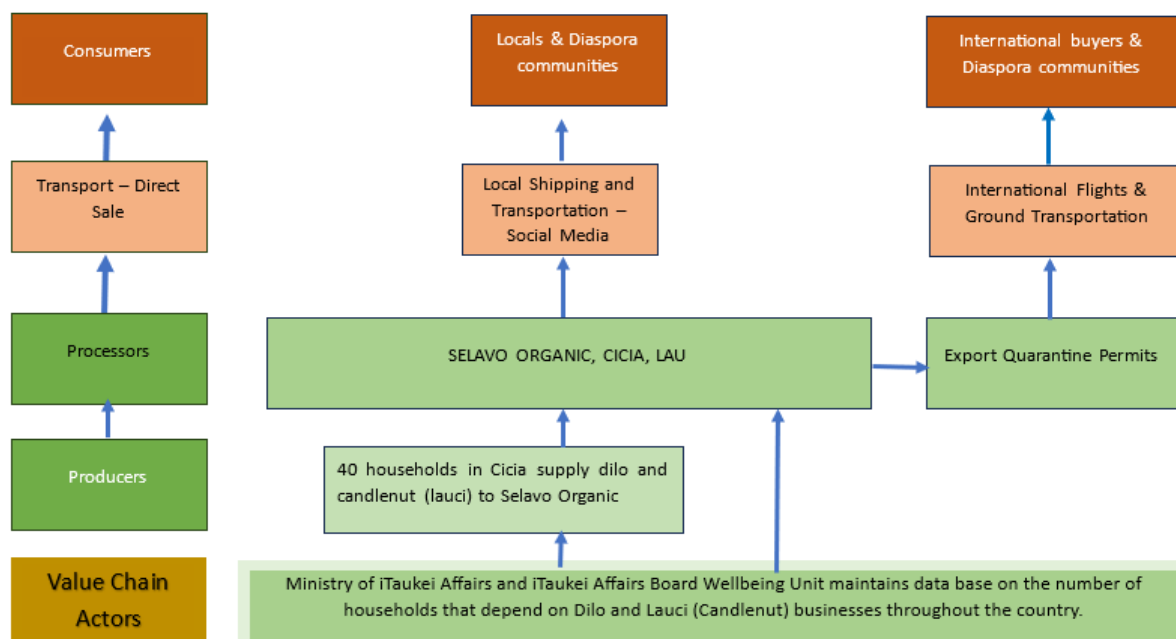


Table 25: Value Chain Actors for Selavo Organic Dilo Production

| Value Chain Actors   | Roles   | Support actors  | Other inputs  | Costs involved   |
|--|---|---|---|--|
| <b>Producers- Youth Tarakua, Cicía, Lau village (20).</b>              | Collection of nuts, some do husking. The couple squeeze the nuts using machines and oil is dried. All suppliers are from the village- Youths and children collect nuts. | Land transport Cicía. Carrier costs.  | Bottles to store oil and labels   | Land transport- \$20 carrier - a month=\$100.00<br>Collection costs from children= \$300 a month                                 |
| <b>Processor</b>   | Flesh of dilo is then sun dried 2-3 months-when current shelf is full- 30 litres of oil<br><br>Extracting of oil is done using an extractor, without a generator        |   | Equipment had been donated by Loving islands. Bottle for oil are and labels are bought from Suva. | Costs is built into product cost   |
| <b>Promotion &amp; Marketing Loving Islands, Selavo Organic Others</b> | Marketing of products- online because the production is out in the Maritime islands,  | Ministry of Women, Forestry Department, NGOs, the Private Sector  | Costs of transportation of products from Cicía to Suva, carrier                                   | Dried 300 –parts- 1kg which is equal to half a litre of oil- \$300 a litre. Transportation costs \$400 a month= \$5,000 annually |
| <b>Selling Locally &amp;Export- Social Media</b>                       | Started selling mixed virgin oil and dilo oil. Now dilo product sold separately- Online selling on different social media platforms-Selavo Organics                     | Loving islands, Ministry of Women, Tourism Fiji, Private sector, Retail and Handicraft market in Suva and other outlets | Have started rebranding   | Target is to sell 30 Litres monthly.   |



### QUANTIFICATION OF THE VALUE CHAIN- Selavo Organics-Cicia

As outlined in the Value Chain map above, the main actors in the Selavo Organic Dilo production consist of remote communities on the island of Cicia, Lau. With an abundance of natural resources coupled with organic certification, dilo production is on demand from Selavo Organics. See Figure 23.

With a simple value chain consisting of community members who collect dilo seeds from naturally occurring dilo trees, the production of Dilo oil in Cicia, Lau introduces a new revenue streams to an isolated island community with limited economic opportunities.

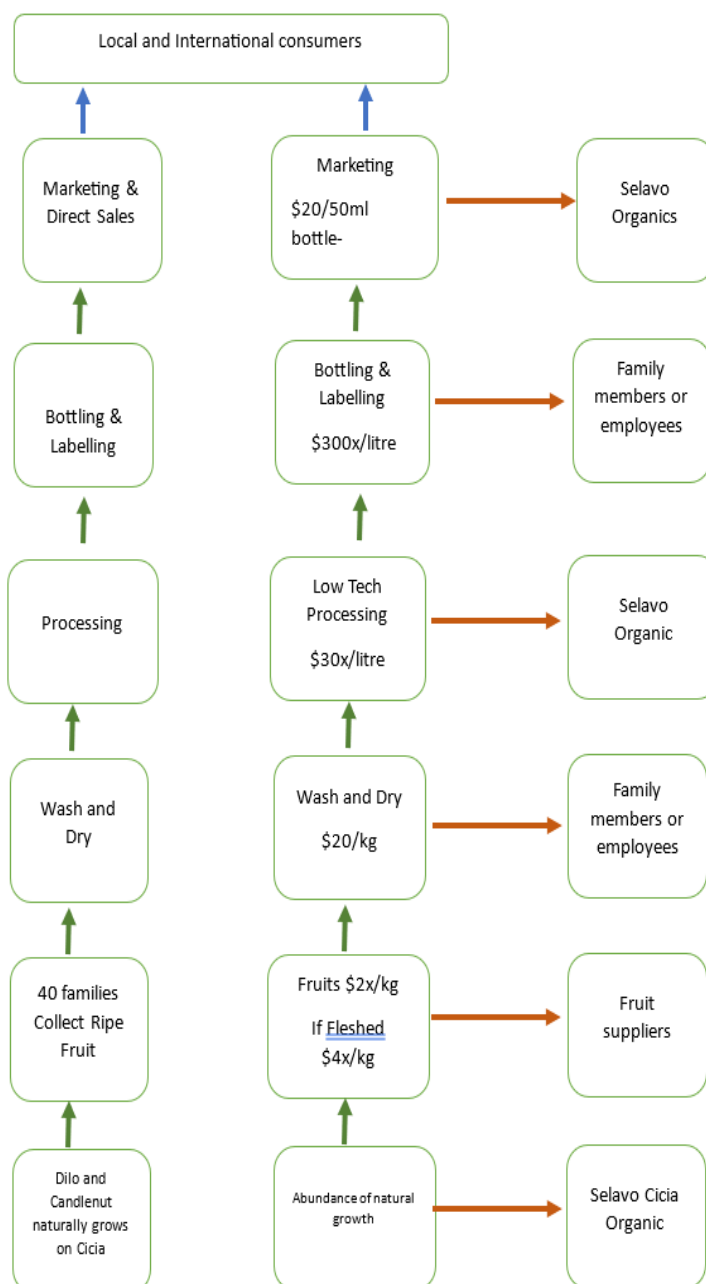
The seeds are sold by bags. A bag would have 80 seeds of dilo. Unfleshed nuts are sold at \$1.0 per kilo (80 seeds). Some producers would clean and husk the seed before selling the seeds to Selavo Organics. De-husked seeds are sold at \$4/kg.

Dilo seeds are sun dried for 2-3 months before they undergo cold press and sold at FJ\$300 per litre. Details are outlined Table 26.

**Figure 23: Quantification of Dilo Value Chain**

**Table 26: Quantification of Value Chain Process**

| Value Chain Actors   | No. of people involved                   | Costs   | Volume in a month/ Domestic and export demand | Level of production that can be met                  | Transportation distance, pricing, margins, wastage |
|----------------------|--|---|---|--|--|
| Producers/ Suppliers | 20 children in the community collect nut | 80 nuts-20c each<br>\$1.00 a kg.<br>If fleshed- \$2.00 a kg-Fleshed nuts<br>1kg= \$4.00 |   | No analysis available on how much volume can be met. |  |
| <b>VALUE ADD</b>     |  | 40c for half litre, 5c for small bottles.   |   |  |  |



|                                   |   |  |  |  |   |
|-----------------------------------|---|--|--|--|---|
| <b>ACTIVITIES</b>                 | 3 people oil sun dried for 2-3 months   | Labels \$250.00 for 1,000<br>Other costs built into the product when sold                        |  |  |   |
| <b>PROMOTION</b>                  | Individually- 15 Loving islands and other SMES, 2   | \$100 a month  | \$500.00 for promotions                                      |  | \$3,000 annually  |
| <b>DISTRIBUTION AND MARKETING</b> | Individual sellers, SMEs, retail shops/Airport/tourism outlets, National and provincial expos, IFAD, POETCOM, Ministry of Agriculture | Most promotion is online. Sold on social media platforms mainly to USA, Hawaii, NZ and Australia | 4 x 30 litres  | 5 x 30 litres a month<br>\$50 for a 150ml bottle           | \$300.00 a litre<br>\$9,000.00 a month.<br>Minus costs \$2,000=<br>\$7,000.00 |
| <b>EXPORTERS/EXTERNAL BUYERS</b>  | Fijian, Samoa, Tonga, etc. Diaspora overseas.500  | Freight costs and biosecurity, transportation  | 150 litres annually-demand-which at the moment cannot be met | 100 litres Can be met now- can expand to other communities | \$30,000 annually<br>Minus costs of \$5,000 a year=<br>\$25,000 annually      |

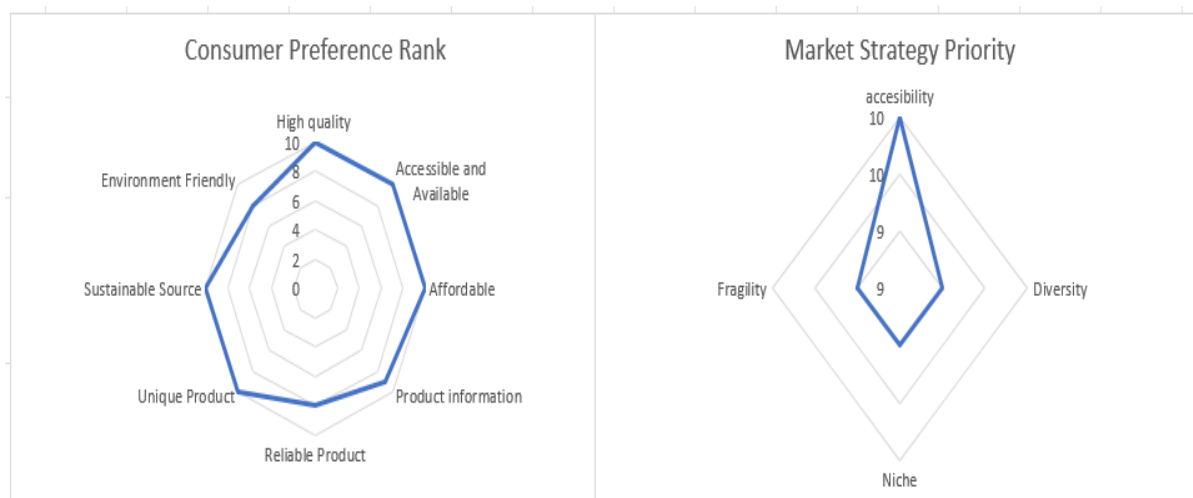
### Market Assessment

Critical success factors for Dilo oil includes the need to have high quality product, affordable, accessible and sourced from sustainable sources. The certification label adds value to all the above as it confirms environmentally friendly and sustainable sourcing.

The market strategy to fulfill customer preference is focused on accessibility to technology and availability of market opportunities. Accessibility to technology is limited by availability of capital funds through loans or grants.

Critical success factors and market strategy are depicted in Figure 24 and details are outlined in Annex 4.

**Figure 24: Selavo Organic Dilo Critical factors for success and market strategy**



## RISKS

At Selavo Organic the biggest challenge is associated with the low level of production associated with limitation in equipment and reliance on community seed/fruit collection which is random at best. There is an urgent need to support training at all levels of production along the value chain. Details of the risk for Selavo Organic is outlined in Table 27.

**Table 27: Risks associated with Dilo Oil**

| Risks  | Management of Risks  |
|--|--|
| The business is run by a couple with very few help and minimal skills available to help expand the business  | Training and targeted business training to ensure expansion of the trade to the whole community to ensure sustainability       |
| Production is low and slow because of equipment available at the moment  | Knowledge of production of oil and years of experience in the couple that run the business. Seek funding to purchase equipment |
| They rely on the community for collecting nuts, husking coconuts or squeezing dilo, etc. All suppliers are from the village- Youths and children collect nuts. | Have to build trust and be transparent to the community- to enable sustainability  |

## SWOT analysis of the Value Chain.

There is great opportunity for the sustainable development of dilo oil in Cicia and other islands in the Lau Group. The dilo plants grow in abundance along the coastal fringes as a large low branching evergreen tree. Dilo trees have white flowers and the fruit is round, green 2-4cm with one single seed. Dilo seeds contain essential oils that are cold pressed.

The biggest challenge at Selavo Organic is the scale of operation which is currently at a “start off” scale where the dilo seeds are brought in randomly by seed collectors. The opportunity arises to develop a systematic approach where the whole community may be incentivized to improve consistency and quality of supply.

There are also challenges to the level of technology adopted with opportunities to embrace the latest machinery for efficient cold press. Details are listed in Table 28.

**Table 28: SWOT Analysis for Dilo Oil**

| Value Chain Actors<br>Main actor (MA)<br>Support Actor (SA)             | Strength and Opportunities  | Weakness and Threats  | Action Needed  |
|---|---|---|--|
| <b>MA:</b> Producers/ community<br>Especially young people and children | The dilo oil project has been in operation for several years and markets have been secured.         | Requires traditional skills which has not been adopted by younger people in the office.         | Need for targeted training of young people in communities.   |
| <b>MA:</b><br><b>Processing, Value add activities</b>                   | The opportunity is in upscaling current equipment to meet the demand                                | No advanced equipment (squeezing /extraction machine) to boost current supply.                  | There is need for funds to purchase equipment to improve processing of dilo oils. Have applied with Women Fund Fiji, and put in a proposal for the next round of grant call. Not easy to get loans on businesses related to traditional crafts and oil |
| <b>SA: Marketing and distribution</b>                                   | Coordination by stakeholders to ensure the setting up of centers for handicraft processing in outer | Distance and logistics to get the product to the buyers. Transportation and logistical problems | If the centers are to be established in outer islands, there will be decentralisation of services, and services will be available for processing   |

|   |   |   |
|---|---|---|
| island locations EG Cicia.  |   | from source and existing marketing avenues to be used- social media, etc.   |
| There is a lot of potential for this product, as dilo trees grow wild and are numerous in the islands There is a lot more awareness of the health benefit of using natural oils | Labor intensive work and depend on traditional skills to make dilo oil  | The potential is very high but need better training on processing and packing, business skills training, literacy training, management and quality controls and monitoring. |
| Markets are available online. There is a lot more awareness of the health benefit of using natural oils.  | Demand not met sometimes. The market is strong and in the last 5 years there has been increased demand but they do not always have products ready to meet demand. | Business could be expanded to include other communities in Cicia, and other islands.  |

#### *Plan to improve the value chain.*

In view of the above discussions and the SWOT analysis, it is noted that the sample group is an individual sole trader. Nevertheless, it is assumed that the sole trader represents struggling entrepreneurs developing the non-timber forest product subsector. Immediate actions and Long-term plans for the development of Dilo oil are listed below.

#### Short-term plan

1. **Improve existing facilities:** Investment in updated equipment to support increased productivity of dilo oil. In addition, the procurement of a generator and other needed equipment to help in processing of dilo will be beneficial. Renovations to processing building to cater for increased supply to buyers.
2. **Develop market and branding:** investment in marketing and creating communication materials for Dilo oil from organic island of Cicia will be essential to ensure consistent reach to potential customers. At the moment, word of mouth and social media are driving sales but there is an urgent need to develop a new brand with supporting labels and online website page that carries the narrative of Dilo oil, sourced from organic island of Cicia, Lau.
3. **Networking:** Start networking and collaborating with other communities in and around Cicia with abundant supply of naturally growing Dilo to secure seed sources and trigger creating of SMEs focusing on the production of Dilo oil. The high level of abundance of raw material coupled with the high value of Dilo natural oil, there is a great opportunity to expand the range of Dilo oil production across the Lau group of islands, injecting a new source of revenue to the islands.
4. **Capacity building:** Support the implementation of basic value chain literacy training with communities about Dilo Oil production to enable a wider and better understanding of the business and the need to sustain supply.

#### Long-term Plan

1. **Ensuring Stability and Sustainability:** Implement measures to ensure the long-term viability and sustainability of the Dilo oil production. This includes fostering sustainable

cultivation practices, and refurbish existing naturally growing Dilo trees by planting additional dilo trees.

2. **Capacity Building:** Prioritize capacity building efforts to empower islanders from Lau with value chain knowledge and skills necessary to effectively manage and grow the Dilo industry. Provide coordinated training programs, workshops, and educational resources to support continuous improvement and professional development within the sector. Selavo Organic aims to establish a learning center in Cicia, Lau to service knowledge transfer to all interested Dilo oil processors in the Lau Group of islands.
3. **Research and Innovation:** Invest in research and development initiatives aimed at enhancing Dilo cultivation techniques, product quality, and value-added processing methods. Encourage innovation within the industry to stay abreast of market trends and consumer preferences.

By implementing these short-term and long-term plans, we can work towards building a resilient, thriving, and sustainable Dilo Oil industry in Cicia and extend to the whole of the Lau Group of islands that benefits local communities, and the economy as a whole.

## Candlenut (*Aleurites moluccana*)

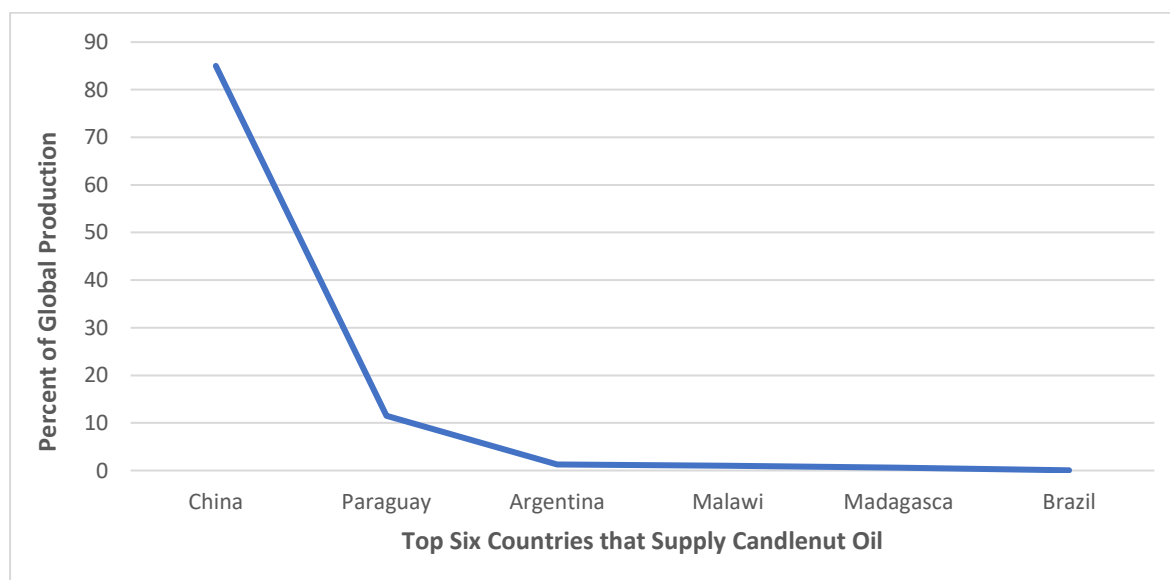
Candlenut (*Aleurites moluccana*) locally known in Fiji as Lauci or Sikeci is native to the Indo-Malay region and was introduced to the Pacific region by aboriginal settlers due to its many uses. Sikeci is a tall spreading tree and averages heights of around 10m in open areas and is commonly found around farms, naturalized around streams and valley slopes. It is also very common around coastal forest. Candlenut tolerates wide variety of habitats and can grow in dry to wet tropical and sub-tropical areas. It also tolerates drought and strong winds and grows on poor soils and steep slopes.

In the Pacific region the Candlenut is commonly used for different purposes including the seeds, leaves, flowers, and bark used in traditional medicine for different ailments. Due to its many uses the Candlenut is recognized as the official state tree of Hawaii (Elevitch and Manner, 2006). In agroforestry systems Candlenut are often interplanted with crops where they provide windbreaks, shade, soil stabilization and improved fallow. They also make good shade tree when planted in urban areas.

In addition to traditional uses Candlenut has found commercial uses as refined Candlenut oil which is widely sold in the cosmetics industry. Refined Candlenut oil is used primarily in skin care, hair care, nail care, lip care, cosmetics, aromatherapy, and others.

Global production of candlenut oil as of 2022 stood at around 506.09m kg or just around 506,000 tonnes. The world's largest producer of candlenut oil is China producing around 388,000 tonnes of candlenut oil followed by Paraguay at 52,000 tonnes, Argentina 5, 000 tonnes, Malawi, 4,000 tonnes, Madagascar 2700 tonnes and Brazil 249 tonnes. See Figure 25.

**Figure 25: Global trend in production of Candlenut Oil**



Source: <https://www.tridge.com/intelligences/candlenut/production> accessed 31/03/2024

Production value in kg

In the region the biggest candlenut producer is Timor Leste producing around 200 tonnes per year which is insignificant compared to the top producers but crucial to the livelihoods of the local communities (Schwab, 2023). Hawaii used to be the biggest producer in the region,



however, it now imports most of its nuts for processing from other tropical Pacific island nations (Poteet, 2006).

In Fiji, candlenut oil production is around a few tonnes per year owing to the limited supply of raw materials. The team collaborated with candlenut oil producer of Time Fiji PTE, who sources raw materials from communities around Fiji, collecting fruits from wild trees. Time Fiji PTE is aspiring to establish plantations of candlenut trees with the assistance of the Ministry of Forestry. As is the case for silviculture tree improvement in timber trees, there is a need to identify good genetic sources of candlenut species in Fiji with high oil content. This will only be possible through targeted research on genetic resources, ecology, and processing technology.

#### *Value chain map*

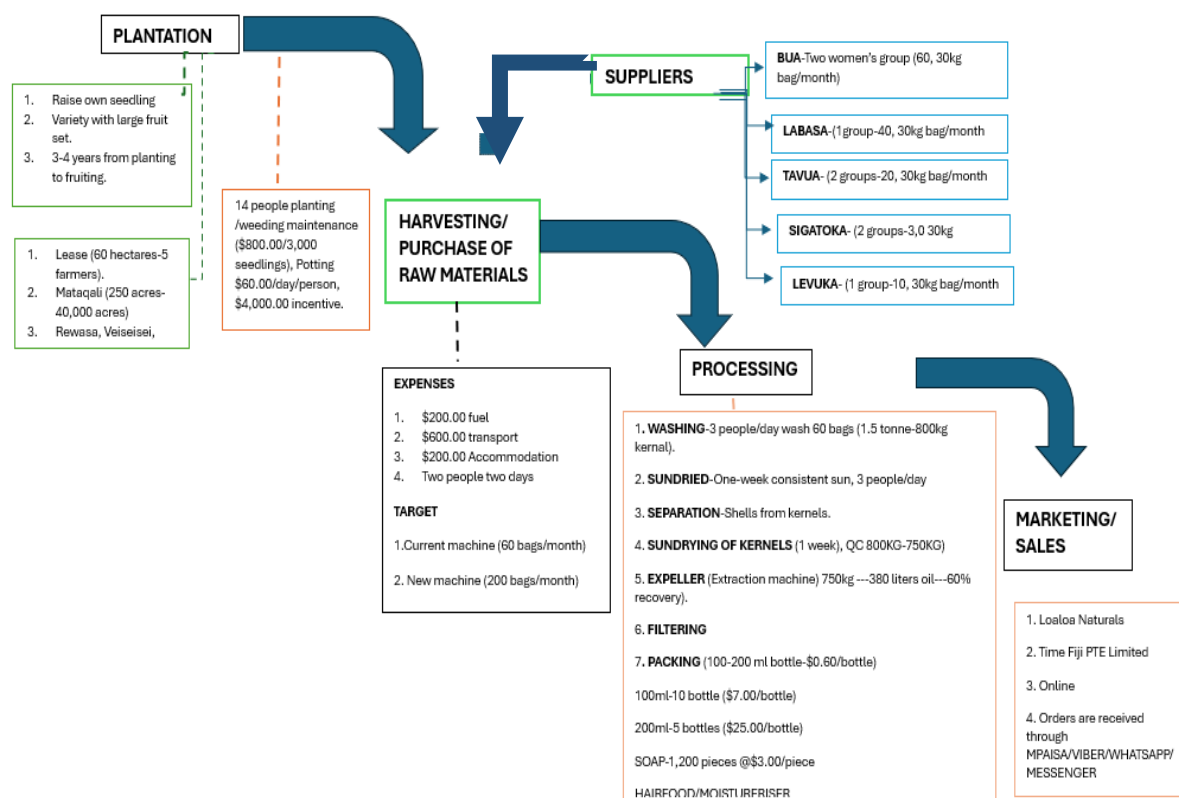
The producers in the value chain production of candlenut oil of Time Fiji PTE are the suppliers of raw materials to the company. Currently there are five main groups of suppliers to Time Fiji scattered throughout the country and these includes groups from Bua, Labasa, Tavua, Ovalau and Sigatoka. They supply around 10-60 x 30kg bags of seeds depending on production which is picked up by the company and delivered to their Nausori warehouse for further sorting, cleaning, and production into candlenut oil.

Time Fiji is also investing in its candlenut farm with the view to increase its production. It has teamed up with traditional local landowning unit in Tailevu to plant 250 hectares of land with specifically selected seeds that produce large fruit set. Between 25,000-28,000 candlenut trees have already been planted at around 3-4 years of age. It is targeting to increase its planting to around 600,000 seedlings that will cover an estimated area of 540 hectares. In addition, Time Fiji is also working closely with five partner farmers to plant candlenut trees on unused leased land under supply agreements with Time Fiji.

Time Fiji is currently the only company that commercially extracts candlenut oil and processes it into soaps and other products. Candlenut production at Time Fiji is centralized at its facility on the outskirts of Nausori town where all the washing, sorting, drying and oil production takes place. All production costs are self-funded from the sale of candlenut oil and other products. All products are sold locally with demand far exceeding current production levels. Production constraints is mainly limited to supply of raw materials and production capacity with current pressing machine only able to process around 60 bags per month. Recently, Time Fiji was able to secure funding support from the Ministry of Forestry to purchase a larger machine which will contribute to increase production to around 200 bags per month.

Value chain map is outlined in Figure 26

**Figure 26: Value Chain process for Time Fiji PTE Candlenut Oil**



### *Proposed plan to improve the value chain.*

In view of the above discussion, critical plans of actions are developed to support further development of the Candlenut oil value chain.

### **Short-term plans – this will have a quick impact**

- 1. Increase source of raw materials:** engage with MoForestry to Increase planting to 600,000 seedlings. The planting of additional seedlings will entail expanding plantation and additional supply agreements with plantation owners. Fiji Time PTE continues to look at opportunities to expand seed sources. Advocacy for high quality seed sources is important to ensure the propagation of high-quality planting materials available to all who are interested to become involved in Candlenut Oil production.
- 2. Improve communication and marketing:** Increase awareness among local landowners on the benefits of planting high quality candlenut to ensure available of raw material for candlenut oils. Once Fiji can be sure of increased production levels, communication materials for marketing will be essential to promote Fiji made candlenut oil.

### **Long-term plans – this will have future impact**

- 1. increase productivity :** The industry is at its infancy and will need capital investment into larger machinery with Increased efficiency of production.
- 2. Certification:** Attain certification standards (HACCAP, ISO, ORGANIC).
- 3. Research and Development:** Tree improvement project, Agro and silvopastoral into the plantation development. Setting local standard FARM-MILL Diversification of raw materials sources.

4. **Carbon trade:** Participate in carbon trade.

## Yasi -Sandalwood

Sandalwood holds exceptional promise as a revenue source for remote island communities in Pacific Island nation archipelagos (Thomson et al. 2020), primarily due to the high value of its heartwood and its long-lasting nature. Certainly, sandalwood (*Santalum* spp.) has played a significant role in the economies of various Pacific Islands nations, such as Fiji. Back in the early 1800s, trade imbalances arose between China and Great Britain, primarily because Britain developed a newfound preference for tea. Sandalwood emerged as one of the few high-value commodities that China was keen on exchanging with the West (Shineberg, 1967). The initial exploitation of *Santalum yasi*, a species of South Pacific sandalwood, occurred in Fiji during the early 1800s, leading to significant depletion by around 1816. Subsequently, there have been sporadic periods of intensified exploitation, typically separated by several decades, owing to the lengthy recovery period required for wild populations.

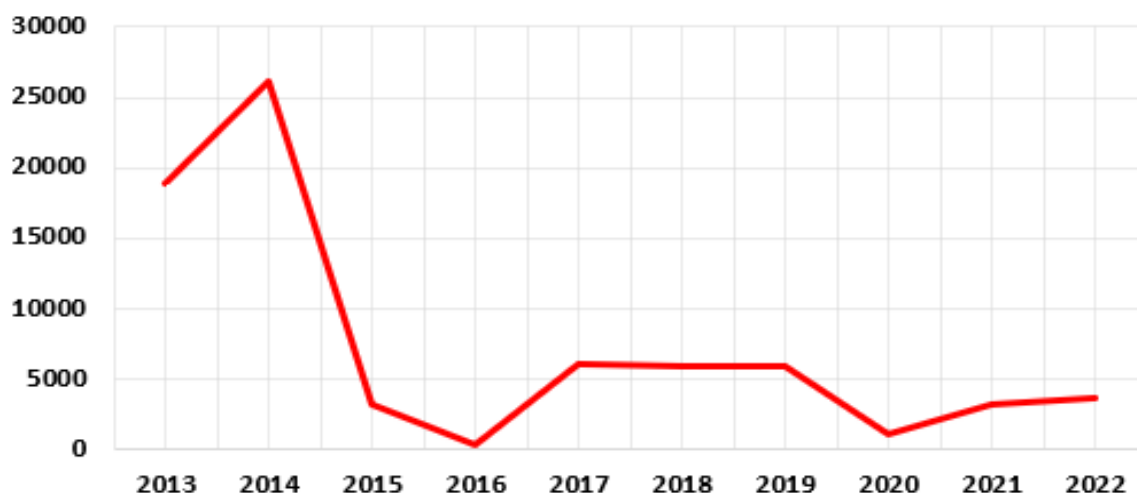
The global demand for sandalwood has exhibited a consistent upward trend from 2016 to 2022, with forecasts projecting further growth at a Compound Annual Growth Rate of 5.5% from 2023 to 2028 (IMR, 2023). See Figure 27.

**Figure 27: Global Sandalwood oil market 2016-2028F (USD Million)**



However, Fiji's ability to meet this rising demand is uncertain due to the limited availability of mature stock across the islands. This challenge is underscored by a significant decline in exports from the 1980s to 2022. Both the Ministry of Forestry and exporters have acknowledged the difficulty in meeting export targets, prompting Fiji to resort to purchasing sandalwood from Vanuatu and Tonga for subsequent export. Export figures illustrate this struggle, with Fiji exporting 918 metric tons from 1985 to 1988 (Bulai, 1995), 511 metric tons from 2006 to 2008 (Thomson, 2013), and only 67 metric tons from 2013 to 2022 (MOF, 2022). See Figure 28.

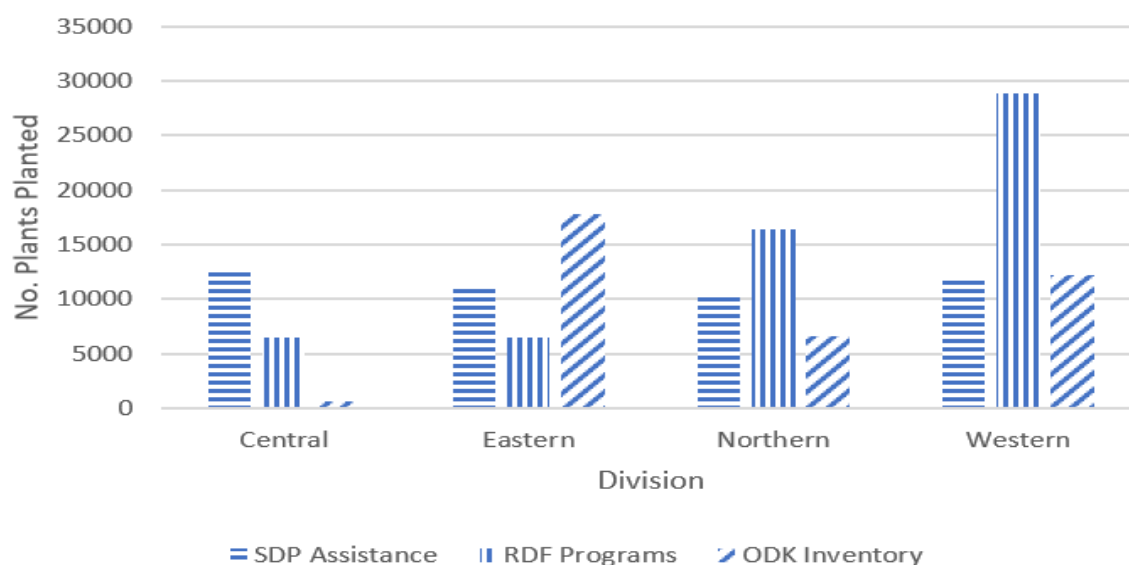
**Figure 28: Fiji sandalwood production 2013-2022**



Source: Ministry of Forestry. 2021. Fiji Sandalwood Resource Inventory, Industry and Market Development Report. Silviculture Research Division.

In response to this challenge, Fiji launched the Sandalwood Development Program (SDP) in 2011, aimed at incentivizing the cultivation of sandalwood and the Restoration of Degraded Forests (RDF) program in 2015, which supports the planting of various tree species. Additionally, many individuals have undertaken sandalwood planting independently of these programs. As outlined in Figure 29, sandalwood inventory of 2021 indicates 46,200 trees recorded under the SDP while 58,142 trees are recorded under the RDF program, and 37,169 trees planted by interested as registered in the open data kit (ODK) farmers in the Ministry of Forestry website (MoF, 2021.b).

**Figure 29: Sandalwood standing stock as of 2021**



With the stock recorded in the sandalwood inventory report, Fiji anticipates establishing a sustainable and stable industry by 2035. It's intriguing to observe the competition between natural and synthetic perfumes. This factor significantly impacts the marketing of sandalwood oil.

#### Value chain map

There are four main groups of actors in the yasi value chain in Fiji from 1984 to 2022, viz. sandalwood resource owners & harvesters; buyers & local processors; international buyers,

exporters & processors and the end consumers, with two supporting actor groups, viz. Fiji Government agencies and local transport operators. The sandalwood owners and harvester are principally iTaukei (Fijian) villagers from the islands of Kadavu, Vanua Levu and offshore islands (Bua and Macuata Provinces), Viti Levu (Nausori Highlands), Lakeba and Ono-I-Lau (in the Lau Group) (Thomson et al. 2020).

The primary sandalwood buyers and local processors included Aromatic Oils (Fiji) Ltd. in Lautoka, Blue Ocean Marine Ltd in Suva, GoldHold Co Ltd in Labasa, Hua Yi Investment in Suva and Wee Kong Marine Product & Exporters Co. in Suva.

Among the international buyers, exporters, and processors were Sital Investment, and their local Fijian associates such as Tropical Rainforest Aromatics in Vanuatu.

The end consumers of sandalwood products sourced from Fiji (yasi) are primarily in Asia (PR China, South Korea, Japan, Singapore, and Vietnam), the Middle East (Dubai and the Kingdom of Saudi Arabia), India and Australia.

Supporting actors in the sandalwood supply chain, include various Fiji Government Ministries and Agencies, as well as local transport operators comprising vehicles and boats who facilitate the movement of the product. The iTaukei Land Trust Board and the Fiji Ministry of Forestry are responsible for approvals related to the cutting and sale of sandalwood. See Figure 30.

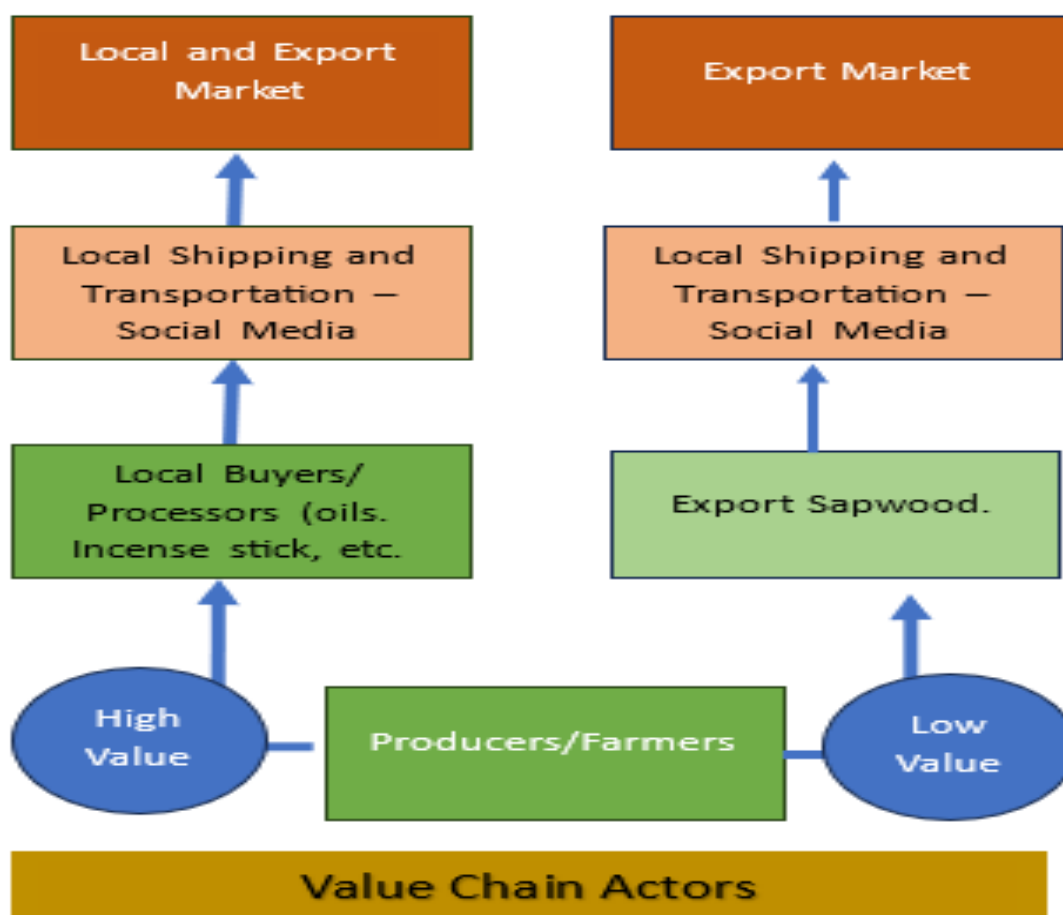
#### *Quantification of the Value Chain*

The indigenous resource owners of yasi engage in harvesting trees, extracting the sapwood, and selling the heartwood to buyers or middlemen. Buyers and middlemen often act as agents for main buyers in urban areas. Over the period from 2013 to 2022, there were significant fluctuations in the quantity of heartwood harvested, totaling 67.2 metric tons over the span of 10 years, averaging 6.7 metric tons annually. This figure contrasts with the production volumes of 285 metric tons in 1986 and 306 metric tons in 2008 for a single year.

Between 2008 and 2010, yasi heartwood was processed through steam distillation by Aromatic Oils (Fiji) Ltd in Lautoka. In 2011, 1,330 kilograms of yasi oil were exported, fetching USD 660 per kilogram (FJD 1,180). At the same time, Sital Investment processed sandalwood oil in the same year, selling it for USD 900 per kilogram. Hua Yi Investment commenced processing incense sticks and jewelry in 2017, catering to Chinese tourists and other interested parties as souvenirs, with items priced at a minimum of FJD 40 per piece.

**Figure 30:** *Sandalwood value chain*





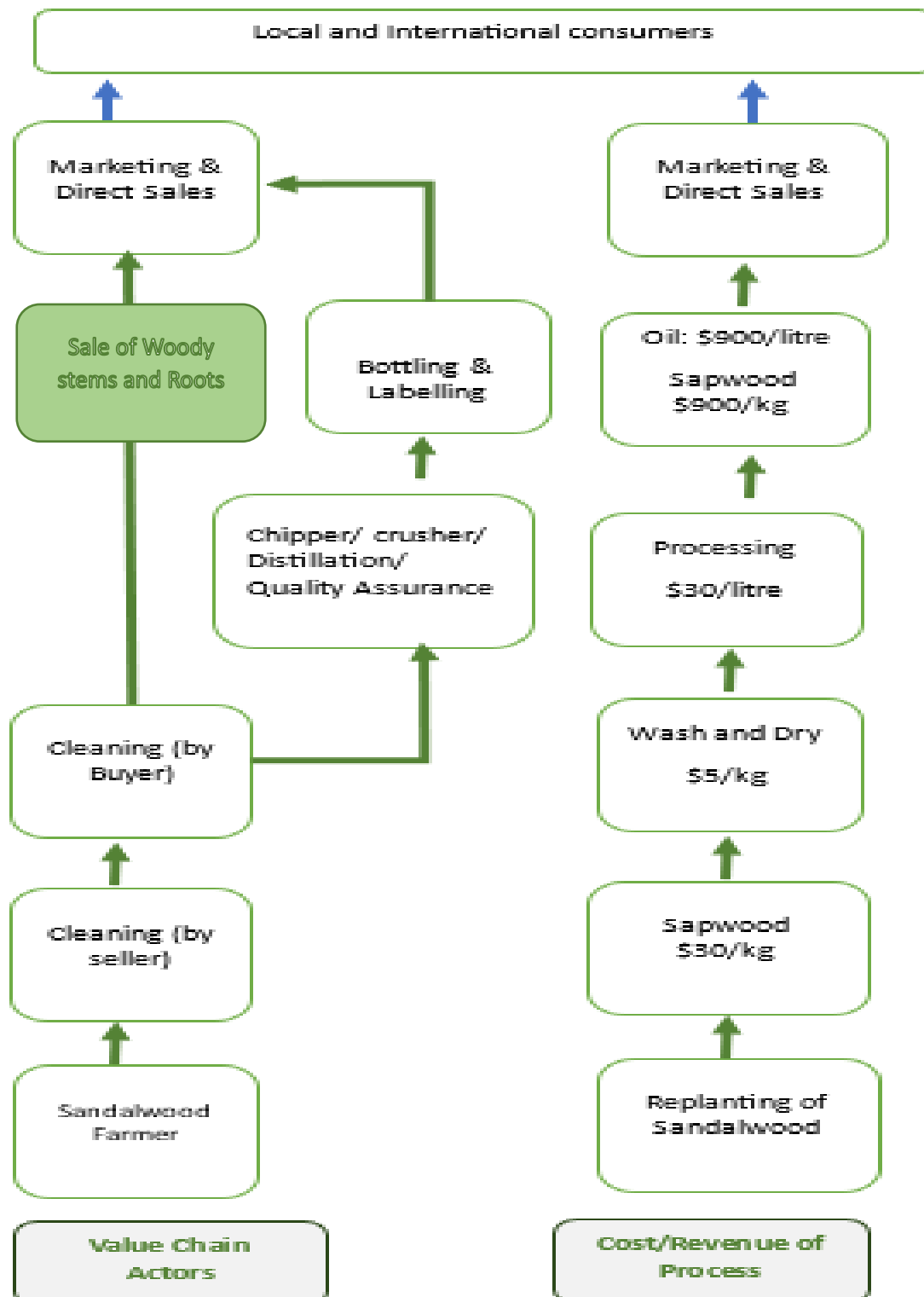
The prices of yasi heartwood at village-gate locations varied over the years, ranging from USD 2.50 to 7 per kilogram (FJD 3-8) in the 1980s, reaching USD 48 per kilogram (FJD 100) in 2018. However, prices fluctuated in subsequent years, dropping to USD 14 in 2020 and ranging from USD 5 to 30 in 2022, with the decline attributed to market fluctuations in the Asian market. See for Figure 31.

#### *Role and Contribution of all actors*

Resource owners and harvesters: Historically, the harvest of sandalwood trees was primarily from wild sources, with resource owners minimally involved until harvest and processing. However, there is now an increasing trend of resource owners actively managing wild sandalwood trees. This includes practices such as pruning, removing overhanging branches, and enriching wild stands through planting and tending for extended periods, typically 20 to 25 years.

Harvesters identify mature sandalwood trees with valuable heartwood, organizing the harvest of the trees along with their main roots. The lighter-colored sapwood is then removed using large knives, typically cane knives. The de-sapped heartwood is then stored and dried in preparation for sale. However, the costs associated with wild sandalwood harvesting and traditional processing have not been extensively studied and documented. Labor inputs vary significantly from tree to tree, with larger and less remote trees offering better returns for the effort involved in cutting, digging, local transport (often by hand or on horseback), and de-sapping.

**Figure 31: Quantification of Sandalwood Value Chain Process**



Local middlemen and processors: Local buyers or middlemen provide advance finance to scout for sandalwood in rural areas, later returning to procure de-sapped sandalwood and transport it to distilleries. These middlemen or processors verify the authenticity of the procured product, steam distill the oils, rectify the oil, and market it internationally. The main costs for local processors include payments to middlemen or buyers, finance to purchase sandalwood, and the costs associated with distillation and marketing of the essential oil.

International buyers and exporters: International buyers purchase sandalwood heartwood directly from villages, sort different grades, and market them internationally. Their primary costs are associated with product inspection, purchasing sandalwood heartwood, and transporting it from sandalwood-producing areas or villages. Marketing and export costs are typically borne by the parent company in Vanuatu or elsewhere. Scarcity of sandalwood can lead to risks of poor quality or counterfeit products being concealed within consignments.

International processors: Value-added processing of sandalwood heartwood occurs outside of Fiji, involving distillation of oil and its incorporation into perfumes, attars, body-care products, and powder for use in incense sticks. Sandalwood oil and powder are often used as substitutes for East Indian sandalwood oil. The proportion of the cost of the sandalwood component in final products varies depending on the product and incorporation rate.

Retailers: Retail outlets provide access to sandalwood heartwood pieces, including carved items, and value-added products containing sandalwood powder or oil, such as perfumes and soaps. However, traditionally, sandalwood has not been distinguished from *S. album*. The markup on sandalwood products varies significantly depending on the retailer's location and overhead costs. Sandalwood products are in high demand and have low perishability, resulting in limited risks for retailers.

Details are listed in Table 29.

**Table 29: Roles of Yasi Value Chain Actors**

| Actor   | What the actor contributes to the final product  | The cost of the actor's contribution  | The reward that the actor receives                                    | Actor Risk   |
|---|--|---------------------------------------|---|--|
| <b>Main actor (MA)</b><br><b>Support Actor (SA)</b> |  |                                       |   |  |
| Resource Owner /Harvester (MA)                      | Planting, Harvesting and Cleaning (de-sap)   | FJD 30 per kg                         | FJD 30 per kg   | Lack of resources and price takers                             |
| Local buyer / Processor (MA)                        | Secure raw materials Negotiate with resource owners on the buying price Down streaming process | FJD 30 per kg<br>Transportation costs | Profit gain from selling price less processing costs and buying price | Quantity of the available raw material and export market price |
| International Buyer (MA)                            | Secure raw materials Negotiate with resource owners on the buying price                        | FJD 30 per kg<br>Transportation costs | Profit gain from selling price less buying price                      | Sustainable and fluctuation of export value                    |
| Consumer/Retailer (MA)                              | Selling of product at different market segments  | Cater for all trade costs             | Good selling price to cover all costs                                 | Consumers preference and affordability                         |
| Transportation (SA)                                 | Provide transportation at local and international shipment                                     | Different freight charges             | Freight fees  | No shipment no revenue for the company                         |
| Regulators (SA)                                     | Ensure regulations are followed and dealings are within the law                                | Maintain trade environment            | Payment of local and export fees as required by law                   | Not following standard operating procedures                    |

## Market Assessment

Heartwood Composition: The composition and yield of heartwood oil are crucial factors for various sandalwood applications, notably oil distillation and incense stick production. The oil yield can range from less than 1% to 8%, greatly influencing the viability of oil distillation. Quality is equally vital, with oils meeting the ISO standard for East Indian Sandalwood oil (ISO 2002 - 3518), containing 41-55%  $\alpha$ -santalol and 16-24%  $\beta$ -santalols, being preferred. The presence of adulterants or undesirable minor constituents can significantly impact the value of sandalwood oil, while the presence of allergens like E,E-farnesol can render it unsaleable. Developing an official monograph detailing information on yasi oil could aid international buyers and end users and facilitate the creation of a separate standard for yasi oil. Experts express concern about hybrids, although the hybrid *F1 S. yasi* x *S. album* produces high-quality oil. Some traders advocate keeping local *S. yasi* pure to cultivate niche markets.

Mislabeling of Exported Sandalwood from Fiji: Sandalwood buyers expect products from Fiji to be derived from pure species, although hybrids with *S. album* can produce similar heartwood. However, other Fijian trees like cevua (*Vavaea spp.*) should never be substituted for *S. yasi*, as this could degrade future markets. Between 2012 and 2018, less than half of the wood exported from Fiji as "sandalwood" was *Santalum yasi*, with some being other species or hybrids and even non-sandalwood species like *Vavaea species* and *Exocarpus vitiensis*. Exporting Cevua as "sandalwood" must be prevented to safeguard the integrity of sandalwood supplied from Fiji.

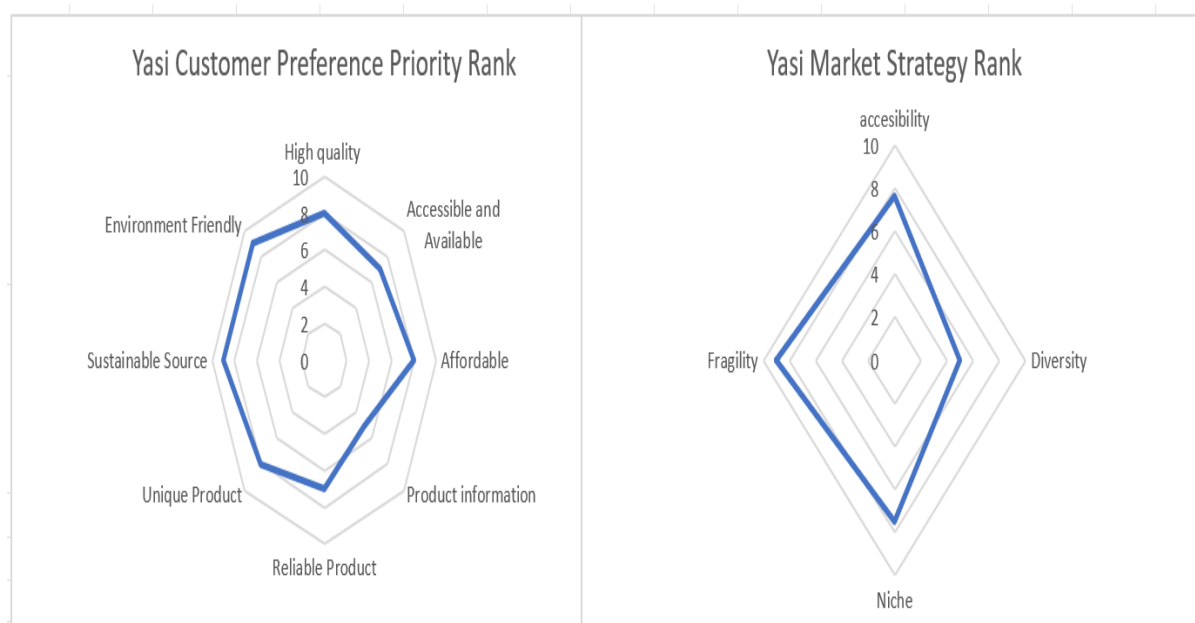
For Carving and Furniture Wood: The carving and furniture markets, particularly in East and South Asia and the Middle East, value sandalwood based on factors like straightness, diameter, proportion of heartwood, piece size, shape, and figure, with heartwood composition and yield being of lesser importance.

Sustainability of Production: While sustainability was previously of limited importance, it has gained significance, particularly for sandalwood oil and body-care product markets. Ensuring continued availability of raw products is crucial for new product development and marketing.

Certification: Legally Sourced, Fair Trade, Organic: Segments of the international sandalwood products market, especially in Europe and North America, prioritize buying from legally sourced, organic, and fair-trade certified sandalwood sources for high-value perfumes and body-care products.

Anticipated customer expectation is outlined in Figure 32.

**Figure 32: Critical Success Factors and Strategy for Yasi**



### SWOT analysis of the Value Chain.

The dilo plant grow in abundance along the coastal fringes as a large low branching evergreen tree. Dilo trees have white flowers and the fruit is round, green 2-4cm with one single seed. Dilo seeds contain essential oils that are cold pressed. There is great opportunity for the sustainable development of Dilo oil in Ciccia and other islands in the Lau Group.

The biggest challenge at Selavo Organic is the scale of operation which is currently at a “start off” where the dilo seeds are brought in randomly by seed collectors. Selavo Organic buys seeds from seed collectors. The opportunity arise to develop a systematic approach where the whole community may be incentivized to improve consistency and quality of supply. There are also challenges to the level of technology adopted with opportunities to embrace the latest machinery for efficient cold press. Details are listed in Table 30.

**Table 30: SWOT Analysis for Yasi**

| Value Chain Actor          | Strength and Opportunities  | Weakness and Threats  | Action Needed   |
|----------------------------|---|---|---|
| <b>Main actor (MA)</b>     |   |   |   |
| <b>Support Actor (SA)</b>  |   |   |   |
| Farmer /Harvester (MA)     | <ul style="list-style-type: none"> <li>Landowner have more advantage to take full control of yasi resources on their land</li> <li>Owners to involve in the harvest and sale</li> </ul> | <ul style="list-style-type: none"> <li>Lack of awareness on Yasi management</li> <li>Lack of awareness on standard expectations on quality and grade</li> <li>Lack of information on prevailing market price</li> </ul> | <ul style="list-style-type: none"> <li>Better collaboration and awareness conducted by relevant authority</li> <li>Development of industry to process sapwood and off-cuts</li> </ul> |
| Local Buyer/Processor (MA) | <ul style="list-style-type: none"> <li>Increase economic and</li> </ul>   | <ul style="list-style-type: none"> <li>It is expensive to set up processing facility</li> </ul>   | <ul style="list-style-type: none"> <li>Government to address issues of chain of custody and product legality</li> </ul>   |

| Value Chain Actor                                   | Strength and Opportunities   | Weakness and Threats  | Action Needed   |
|---|--|---|---|
| <i>Main actor (MA)</i><br><i>Support Actor (SA)</i> |  |   |   |
| International Buyer (MA)                            | <ul style="list-style-type: none"> <li>• Knowledge of global sandalwood industry</li> </ul>  | <ul style="list-style-type: none"> <li>• Lack of commitment to development of a sustainable yasi industry</li> </ul>  | <ul style="list-style-type: none"> <li>• Involve buyers in replanting yasi to replace those harvested</li> </ul>  |
| Consumer /Retailer (MA)                             | <ul style="list-style-type: none"> <li>• Understanding of sandalwood products markets and consumer preference</li> <li>• High demand of oil in Asia, India and Africa</li> </ul> | <ul style="list-style-type: none"> <li>• The quality of oil produced from young industrial sandalwood (<i>S. album</i>) plantations is lower than that of wild harvested sandalwood</li> <li>• Artificial oil is disrupting the market</li> </ul> | <ul style="list-style-type: none"> <li>• Opportunity for yasi to be branded and gain recognition in the marketplace</li> <li>• Fiji Government and industry stakeholders need to consider ways to limit yasi being used as album substitute.</li> <li>• Fiji Government to ban export of sandalwood raw material and encourage downstream processing</li> <li>• Fiji Government to ban synthetic oil</li> </ul> |
| Regulator (SA)                                      | <ul style="list-style-type: none"> <li>• Mandate to regulate sandalwood development and trade in Fiji</li> </ul>   | <ul style="list-style-type: none"> <li>• Weak regulatory function and inadequate legislation to protect and advance the yasi industry in Fiji</li> </ul>  | <ul style="list-style-type: none"> <li>• New legislation and increased training and funding of Ministry of Forestry, including for R&amp;D, sandalwood development project, policy development, and enhanced regulatory functions.</li> <li>• Regulate the ban in the sale of substitute such as cevua</li> </ul>   |
| Transport (SA)                                      | <ul style="list-style-type: none"> <li>• Existing mode of transportation at local and international markets</li> </ul>   | <ul style="list-style-type: none"> <li>• High costs of freight for inter-island ferries</li> </ul>  | <ul style="list-style-type: none"> <li>• Subsidize of freight fees to reduce resource owners costs</li> </ul>   |

*Propose a plan to improve the value chain.*

In view of the above discussions and the SWOT, immediate actions and Long-term plans for the development of Yasi includes:

Short-term plan

**1. Mapping and Inventory of All Standing Sandalwood Trees:**

- Conduct comprehensive mapping and inventory of all existing sandalwood trees across Fiji.
- Utilize GPS technology and remote sensing techniques to accurately locate and document sandalwood stands.
- Compile data on tree density, age distribution, and health status to inform future management strategies.
- Create a centralized database to store and manage inventory information for effective monitoring and decision-making.

**2. Identify quality gene source of Santalum Yasi for mass cultivation:**



- Conduct surveys to identify areas with high concentrations of *Santalum yasi*, the native sandalwood species.
  - Designate these areas as protected zones to safeguard seed sources and promote natural regeneration.
  - Implement measures to prevent unauthorized harvesting while supporting seed collection from such protected seed banks.
  - Collaborate with local communities to raise awareness about the importance of preserving *Santalum yasi* habitats and the benefits of natural regeneration.
3. **Encourage Sandalwood Planting Program:**
    - Launch an outreach campaign to promote sandalwood planting among landowners and communities.
    - Provide training and technical assistance on proper planting techniques, species selection, and maintenance practices.
    - Distribute seedlings and planting materials to interested landowners and facilitate access to planting sites.
    - Offer incentives such as subsidies to encourage participation in the planting program and foster community engagement.
  4. **Set Guidelines for Harvest of Matured Sandalwood:**
    - Develop criteria and thresholds for determining when mature sandalwood trees are ready for harvest.
    - Consider factors such as tree age, heartwood development, and sustainable harvesting practices.
    - Establish guidelines for selective harvesting to ensure regeneration and long-term sustainability of sandalwood resources.
    - Provide training to harvesters on proper harvesting techniques and compliance with harvesting guidelines to minimize environmental impact.

### Long-term Plan

1. **Coordinated effort to build the Yasi Industry:**
  - a. Better plan yasi utilization together with iTaukei Land Trust Board, Ministry of Forestry and sandalwood buyers. Develop yasi industry plan in collaboration with all stakeholders
2. **Access to capital:**
  - a. Encourage downstream process through the installation of processing facilities
3. **Develop and promote Fiji yasi sandalwood products**
  - a. Support creation of a unique and distinctive Fiji sandalwood brand
4. **Develop and Implement Yasi Sandalwood Regulation:**
  - Formulate regulations specifically targeting the management and sustainable utilization of *Santalum yasi*.
  - Establish clear guidelines for harvesting, transportation, processing, and trade of yasi sandalwood.
  - Enforce strict penalties for illegal harvesting and trade to deter unauthorized activities and protect sandalwood resources.
  - Collaborate with relevant government agencies, indigenous landowners, and stakeholders to ensure effective implementation and compliance with regulations.

- Ban the sale of substitute Fiji sandalwood such as cevua

## Tree Nursery



Community nurseries in the Province of Ra.

## Tree Seedling

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In the past all tree seedling production was solely carried out by the Department of Forestry. The Silvicultural Research Division undertook seed research to ensure robust genetic traits in the seedlings produced by the Extension Division who would raise the seedlings and distribute to landowners who planted the seedlings for own use.

Multiple provenance trials were conducted on exotic and indigenous species by the Silviculture Research Division, Department of Forestry. The development of tree seedling production by the Ministry of Forestry (then Department of Forestry) was to set up a plantation program. From the 1940s to 1980s trials were conducted on native species but due to the recalcitrant nature of most native species in Fiji large scale plantation was not viable. However, two exotic timber species proved successful, *Pinus caribea* and *Swietenia macrophylla*.

Pine plantations were initially set up by the Government on “talasiga grasslands,” i.e., dry grasslands located on western leeward side of the two main islands with nutrient deficient soils due to frequent or occasional fires and covered with a fire climax vegetation of mission grass, *Pennisetum polystachyon*. The main objectives of the planting program were to reduce grazing and burning pressure on the soil, generate an improved economic return in rural areas, generate foreign exchange earnings, and contributing to the protection and conservation of the environment by planting degraded grasslands.

Mahogany plantations were planted in logged-over forest to meet local demand and development export trade in timber products, provide foreign exchange earnings and increase employment in rural forest areas.

In recent years, the Ministry of Forestry have managed to improve techniques of seed germination problems and together with an influx of funding from multilateral and bilateral sources to adapt and mitigate the impacts of climate change, there have been a push to plant more native species to restore degraded areas and sequester carbon. This has resulted in the need to plant more native tree species placing strain on supplies from Ministry of Forestry nurseries. To solve this problem the Ministry of Forestry through its Extension Division began an extensive program to train communities on seed collection, propagation, and nursery management. This has led to the outsourcing of seedling propagation for major projects such as reforestation of degraded forest project and 30 million trees in 15 years initiative to semi-commercial and community tree seedling nurseries.

The team assessed two such nurseries.

The Yavusa Vatudamu Group of Companies (YVGC), a registered company belonging to the Yavusa Vatudamu which consists of five mataqalis from the village of Rewasa, district of Naroko in the Province of Ra. The business won a tender to supply seedling to the “Jobs for Nature Project”, a World Bank funded project across Fiji. Seedlings are purchased from various communities in the Ra Province and taken to their holding nurseries at Rewasa and then distributed to various communities in Fiji to be planted as and when required by the Ministry of Finance and Ministry of Forestry. In 2023, the YVGC purchased over 600,000 seedlings from surrounding communities in the Province of Ra with a value of over \$1.8 million.

The second company assessed is a community-based tree nursery venture between three individuals Sitiveni Waqa, Ilikini Davui and Peniasi Naqaranikulu who focus on raising as well as buying and selling tree seedlings to the Ministry of Forestry, Reforestation of Degraded Forests project and Ministry of Finance, Job for Nature Initiative. The venture is called Veitacini Joint Venture (VJV), also based in the Province of Ra in the district of Naroko. Currently the business and its associated suppliers have over 120,000 seedlings ready to be sold to interested buyers. VJV buys a variety of tree seedlings from surrounding communities



across all villages in the Province of Ra and sell the same seedlings at \$3.00/seedling. VJV resell the seedlings at the same rate they buy as they aim to assist community members earn some income.

Tree seedling species traded in 2023 from the above vendors include, tiri (*Rhizophora sp*), vesi (*Intsia bijuga*), dakua makadre (*Agathis macrophylla*), vesiwai (*Pongamia pinnata*), dilo (*Calophyllum inophyllum*), kaudamu (*Mysristica spp*), tavola (*Terminalia catapa*), mango (*Magnifera indica*), breadfruit (*Artocarpus altilis*), citrus (*Citrus spp*), avocado (*Persea americana*), dakua salusalu (*Retrophyllum vitiense*), bamboo (*Bambusa spp*).

#### *Tree Seedling Value chain*

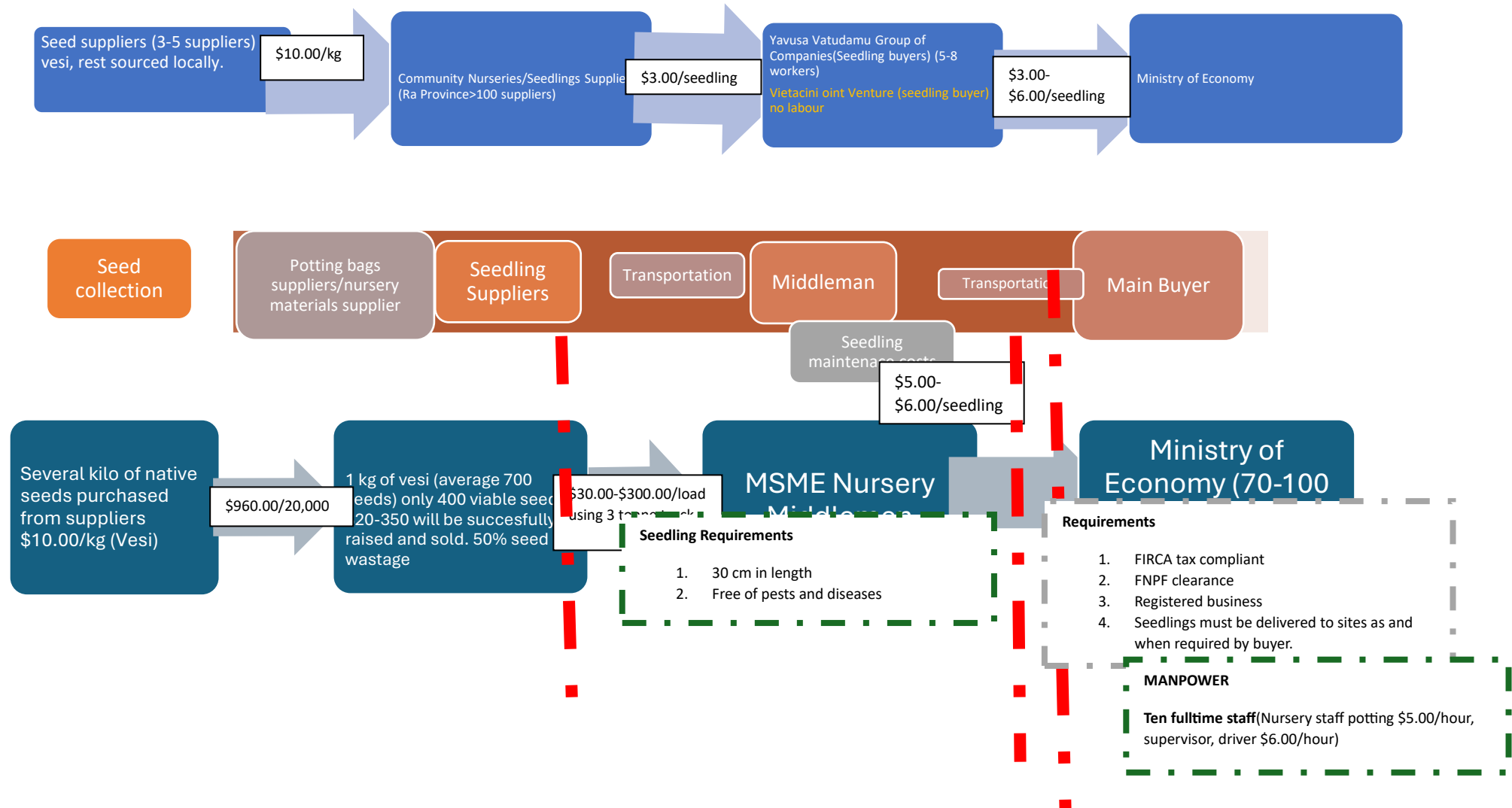
The main actors for the tree seedling value chain are the community nurseries. These comprises of either community groups (youth, church, women), village group or private individuals. These groups raise the seedling typically in small to medium nurseries and sell them to the buyer or middlemen – in this case, Yavusa Vatudamu Group of companies and the Veitacini Joint Venture. Community seedling suppliers typically collect seeds from nearby forests, germinate and nurture in home nurseries for 6-9 months before selling to the middlemen. Seeds are also available from suppliers either within the province or outside the province such as *Santalum Yasi* seed suppliers from Vanua Levu. See Figure 33.

The most important actor in the value chain are the seed collectors without which there will be no seedlings to nurture and sell. The seed collectors can be considered primary producers as they simply collect, clean, dry the seeds and ensure they are healthy and ready for germination.

Seedling suppliers are included all the home-grown nurseries that supply to the middlemen. The total number of seedling suppliers in the Province of Ra, is estimated at 60 satellite or small nurseries.

Of the two key nursery operators in the Province of Ra, YVGC is a full-fledged Medium enterprise earning approximately \$1.8m per annum while Veitacini Joint Venture is simply a holding nursery that is operating as a not-for-profit organization who buys and resells tree seedlings at the same cost of purchase. YVGC has two 60m x 20m nurseries in Rewasa, capable of holding 40,000 seedlings. The Ministry of Finance issues purchase order to YVGC who then becomes responsible for delivering the ordered seedlings to the

Figure 33: Value Chain for Tree Seedlings Market







various sites across Viti Levu and Vanua Levu as and when required. At the same time, YVJC services orders from the Ministry of Forestry, regional organizations, civil society organization as well as private entities interested in buying tree seedlings.

To be a registered vendor with the Ministry of Finance, bidders need to have a business license and have Fiji Inland Revenue and Customs Authority (FIRCA) and Fiji National Provident Fund (FNPF) clearance certificates. The process of getting registered can be onerous, and barrier especially for communities or groups to bid. Once a vendor is selected to be a service provider for the Jobs for Nature Project (implemented by Ministry of Finance), orders are placed, and the middleman is responsible for transporting the seedling to the planting sites. Each vendor is expected to follow tender specifications especially on the seedling quality. Monitoring of planting and weeding maintenance is conducted by the Ministry of Agriculture and coordination of the work for each province is through a provincial conservation officer at the Ministry of iTaukei Affairs.

Apart from the main actors, supporting actors also play an important role in the value chain. One of the supporting actors is the supplier of planter bags and nursery materials. Seedlings are raised in planter bags which are purchased from M.Hanif at around \$960.00/20,000 pots. Other important supporting actors to the tree nursery operators is transportation of seedlings from community to holding nurseries and from holding nurseries to planting site. Currently seedling suppliers pay for their own transport to deliver seedling to holding nursery or middleman arranges and pay for transportation of seedlings. Depending on the number of seedlings uplifted and distance from pickup points, transportation costs range from \$60.00 to \$300.00 per trip. Last year YVCG, paid around \$40,000.00 in transportation costs. The business is currently looking at investing in a five-tonne truck to reduce cartage costs.



Fiji Minister of Forestry,  
Hon. Kalaveti Ravu,  
spearhead RDF project to  
plant 30m trees by 2037

#### *Quantification of Magimagi Value Chain*

As outlined in the Value Chain map above, the main actors in the Tree Seedling Value Chain include the seed supplier, individual or community nursery owner, middlemen who buy seedlings from local communities, and the buyers of tree seedlings. Supporting actors include nursery material suppliers and transportation providers. See Table 31.

Agile youths are involved with seed collection. The seeds are sold by weight – either grams or kilogram. In the province of Ra, there is an estimated 12 seed suppliers. Native seeds are sold at \$10-\$50 per 500g depending on the species. Seeds are also sourced from other Provinces such as *Santalum Yasi* seeds which are collected from natural yasi stands in Bua/Macuata Vanua Levu.

There are more than 100 seedling suppliers located on Viti Levu, supplying around 500-10,000 seedlings a year. In December 2023, about \$700,000 was circulated among rural nursery owners from the sale of seedlings at \$3.00/seedlings.

Middlemen are the nursery collection centers at Provincial level. Two nursery collection centers are in the Province of Ra. The YVGC is one of the two nursery collection centers. In 2023, YVGC supplied over 600,000 seedlings to the Ministry of Finance - Jobs for Nature Project earning over \$1.8 million.

Some of the risks identified include the challenges to secure seed sources due to inclement weather patterns and the low quality of seedlings produced due to pest and diseases. In terms of the business arrangements, seed and seedling orders are inconsistent, often affecting cash flow to sustain the business over time.

**Table 31: Tree Seedling Value Chain Actors**

| Actor                                      | Role   | Cost of the actor's contribution  | The reward that the actor receives   | Actor Risk  |
|--|--|---|--|---|
| <b>Main actor (MA)</b>                     |  |   |  |   |
| <b>Support Actor (SA)</b>                  |  |   |  |   |
| Seed supplier (MA)                         | Contributes seeds which is sown and sold as seedling | Time for collecting seeds from the forest<br><br>Seed collectors live in local communities and do this as part of their many chores | Sale of seeds to seedling supplier<br>Depending on the species, seed sales range from \$20-\$60 per kilogram | Low seed supply due to extreme weather event.<br>Inconsistent order-native seeds are recalcitrant seeds so cannot be stored long-term |
| Community Nurseries/Seedling supplier (MA) | Raising the seedlings                                | Seedling raising and maintenance costs  | Sale of seedling to middlemen  | Low quality of seedlings due to pests/diseases.<br>Inconsistent order.<br>Extreme weather event.                                      |
| Middleman (MA)                             | Purchase the raised seedlings/Raises own seedling    | Seedling maintenance and transportation costs.  | Sale of seedling to buyer  | Inconsistent order.<br>Poor quality of seedling.<br>Cost of transportation from community nurseries                                   |
| Buyer (MA)                                 | Purchase seedlings from middleman                    | Seedling maintenance/transportation   | Quality seedlings, availability of native seedlings  | Seedling too long in holding nurseries prior to planting-many dying.<br>High transportation costs.<br>Delay in govt. payment process  |
| Potting Bag suppliers (SA)                 | Material to raise the seedling                       | Production costs  | Sale of potting bags   | Low demand  |
| Nursery Materials supplier (SA)            | Material to raise the seedling (shade cloth)         |   | Sale of materials  | Low demand  |
| Transportation providers (SA)              | Transportation of seedlings to holding nursery       |   |  | Low demand  |

## MARKET ASSESSMENT

Critical success factors for nurseries include accessibility, availability of stocks, high quality seedlings, sustainable source and environmentally friendly operations. A summary of the customer preference and strategy is outlined in Figure 34 while details are listed in Annex 4.

The market for tree seedling is dependent on availability of large restoration projects or large landscaping work where seedlings are needed. In 2021, several projects demand seedlings for land restoration work. These include the Jobs for Nature by the Ministry of Finance and the 30million trees by 2030 under the Ministry of Forestry.

Nursery out growers sell native tree seedlings at a fixed price of \$3 per seedling. The nursery collection centers such as YVGC have the opportunity to set the price for seedling that are re-sold into the market to recover operational cost associated with transportation and nursery upkeep. Other commercial nurseries also exist in other provinces of Fiji. Many of the commercial nurseries cater for commercial landscaping companies that service the hotel industry. Such commercial nurseries often focus on flowers and may not supply tree seedlings.

**Figure 34: Customer Preference and Strategy Ranking for Tree Seedlings**



### SWOT analysis of the Value Chain.

Seed suppliers are few in numbers and locally dispersed. The job requires an understanding of species identification as well as knowing the phenology of each species targeted for seed collection. Seed collectors are also expected to be able to climb native trees without any harness or equipment as is the case in local communities. Youths and young adults are often engaged in this activity.

The biggest risk to the seed supply is the impact of extreme weather events to the mother trees. A 'mother tree' is identified as a seeding tree where seed suppliers collect seeds on an annual basis. Mother trees are selected on a physical characteristics and accessibility of seed branches. There is a need to work closely with the Ministry of Forestry to improve the selection of superior gene pools and mother trees that will supply good and healthy seedlings for propagation.

Community Nurseries or Seedling suppliers would have undergone "nursery training" either through the Ministry of Forestry or civil society organizations such Conservation International, Worldwide Fund for Nature (WWF) and others. Training often includes seed collection, seed propagation and nursery management.

The biggest opportunity and strength of this market is associated with its socially inclusive nature that allows participation of women and the more vulnerable in society. Some weakness and challenges faced by nursery owners include the high maintenance cost, slow movement of seedlings due to uncertain demands, high transportation costs, delay in payment from Government for services provided. The annual tender process required to secure supply agreement with the Government is a welcomed opportunity as it provides security of sales through supply agreements. Often, there is no clear guidelines on annual number of seedlings required by buyers. Such uncertainties are not good for cashflow and growth.

Details of the SWOT analysis is listed in Table 32.

**Table 32: SWOT Analysis for Tree Seedlings**

| Value Chain Actor         | Strength and Opportunities      | Weakness and Threats                             | Action Needed                 |
|---------------------------|---------------------------------|--|-------------------------------|
| <b>Main actor (MA)</b>    |                                 |  |                               |
| <b>Support Actor (SA)</b> |                                 |  |                               |
| Seed supplier (MA)        | Locally based and are dispersed | 1. Extreme weather event impacting mother trees. | 1. Diversifying seed sources. |

| <b>Value Chain Actor</b>                            | <b>Strength and Opportunities</b>  | <b>Weakness and Threats</b>  | <b>Action Needed</b>   |
|---|--|--|--|
| <b>Main actor (MA)</b><br><b>Support Actor (SA)</b> |  |  |  |
| <i>Community Nurseries/Seedling supplier (MA)</i>   | Have been trained in seed collection/propagation/nursery management  | <ol style="list-style-type: none"> <li>1. Inconsistent order from buyer. middleman/transportation costs/nursery maintenance costs.</li> <li>2. Low quality seeds.</li> <li>3. Delay in receiving funds from middleman (buy and pay later).</li> </ol>  | <ol style="list-style-type: none"> <li>2. Identification of local seed sources.</li> <li>3. Development of seed quality standard/training.</li> </ol>  |
| <i>Middleman (MA)</i>                               | Have been trained in seed collection/propagation/nursery management. Socially inclusive and supports rural communities | <ol style="list-style-type: none"> <li>1. Seedling maintenance costs.</li> <li>2. Transportation costs.</li> <li>3. Delay in govt payment.</li> <li>4. Annual tender process.</li> <li>5. Dependent on securing future tender.</li> <li>6. No clear requirements from Forestry regarding their species required and quantity and tender requirements.</li> </ol> | <ol style="list-style-type: none"> <li>1. Expand and build another holding nursery.</li> <li>2. Purchase 5 &amp; 7 tonne truck for transportation and configured bed to maximize transportation of seedling.</li> <li>3. Training of nursery staff on seed, seedling propagation and nursery management.</li> <li>4. Diversified into other business (quarry, vaivai, goldmine)</li> </ol> |
| <i>Buyer (MA)</i>                                   | Existing funding extended to fund purchase of seedlings.   | Availability of sites/communities for planting of seedling purchased.  | Need to secure further WB funding to continue with work.   |
| <i>Potting Bag suppliers (SA)</i>                   | Does not rely in tree seedling business alone. Consistent supply Supply whatever amount needed. Price competitive      | Factory outlet located in Lautoka. Can be purchased in hardware shops but are usually expensive.   | Have a location nearby where people can buy or obtain planter/potting bags without travelling to Lautoka   |
| <i>Nursery Materials supplier (SA)</i>              | Does not rely in tree seedling business alone. Supply available from any hardware                                      | Nursery materials can be expensive.  |  |
| <i>Transportation providers (SA)</i>                | Does not rely on carting of tree seedling business alone.  | <ol style="list-style-type: none"> <li>1. Fuel costs.</li> <li>2. Transport not configured to maximize transportation of seedlings.</li> </ol>   | Need consistent hire services.   |

### *Propose a plan to improve the value chain.*

Short-term plans – this will have a quick impact.

- Working to submit bid to secure seedling tender for next year.
- Purchase 5 & 7 tonne seedling configured truck for cartage of seedlings to various sites.
- Training of staff on seed collection, propagation, and nursery management.

Long-term plans – this will have future impact.

- Working on making business more nimble reducing overheads.

- Reducing number of trustees from 5 to 3.
- Diversifying business to not solely rely on tree seedling sector.



## Landscape and Agroforestry

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## Bamboo

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Bamboo is an ancient woody grass with about 1200 species widely distributed in tropical, subtropical, and mild temperate zones (GFRA, 2020). Bamboo produces woody culms that may be used whole as timber or split for a multitude of wood products (Benton et al. 2011).

The Global Forest Resource Assessment of 2020 (GFRA, 2020) underscores bamboo's widespread presence and multifaceted utility globally across all continents and regions, playing a pivotal role in economic and cultural spheres. Bamboo boasts diverse applications, serving purposes ranging from construction and craftsmanship to producing pulp, paper, panels, and flooring. Additionally, bamboo finds use in the fabrication of veneer, roofing materials, fabrics, and even as an alternative energy source in the form of oil, gas, and charcoal (FAO, 2017), prized for its excellent natural absorbent properties (Tauraga, 2017).

The global bamboo market is expected to attain a valuation of US\$ 6,533.11 million in 2023 and is projected to reach US\$ 18,440 million by 2033. A CAGR of 10.9% is anticipated for the market from 2023 to 2033 (FMI, 2022). The extraordinary growth in demand for green construction, especially across developed regions such as North America and Europe, along with the increased adoption of bamboo for construction, is expected to propel the market valuation over the forecast period. The EU is responsible for 37% of the global bamboo trade, worth approximately US\$790 million (Sheppard et al., 2020).

In the South Pacific region, the South Pacific Community (SPC) has been a proponent of non-wood products like bamboo, recognizing their potential to support the livelihoods of Pacific Islanders (SPC, 2009). Subsequently, in collaboration with SPC, the Ministry of Forest embarked on initiatives to revitalize the NTFP sector. The Republic of Indonesia, through its Embassy in Suva, partnered with the Ministry of Forestry to conduct training programs focused on bamboo utilization and handicrafts.

Bamboo is increasingly seen as a viable alternative to timber, echoing traditional practices in rural communities in Fiji, where it has been utilized for constructing housing materials such as walls and flooring.

Although bamboo is a traditional housing material for indigenous people in Fiji, the formal redevelopment of bamboo began in the 1970s in Vunidawa, Naitasiri, by the Government of the People's Republic of China (GOF, 2019), through a project to explore utilizing local bamboo species. However, the project ceased due to a lack of appropriate technology, low interest from industry stakeholders, and a lack of investments (MoF, 2020). Despite these challenges, a dedicated group persisted in advancing the bamboo industry. In 1998, the Fiji Bamboo Association was established to rejuvenate and promote the use of bamboo and bamboo products within the local context.

Regardless of these efforts, the full potential of bamboo in Fiji remains largely untapped compared to regions like Asia and South America.

Bamboo shoots is an exportable product. There is immense potential to explore this market given the sizable Asian population in New Zealand and around the Pacific and possibly in China or other Asian countries such as Singapore, which have reasonable airfreight connections with Fiji (FAO, 2017). Present endeavors by the Ministry of Forestry, alongside development partners such as the Fiji Bamboo Association, Pacific Islands Development Forum (PIDF), and other stakeholders, aim to promote, revitalize, and fully harness the potential of bamboo for socio-economic growth. Through these collaborative efforts, it is envisioned that bamboo can emerge as a valuable resource contributing to Fiji's economic development and sustainability.

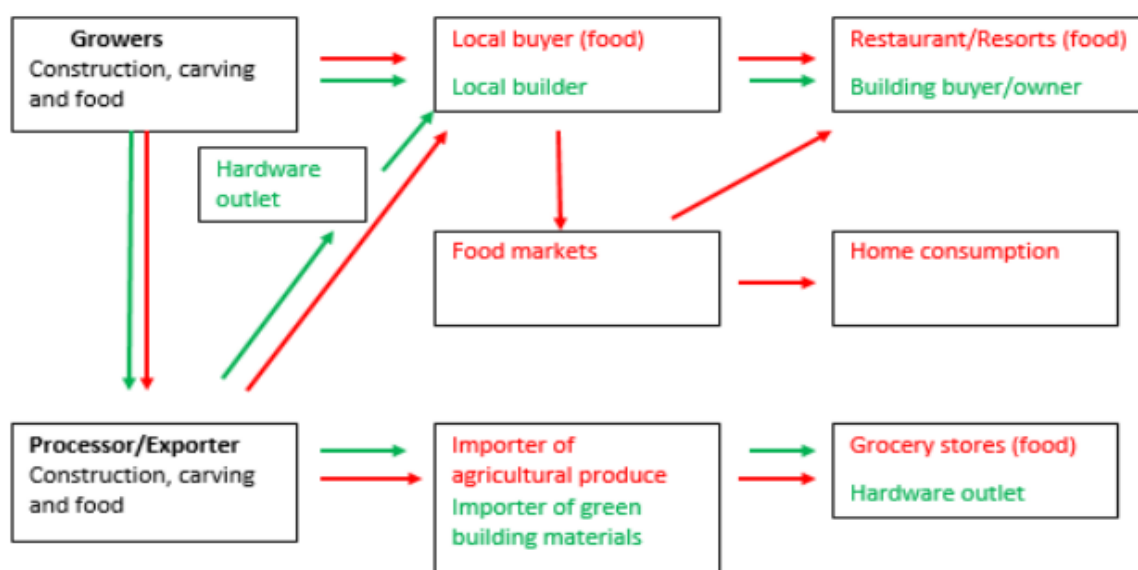
The bamboo value chain assessment outlined in this report is based on information provided by representatives of Sunnyville Bamboo.

## Value chain map

The successful development of a bamboo-based enterprise will require a thorough understanding of the value chain (PARDI, 2021). In recent value chain development initiatives in the Pacific, it has become evident that the structure of value chains varies depending on the type of product. The value chain typically involves growers, local buyers, processors, exporters, and consumers of food products. Other actors such as middlemen, markets, and resorts are also involved in the broader value chain. While this structure shares similarities with the construction industry, it tends to be more streamlined and straightforward. The supporting actors for construction and food are transportation, customs, buildings, and food regulators.

Green and red arrows delineate the value chains for construction and food (Figure 35). These visual indicators highlight each sector's distinct pathways and processes, emphasizing their unique characteristics and contributions to the overall end product.

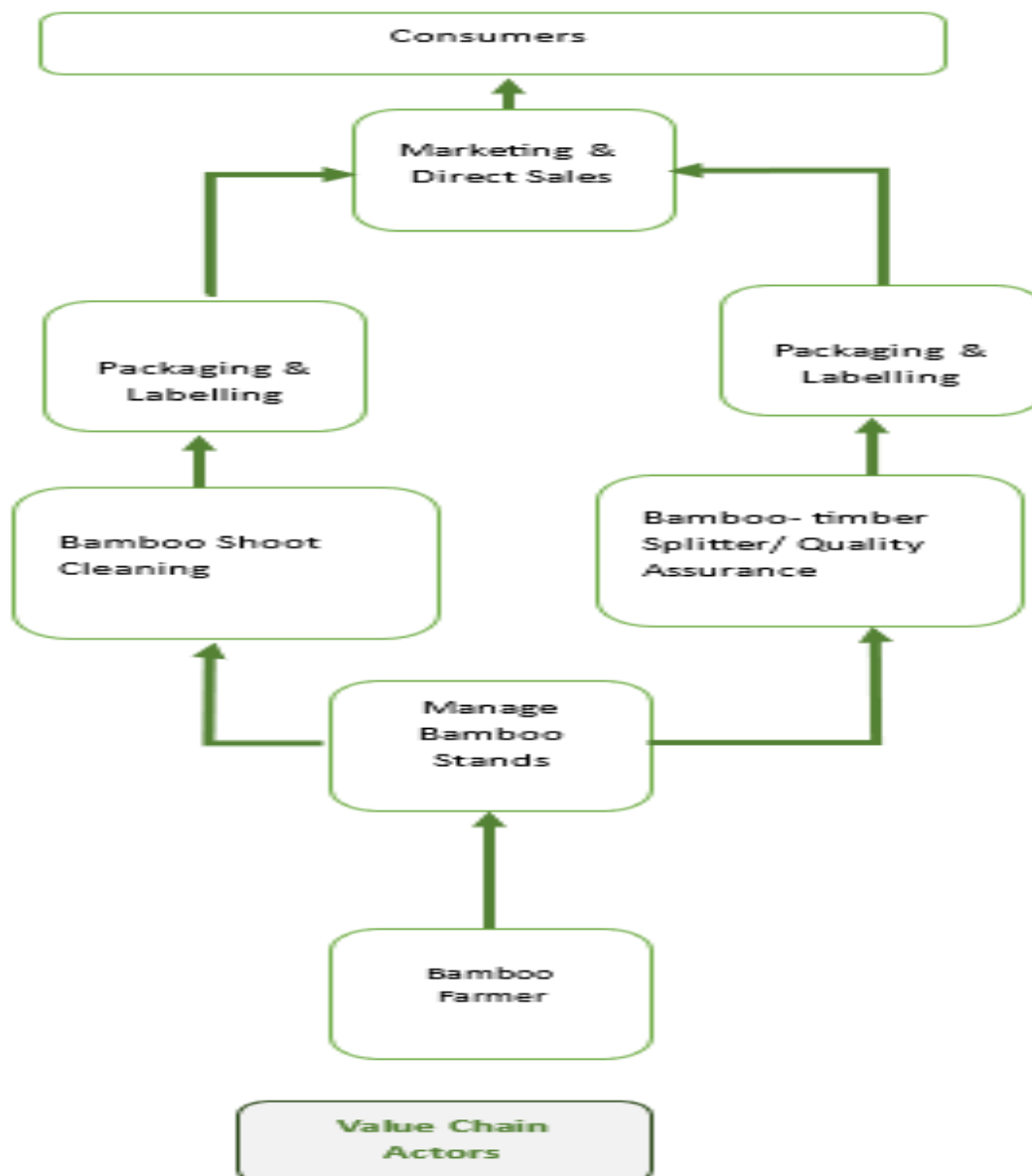
**Figure 35: Value Chain Map for Bamboo**



In the construction sector, the green arrows symbolize the interconnected stages of value addition, from raw material sourcing to the final built environment. This encompasses activities such as harvesting bamboo, processing building components, transportation and logistics, construction and assembly, and, ultimately, the delivery of finished structures. Each step in this value chain represents a crucial link in the construction process. See Figure 36.

Conversely, the red arrows delineating the food chain signify the flow of bamboo shoots from farm to table. This encompasses cultivation, harvesting, post-harvest handling, processing, packaging, distribution, and retailing. From the cultivation to the processing of raw ingredients into consumable products, the food value chain encompasses a diverse array of activities aimed at meeting consumers' nutritional needs.

**Figure 36: Simplified Value chain for bamboo shoots and construction**



The

significance of supporting actors or supporting services within a value chain cannot be overstated, as they play a vital role in bridging the gap between different phases of the value chain. These supporting actors encompass a range of services and entities, including transportation providers, regulatory bodies, and policy frameworks. Their contributions are essential for ensuring the smooth flow of goods, information, and resources throughout the value chain.

Transportation services, for instance, facilitate the physical movement of raw materials, components, and finished products between various stages of production and distribution. Whether it is transporting raw materials from suppliers to manufacturers or delivering finished goods to retailers or consumers, efficient transportation networks are critical for maintaining the integrity and efficiency of the value chain.

Regulatory bodies and policies also play a crucial role in shaping the operating environment within which value chains operate. These entities establish standards, regulations, and guidelines that govern various aspects of production, trade, and commerce. By ensuring compliance with safety, quality, and environmental standards, regulatory bodies contribute to the overall reliability and credibility of products within the value chain.



The complete cycle of the value chain, from raw material extraction to the production of final products, underscores the integration and coordination of leading and supporting actors. Each phase of the value chain relies on seamless interaction and collaboration between stakeholders, including producers, suppliers, manufacturers, distributors, and service providers. By recognizing the interconnectedness of these actors and their respective roles, organizations can enhance efficiency, minimize bottlenecks, and maximize value creation throughout the entire value chain.

#### *Quantification of the Value Chain*

The value chain actors for bamboo include the producers or farmers who own the bamboo stands and the processors who buy the raw bamboo shoots or stems processed into other bamboo products such as plyboard or timber. Critical actors in the market include importers and exporters. Importers bring bamboo products from Asia, which provides a foundation for the aspirational nature of bamboo production in Fiji.

Details are listed in Table 33.

**Table 33: *Bamboo main actors and supporting actors***

| <b>Actor</b>  | <b>What the actor contributes to the final product</b> | <b>The cost of the actor's contribution</b>      | <b>The reward that the actor receives</b>             | <b>Actor Risk</b>   |
|---|--|--|---|---|
| <b>Main actor (MA)</b><br><b>Support Actor (SA)</b> |  |  |   |   |
| Growers (MA)  | Cultivation and harvesting of bamboo                   | FJ \$180 per clump of 10                         | \$180   | Not interested in Manual and physical work                          |
| Processor(MA)                                       | Convert raw materials into desirable products          | \$1,805.00 for 10 poles                          | \$1,805.00  | Frequent changing of personnel and lacking knowledge of the process |
| Local Buyer<br>Local Builder (MA)                   | Purchase directly from processors and growers          | Mark up of a certain percentage of raw materials | The difference between buying price and selling price | Less demand in the market   |
| Food Market (MA)                                    | Storage and selling                                    | Mark up of a certain percentage of raw materials | The difference between buying price and selling price | Consumer demand   |
| Exporter/Importer (MA)                              | Purchase from local exporter                           | Mark up of a certain percentage of raw materials | The difference between buying price and selling price | Quality assurance and standards                                     |
| Consumer (MA)                                       | Complete the value chain                               | Buying at the selling price                      | Quality and nutrition value                           | Taste buds  |
| Transporter (SA)                                    | Transporting materials                                 | Freight costs                                    | Freight costs   | Breakdown in transportation   |
| Regulator (SA)                                      | Facilitate trade                                       | Fees   | Fees  | Nonadherence  |

In the bamboo value chain, growers and harvesters typically incur a total of FJ\$180 for a clump of 10 poles. While harvesting bamboo involves significant labor, the associated costs are relatively low. However, processing bamboo requires more investment as it involves additional work, resulting in total expenses of FJ\$1,625. See Table 34.

Despite the costs incurred in harvesting and processing, bamboo offers many valuable by-products. These include furniture, cutlery, textiles, compost, soap, construction materials, and more. Bamboo's versatility and the diverse array of products derived from it contribute to its economic significance and potential for sustainable development.

Expanding bamboo cultivation and optimizing its value chain could further enhance its economic and environmental benefits. At a low-scale income, the total net profit obtained per clump is FJ\$5,345, highlighting the potential profitability of bamboo cultivation and processing. This underscores the importance of investing in and promoting bamboo as a viable and lucrative economic venture

#### *Market Assessment*

Bamboo has emerged as a sustainable source of income for small-scale producers. However, achieving success in this endeavor hinges greatly on delivering a high-quality product that aligns with market demand. Essential skills for aspiring bamboo entrepreneurs include understanding market dynamics, mastering production techniques tailored to market preferences, and ensuring timely delivery at competitive prices. These competencies are pivotal in navigating the complexities of the bamboo market and capitalizing on its economic potential.

The market opportunities for edible bamboo shoots appear almost limitless in East Asian markets: for example, in PR China, between 3.2 and 4.0 million tons of bamboo shoots are produced yearly, mainly for local consumption. However, with farm gate prices for bamboo shoots in China at around FJD 2-4 per kg, Fijian and Pacific Islands growers cannot compete in China and most East Asian markets, especially considering transport, biosecurity, and other costs associated with export.

**Table 34: Poles market assessment**

| Year of Bamboo Plant=>   | Income in FJD |              |              |              |              |              |
|--|---------------|--------------|--------------|--------------|--------------|--------------|
|  | 6             | 7            | 8            | 9            | 10           | >10          |
| <i>Bambusa oldhamii</i> : sale of timber poles 2-4 poles per clump, 10m x 7.5cm diameter x 200 plants @FJ6/pole (less FJD 2 harvest, processing, transport)    | 1,800         | 2,700        | 3,150        | 3,600        | 3,600        | 3,600        |
| <i>Demdrocalamus asper</i> : sale of timber poles 2-4 poles per clump, 12m x 10cm diameter x 100 plants @FJ12/pole (less FJD 3 harvest, processing, transport) |               | 1,950        | 2,925        | 3,413        | 3,900        | 3,900        |
| <b>Income from sales of bamboo poles for timber</b>  | <b>1,800</b>  | <b>4,659</b> | <b>6,075</b> | <b>7,013</b> | <b>7,500</b> | <b>7,500</b> |

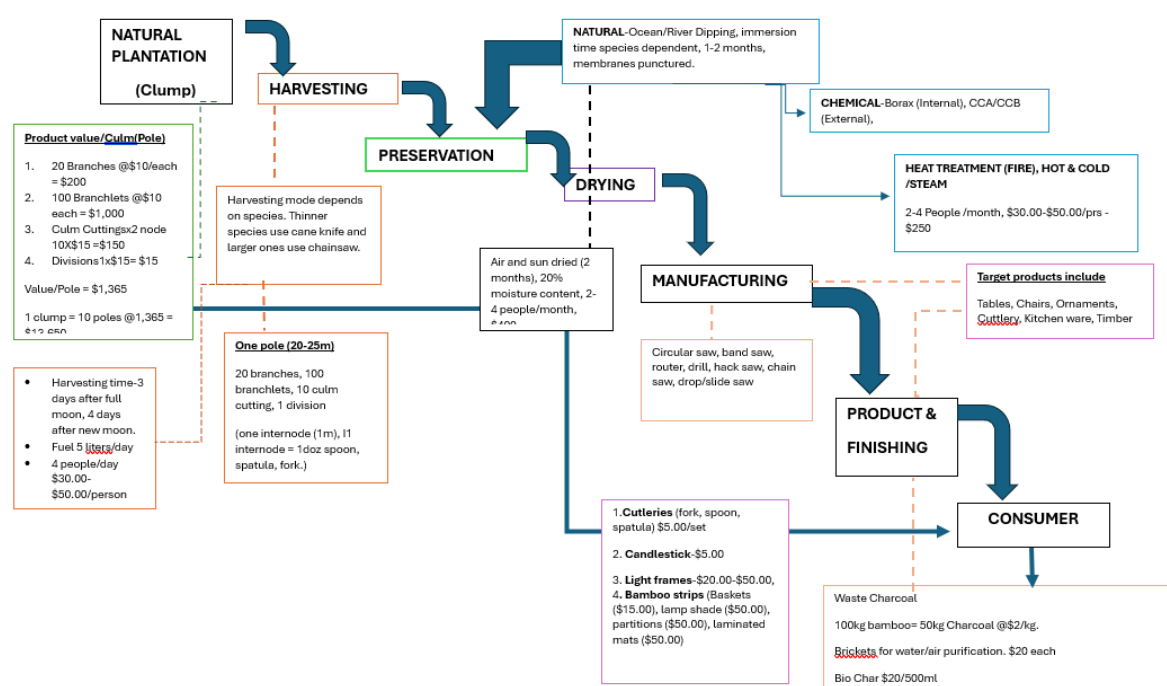
(Source: PARDI 2. BAMBOO AGRIBUSINESS COMPENDIUM. October 2021)

Pacific Island producers of edible bamboo shoots must target nearby and potentially more lucrative markets. These markets include not only local Asian food outlets but also fresh bamboo shoot markets in Pacific Rim countries with sizable diaspora populations of Chinese, Koreans, and Japanese, along with vibrant restaurant industries, such as Australia, New Zealand, Hawaii, the West Coast of the USA, and Canada. It's crucial to consistently produce fresh, edible shoot products in the volumes required for selected niche markets and maintain the highest quality standards.

Bamboo holds tremendous promise for the building industry in terms of construction, especially in regions prone to earthquakes like Vanuatu and the Solomon Islands. With poorly constructed cement block structures posing significant risks during seismic events, bamboo offers a solution with its potential for low-cost, lightweight building structures that are flexible and can safely sway during earthquakes. However, legal barriers exist in some Pacific countries, like Fiji, where bamboo is not included in building codes. Collaboration between the bamboo industry, including associations, processors, growers, architects, and governments, is essential to update building codes and integrate bamboo into construction regulations. Once bamboo is officially recognized in building codes, the demand for bamboo in construction projects by architects and builders is expected to increase significantly.

Moreover, there are opportunities to explore bamboo's potential in innovative composite materials for building walls and panels. Research in countries like Thailand and Fiji is already underway in this area, and such advancements could further expand the market demand for bamboo. Market map for bamboo is outlined in Figure 37.

**Figure 37: Bamboo market map**



#### SWOT analysis of the Value Chain.

Bamboo is readily available in degraded landscapes in Fiji. With limited knowledge of the opportunity for an alternative livelihood that Bamboo presents to local communities, there is an urgent need to raise awareness, propagate, and expand its natural range. Bamboo takes 3-5 years to mature; hence, the opportunity for a quick turnaround is high.

The biggest weakness and threat is the availability of imported bamboo products from abroad, which flood the market with commodities such as bamboo spoons, baskets, etc. Local operators also find access to financing challenging to secure as pioneer operators advocate for Government and community support. See Table 35.

**Table 35: Bamboo SWOT analysis**



| Actor   | Strength and Opportunities  | Weakness and Threats   | Action Needed   |
|---|---|--|---|
| <b>Main actor (MA)</b><br><b>Support Actor (SA)</b> |   |  |   |
| Bamboo Supplier (MA)                                | Opportunity to sell bamboo as a new commodity in the market   | Absence of harvesting standards  | Needs training to reduce waste  |
| Operators (MA)                                      | Localize knowledge and skills.<br>Availability of finance and labour.<br>Self-training              | Small scale<br>Limited financing<br>Lack of local standards              | Formal training<br>value adding and product development<br>Funds to increase production/marketing |
| Marketing and Sales (MA)                            | Develop market and branding for Fiji-made bamboo products   | Lack of marketing<br>Define roles to ensure improved business management | Business management training  |
| Local Consumer (MA)                                 | High demand for products<br>Lack of completion from alternative products<br>Product diversification | Lack of product supply<br>Lack awareness on bamboo products              | Need support for product EXPO and promotion   |

*Propose a plan to improve the value chain.*

Given the above discussions and the SWOT analysis, immediate actions and long-term plans for the development of Bamboo include:

Short-term plan

1. **Design and plan strategy to develop the Bamboo subsector**—Given the Ministry of Forestry's support for developing NTFP, the Ministry must develop policies and strategies to support the development of the Bamboo subsector. Strategies may include raising awareness of opportunities presented by bamboo production, research and development, and market development.
2. **Establish a Bamboo Association:** Support forming a bamboo association to advocate for the development of bamboo subsector in Fiji. Involve all value chain actors in the association to ensure the strategy developed in (1) above is fulfilled for succession.
3. **Support access to capital:** The Ministry of Forestry will make a stronger case to work closely with banking institutions such as Fiji Development to develop a financing package for the bamboo subsector. Such a package may include opportunities to procure high-end machinery and training for bamboo timber production.

Long-term Plan

1. **Seek bilateral support from Asian countries:** The Ministry of Forest would be well placed to secure bilateral agreements with Indonesia to support upskilling and training on bamboo production.
2. **Collaborate with the International Bamboo and Rattan Organisation (INBAR):** INBAR was set up in 1984 and evolved from an informal network of bamboo and rattan researchers with support from the International Development Research Center (IDRC) of Canada. INBAR became an independent international organization in 1997, with founding members being Bangladesh, Canada, China, Myanmar, Nepal, Peru, the Philippines, and Tanzania. Currently, there are 51 member countries, of which Fiji is one of the 2 countries from the Pacific (part of Tonga). INBAR has grown

considerably in strength and scope and come away from a research-only organization and towards a more action-focused mandate. INBAR is committed to exploring ways to substitute plastic with bamboo as part of the Global Development Initiative.

3. **Include bamboo in forest inventory:** Advocate for the inclusion of bamboo in the national forest inventory to address limited information on the extent of bamboo in Fiji. The sector's growth may depend on existing resources that can be complemented by planted resources.

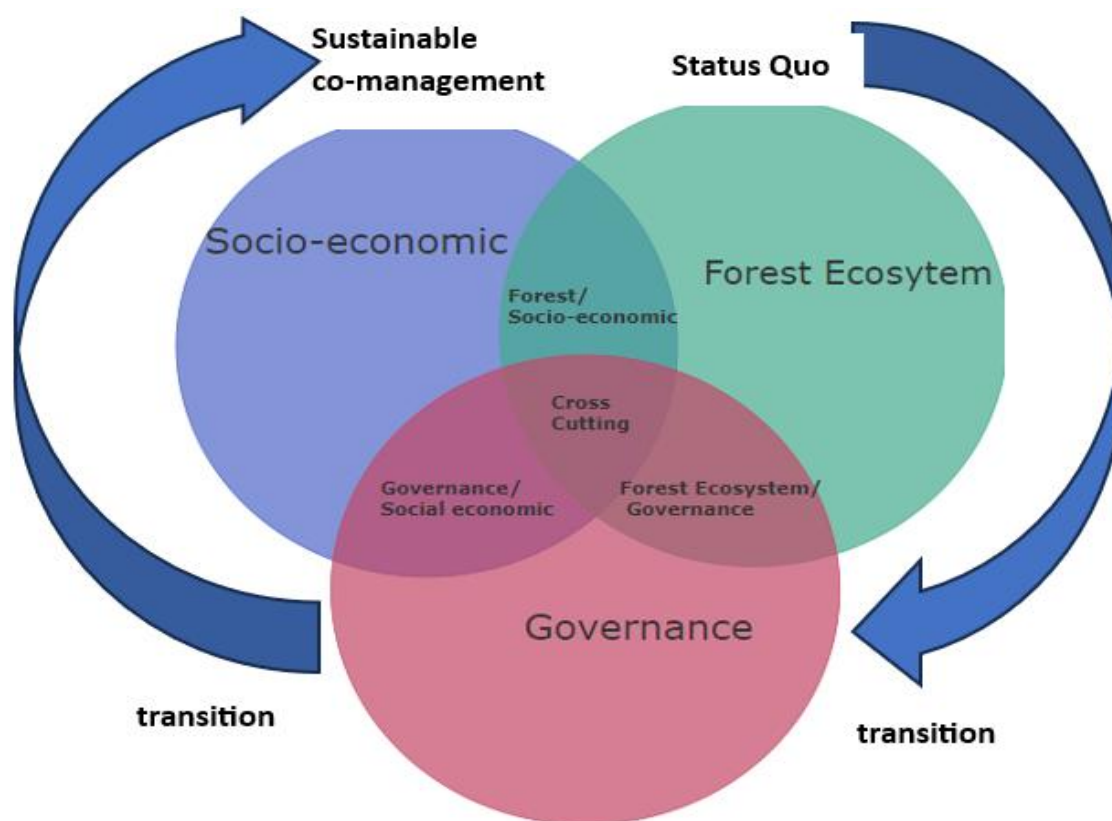
## Transition to sustainable co-management

The ten case studies presented above outline the status quo of key NTFP in Fiji.

Value chain actors consist of all community members, men, women, youth, and, in some cases, children collecting seeds in the wild. NTFP production at the community level is primarily for livelihood or subsistence. Community members are primary producers in almost all the commodities assessed. Processors consist of individual business owners with the passion, patience, and commitment to invest in NTFP. Marketing channels for all NTFP commodities assessed are comprised of informal and formal markets through social media and word of mouth. Food and tree nurseries are preliminary targeted for local consumption. At the same time, medicine, handicrafts, perfume, and oils have the opportunity to expand into the export market, targeting niche consumer groups such as the diaspora community.

Long and short-term plans are consistent across all commodities, focusing on the three pillars of *forest ecosystem*, *governance*, and *social systems* (Sheppard et al., 2020). An additional pillar under “*Cross-cutting*” is added to capture common elements across forest ecosystems, socio-economic systems, and governance (see Figure 38).

Figure 38: NTFP Transition from status quo to sustainable co-management



### Forest Ecosystem/ Governance

#### *Ecosystem Services*

All 10 commodities are part of Fiji’s forest habitat, but timber species have always been the focus of research and development. Although species and ecological information are available for Candlenut, Yasi, and Kura, very little information is available on raw materials used in handicrafts, food, and landscape restoration. It is imperative to integrate and harmonize NTFP with the wider forest management goals to achieve sustainable goals that enhance forest functions and associated ecosystem services.

Possible solutions to achieve sustainable co-production management on NTFP in Fiji may include the following.

- Targeted research on the contribution of each commodity in the forest ecosystem to quantify harvestable limits.
- Generate interest among researchers to assess the ecosystem services of all NTFP commodities, including, but not limited to, Voivoi, Masi, Magimagi, Kura, Candlenut, Dilo, Yasi, edible ferns, and bamboo.
- Long-term food security calls for a better understanding of the impact of changing climate on important food sources such as edible ferns (ota) through development of climate modelling
- Review existing traditional and formal governance systems to develop an integrated forest/governance system that will support the development of NTFP commodities while retaining cultural values of NTFP that will satisfying all value chain actors

#### *Inventory, Accounting, and Control*

Many NTFPs discussed in the case study have no information on baseline inventory of the raw material available and status of extraction levels. This may pose a risk to over-exploitation and forest degradation. At the same time, there is no legislative control to capture production data, giving rise to the current situation where there is no available data on resource access, extraction, production, and sale of core commodities. It is also evident in the value chain, and market assessment for each commodity that there is very little support available to entrepreneurs who engage at early stage of developing NTFP commodities. The Ministry of Forestry may take the lead role in undertaking resource inventory and initiate control mechanisms such as a licensing framework that will facilitate data collection to accurately account for available resources, extraction rate, and development efficiency. Such information will assist the Ministry of Forestry in accurately reporting on the sustainable development of NTFP in Fiji.

Possible solutions to achieve sustainable co-production management may include the following.

- Prioritize integration of Bamboo, Yasi, Dilo and Candlenut in the national forest inventory to track wild and cultivated populations of the same. Establish yield tables to control extraction levels.
- Support targeted research on cultivation methods for all species. Information on propagation methods is important to reduce and control extraction from the wild.
- Develop standard measures and accounting to standardize reporting and reporting of NTFP production.

## **Forest Ecosystem**

### *Forest Management*

Fiji has strong policies on Sustainable Forest Management with strong standards of harvesting in place through the Fiji Harvesting Code of Logging Practice. The inclusion of environmental safeguard in Fiji's code of harvesting practice will ensure rehabilitation and enhanced natural regeneration of Fiji's native forest.

The biggest driver of deforestation and forest degradation is agriculture extension particularly driven by extension of kava plantations. There is an urgent need to develop communications material that advocate shade grown kava and the reuse of fallow land where kava cultivation occurred over the past years.

The Protected Area Committee have assessed and made recommendation on Key Biodiversity Areas in Fiji. The scope of this assessment covers the whole of Fiji and proposes 16.7% of land (predominantly forest area) to be protected. Such proposed protected areas need landowner endorsement before they can be legalized under the Forest Act.

Possible solutions to achieve sustainable co-production management may include the following.

- Undertake national land use plan to secure support from all users on allocation of land use through landscape approach between forest, agriculture and other uses including areas where NTFP may be cultivated in alignment to land use capability
- Secure support and provide incentives for landowner cultivation of suitable NTFP
- Secure support and provide incentive to private and landowning communities already engaged in NTFP value chain
- Strengthen capability of timber harvesting operators to replant logged over areas with native species
- Secure landowner support to protect the key biodiversity areas identified by the Protected Area Committee

## **Governance**

### *Policy and Legislation*

The National Forest Policy 2007 integrates forest resource management, particularly NTFP, into sustainable forest management. It provides a framework of co-management between the Government and landowning units; with the Government committed to encouraging the production, harvesting, and use of NTFP. As the case studies above show, each proprietor is driven by passion and self-interest in developing the 10 commodities discussed. There is a clear disconnect between policies and NTFP development in the Ministry of Forestry Implementation Guideline, the Ministry of Forestry Strategic Plan and the Ministry of Forestry Annual Business Plan.

Access and property rights are clearly defined in Fiji and are not an issue for all commodities assessed in the case study. Commodities under Perfume & Oil have identified the need to lease lands to ensure access rights to raw materials. As production grows and the market is fully established, these issues will become important as they affect the availability and sustainability of resources. It would thus be prudent to formulate relevant policies and legislations to govern, control, and account (reporting) for available raw material against production rates and return.

The commodities assessed in the case studies above fall under the legal jurisdiction of Agriculture and Forest sectors. Overarching legislation may need to be considered to ensure alignment of laws under agriculture, forest, and environment. The Endangered and Protected Species Act, under the Ministry of Environment limits the trade of endangered and protected species and may limit the trade of timber and NTFP.

Possible solutions to achieve sustainable co-production management may include the following.

- Develop a strategic policy for NTFP with focus on high value low impact commodities to improve the value chain
- Clearly define the governance system for each key commodity to support the creation of meaningful policies and legislation.

- Assess policy and legal requirements for each commodity to ensure smooth trade transition from status quo to sustainable co-management.
- Develop licensing processes where applicable to improve governance and control measures by regulating the extraction of raw materials used to produce marketable commodities
- Ensure sustainable extraction by linking policies and regulations to prohibitions/ extraction conditions to control resource use

## **Social Systems - Socio-economic structures**

### *Cooperation, Network, and empowerment*

The level of cooperation among the different NTFP categories are not consistent. For instance, there appears to be more coordination and network in the handicraft, restoration, perfume and oil, and food subsectors. In contrast, medicine production appears to be individualist and competitive. The trend can be attributed to the nature of the value chain and the level of dependency among value chain actors. For instance, in the case of handicrafts, many different ingredients are required to create the final artifact. Similarly, the production of perfume and oil needs the input of many producers of raw materials to supply the process of the final commodity. Working among the value chain actors is, therefore, critical for success. A critical recommendation involves raising awareness and capacity of each value chain operator to be aware of the full production process while deepening understanding of the challenges and opportunities to improve effectiveness at each development stage. Such appreciation will empower the value chain actors and facilitate the full integration of various processes to share a single vision for the commodity.

Possible solutions to achieve sustainable co-production management may include the following.

- Encourage collaboration and networking among value chain actors to share skill sets and improve co-production management of NTFP
- Encourage Formation of formal networks such as Associations are essential to enable recognition and good governance
- Review the application of the cooperative model for commodities such as handicrafts, food, perfume, and oil to ensure equal benefit sharing and protection of the resource base

### *Trade and market access*

All 10 commodities discussed above trade in the informal market through social media and word of mouth while they access the formal markets through expeditions, trade shows, and small retail outlets. Except for Bamboo, all commodities appear to have established and clear market channels, especially in the handicraft subsector through the informal sector.

Fiji's National MSME policy aims to improve access to financing and business services to ensure "A Brighter Economic Future for all Entrepreneurs" across all sectors in Fiji. Despite such strong government policies, MSME in Fiji remains to be fully realized at the sectoral level. Proprietors of each commodity in the case study express difficulty in securing capital. Many factors may contribute to such a situation, such as the bankability of the product, lack of business experience of the proponents, lack of secure access rights to raw materials, lack of supply agreement, and many other factors.

The national MSME policy aims to develop and promote entrepreneurial culture, encouraging MSMEs to grow with comparative advances aligned to national sectoral policies. The critical success sector of all commodities assessed indicates that sustainable sources of raw materials, environmental benefits, and high-quality products are essential for customer

engagement. The product's affordability follows these traits, including the availability of the goods, reliability in quality, and uniqueness, which are considered secondary importance. When considering the market strategy outlined for each commodity assessed, it is evident that fragility is considered a priority, followed by accessibility, niche, and diversity. Manifestation criteria for fragility include the opportunity for economies of scope through diversified but interlinked activities as well as vulnerability to the impact of climate change on resource availability.

Possible solutions to achieve sustainable co-production management may include the following.

- Define market structures for each commodity to appreciate and improve nonmarket values.
- Undertake targeted research to understand nonmarket trading, especially for handicrafts and food, as these commodities also support the livelihoods of rural households.
- Undertake targeted research for high-value commodities, such as Perfume and oil, to understand resource availability, the level of sustainable yield, and the potential of expanding raw material through restoration/cultivation, all with the overall mission to support market expansion.
- Perfume, oil, medicine, restoration/ landscape/ agroforestry involve specific technologies and processes with a more defined market structure. Undertake economic and business analysis to ensure the bankability of each commodity, ensuring a win-win for all value chain actors.
- Encourage the formation of associations for each commodity line to facilitate better networking along the value chain, aiming at improving market penetration.

#### *Livelihood*

All ten commodities outlined in the case study primarily support the livelihoods of local communities and bring multiple benefits to all sectors; for instance, benefits from handicrafts and artifacts positively impact infrastructure development, social cohesion through cultural and traditional artifacts, and tourism industry support. However, it is challenging to capture information that differentiates and evaluates the actual quantity harvested, the amount that is locally consumed, and the amount sold in the market to understand the livelihood provision of NTFP. Despite the data and information dilemma, the benefits of NTFP in supporting livelihood cannot be over-emphasized.

Possible pathways to support the fulfillment of sustainable co-production management may include the following.

- Improve the efficiency of production through the introduction and adoption of appropriate technology to ensure minimal resource use and maximum return
- Raise community members' awareness of the value chain process to ensure a complete understanding of their contribution to commodity development and marketing. Collaboration, coordination, and networking are crucial to improve co-production efficiency.

### **Social Systems/ Forest Ecosystems**

#### *Innovation*

Each commodity highlighted in this assessment shows the proprietors' innovation in moving away from timber/wood-based production. The case studies highlights local ability to co-manage production and integration of NTFP transitioning from subsistence livelihood intervention to an NTFP MSME enterprise. The challenge is to ensure that development



pathways to a fully developed market transition from status quo to sustainable co-production management align with the framework proposed by Sheppard et al. (2020).

NTFP processors in Fiji do not need to reinvent machinery and technology. Availability of knowledge, technology, and equipment is no longer an issue, as the internet now provides access to a wide range of machinery to cater for all aspects of production. As evident from the above discussion, lack of capital is the most prominent challenge NTFP entrepreneurs face in Fiji. A critical recommendation, therefore, lies in the need to develop innovative financing mechanisms that will provide continuous support through all stages of product development.

Possible solutions to achieve sustainable co-production management may include the following.

- Develop management plans for each commodity at the national level that integrate the resource base/availability and carrying capacity of the commodity to determine the maximum sustainable production level.
- Develop integrated governance, social-economic, and environmental principles to guide co-production system
- Develop explicit objectives for each commodity to manage the NTFP, coordinate value chain actors, manage expectations, and ensure social cohesion aligned with traditional NTFP governance
- Establish policies that mandate and provide support for the co-management of each commodity to ensure sustainable management and win-win for all value chain actors.

### **Cross-cutting**

Each commodity assessed identified research and development as a crucial need. For Magimagi, particular coconut species with longer fibers need targeted research on propagative capacity, the species' genetic resource pool, and its risk factor in response to pests and diseases. Similarly, Kura, Candlenut, and Dilo need targeted research on oil quantity, germination methods, and process quality control.

Each commodity assessed currently has no published plans or adaptation strategy to respond to the impact of climate change. There is an urgent need to de-risk each commodity from climate impact. For instance, voivoi is water tolerant and used as a buffer along creek banks to hold the soil during floods. Bamboo is drought-tolerant and considered a pioneer species in degraded landscapes. Tree nurseries have become an essential source of income for rural communities at the edge of native forests.

The most significant opportunity for community forestry and individual NTFP enterprises is the increasing appreciation (among consumers) towards community-based products, deforestation-free, green, and sustainable commodities, socially conscious manufacturers and customers, and increased purchasing power. This market trend is likely to stay.

Critical recommendations that will ensure expansion of NTFP under cross-cutting pillar would (Soe and Yeo-Chang, 2019) include: (1) the need to promote and support social forestry schemes anchored in sustainable forest management that integrates sustained contribution in the development of community forestry enterprises; (2) close collaboration with the forestry departments and other concerned government agencies to provide clarity on the extent of traditional user rights, customary user rights, and sustainable resource rights; (3) package awareness materials to ensure full appreciation of policies and monitoring protocols to ensure that community forestry enterprises are competitive and well linked to the market; (4) support the network of agencies, organizations, and people involved and promote NTFPs maintained by better data collection and management; and (5) encourage governments to be aggressive

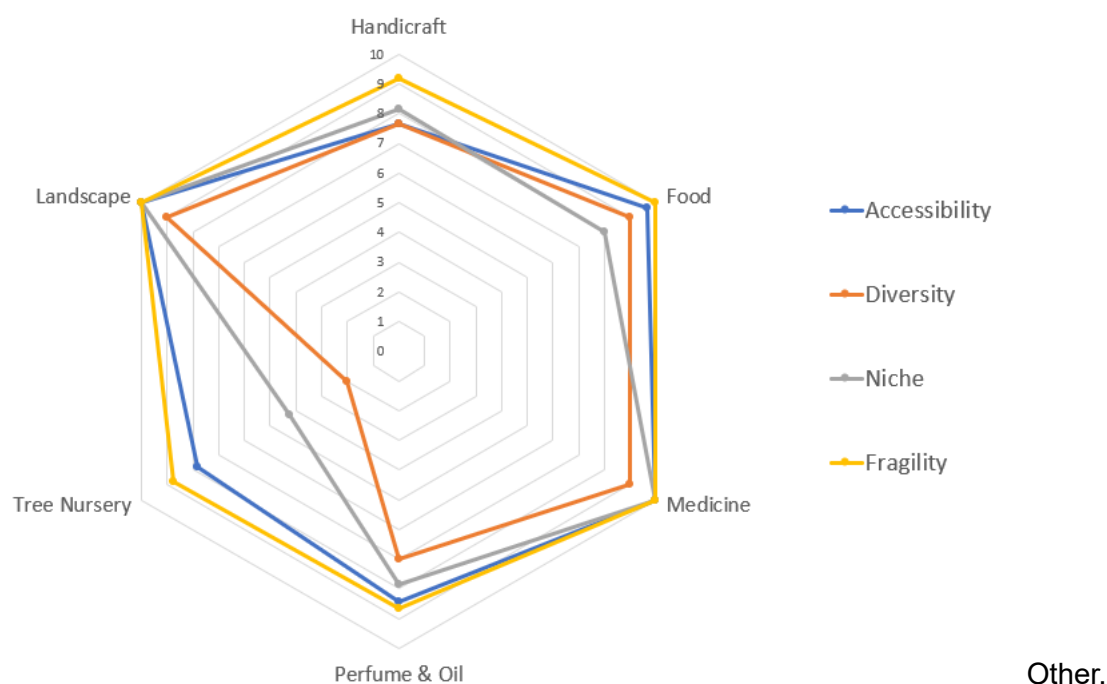
in promoting NTFPs for handicrafts, cosmetics, industrial, and pharmaceutical uses and to support targeted research and development on NTFPs.

## CONCLUSION

Limited information on each case study on product price and quantity restricted the ability to project product supply and demand at the local and international market. Historical data on price and production level would provide insight on how the buyers and the sellers interact in the marketplace. It would help understand impact on supply if prices change over time as well as projected impact on employment and resource need.

Critical success factor was assessed for each commodity to understand what conditions / functions are necessary to attract customers to buy NTFP product (Figure 39). These factors include accessibility, diversity, niche and fragility. In the case of handicraft commodities fragility and creating niche products is important. Consumers are assumed to value sustainable sourcing and environmentally sound practices. For food product, fragility, accessibility and diversity are more important than creating a niche market. In medicinal product, creating a niche product, accessibility and fragility are more important than diversity. In perfume and oil, fragility and accessibility are of paramount importance. For tree nursery, fragility and accessibility are important.

**Figure 39: Summary of Critical Success Factor for each Criteria of NTFP assessed**



Two factors came out strongly across all commodities including the need to be accessible and fragility. Accessibility includes the need to have high quality, available and affordable products while fragility includes sustainable sourcing supporting environmental and ecosystem functions that will ensure ability to respond to climate change.

Risk assessments of the case studies indicates the volatility of the product in the market. Although the data set available for each case study is limited, risk averse for each commodity group is discussed. For handicraft voivoi is a perishable good at risk from wet humid conditions and associated supply disruptions. Investment in cyclone proof storage facilities are therefore important to all value chain actors. All handicraft commodities have a market channel where

there are large number of producers, small number of processors and large number of buyers. Encouraging all value chain actors to network and collaborate may be beneficial to better coordinate product flow and development along the value chain. Women collecting the edible fern – ota, are moving further into the forest as supply continues to deplete from more accessible areas. Cultivation of ota may be a critical investment to reverse the risk of diminishing supply. Raw material for medicine, perfume and oil are harvested from the wild, resulting in inconsistent supply and disruption to production process. Targeted research into high value genetic resources, cultivation and processing will be beneficial to support investment confidence into these commodities.

In view of considerations to transition NTFP from current status quo to sustainable co-management, the above discussion provides an overview of possible priority actions that may be considered as the foundation of a NTFP policy and relevant regulations. In consideration of the case studies assessed, urgent and immediate steps towards enhancing NTFP development in Fiji would encapsulate the following:

Short-term:

1. **Design and develop national policy to support the development of NTFP in Fiji**—such a policy would be pivotal to ensure all of Government support to the development of MSME for NTFP products in Fiji as it would clearly articulate a high-level vision, mission and implementation plan to transition NTFP from status quo to a sustainable co-managed market .
2. **Support access to capital:** develop financing support to support entrepreneurs developing NTFP products in Fiji. The Ministry of Forestry is developing successful focused assistance to timber based MSME as outlined in Output 1 (report under this grant agreement). Similar efforts must be extended to NTFP to support individuals who have invested own funds to kick start NTFP production. The Ministry of Forest may consider working closely with banking institutions such as Fiji Development to develop financing package for the all NTFP commodities. Such an intervention may include the development of incubation centers as participants procure high-end machinery and training to ensure production efficiency of the NTFP commodity of interest.

Long-term:

1. **Integrate NTFP into sustainable forest management:** Advocate for the inclusion of NTFP (bamboo, kura, yasi, Dilo, Candlenut, others) in the national forest inventory to address limited information on the extent of bamboo in Fiji. The sector's growth may depend on existing resources that can be complemented by planted resources
2. **Establish a NTFP Association:** support the formation of an umbrella NTFP Association using hub and spoke model where the NTFP is a hub, supported by commodity-based associations as spokes. Such an arrangement will ensure that all value chain actors are involved in the development of NTFP in Fiji.

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## ANNEX 1: Commodity Description shared on 6 Feb 2024

|                           |                            |                        |   |
|---------------------------|----------------------------|------------------------|---|
| <b><u>Handicraft</u></b>  |                            |                        | <b><u>Medicine</u></b>  |
| Soga                      | Bamboo                     | Makadre                | Charcoal  |
| Dyes                      | <b><u>Masi</u></b>         | <b><u>Magimagi</u></b> | <b><u>Kura</u></b>  |
| Reed                      | <b><u>Voivoi</u></b>       | Vau                    | Assorted native trees – medicinal uses marketed as Juice Fiji |
| Bamboo                    | Wame                       | Sasa                   | Yaqona/Waka   |
|                           | Wood carving               | Ratali (Rattan)        | Cagolaya (Medicinal Ginger)                                   |
|                           |                            |                        | Lemon Grass   |
|                           |                            |                        | Mushroom  |
| <b><u>Food</u></b>        |                            |                        | <b><u>Perfume &amp; Oil</u></b>                               |
| Honey                     | Turmeric                   | Mushroom               | <b><u>Yasi</u></b>  |
| <b><u>Ota</u></b>         | Cocoa                      | Lemon Grass            | Makosoi   |
| Coconut                   |                            | Assorted               | Moringa   |
| Vanilla                   | Coffee                     | Yams (Tivoli etc.)     | <b><u>Lauci</u></b>   |
| Assorted native fruits    | Bamboo Shoots              | Moringa                | <b><u>Dilo</u></b>  |
|                           |                            |                        | Lemon Grass   |
| <b><u>Restoration</u></b> |                            |                        | <b><u>Landscape Agroforestry</u></b>                          |
| Assorted tree seeds       | Vetiver Grass              |                        | Firewood  |
|                           | <b><u>Tree Nursery</u></b> |                        | Horticulture  |
| Assorted Tree seedlings   |                            |                        | Coco-wood   |
|                           |                            |                        | Ecotourism  |
|                           |                            |                        | <b><u>Woodchips</u></b>                                       |
|                           |                            |                        | <b><u>Bamboo</u></b>  |

Handicraft – Soga, Masi, Voivoi, Wood carving

|  |   |
|--|---|
| <b>Commodity: Soga</b>   | <b>Latin name: <i>Metroxylon vitiense</i></b>   |
| Biological Description ( <i>describe the natural status of the source plant for this commodity</i> )           | A now endangered palm species and endemic to the Fiji Islands, Soga is 1 of only 5 sago palm species in the world. It grows in lowland swampy forests and has a unique life cycle where it takes around 20-25 years of growth before it begins bearing fruit then dying soon after the mature fruit has fallen to the ground. The soga is more commonly known as Fiji sago palm and at present, the isolated populations of soga are mainly restricted to the Serua province. |
| Commodity Description: ( <i>describe the part of the forest plant that is used/processed for sale/market</i> ) | <ul style="list-style-type: none"> <li>Soga leaves are used for traditional roofing thatch where the leaves are removed from the midrib and torn lengthwise before the interweaving process is conducted in which the</li> </ul>  |

|   |         |  |   |
|---|---------|--|---|
|   |         | leaves are interwoven with raffia on bamboo sticks. <ul style="list-style-type: none"> <li>• Palm heart is an edible part of sogā</li> <li>• Starch is occasionally extracted from the trunk of the palm with records of it being consumed in Rotuma but is rarely used in other parts of Fiji.</li> </ul>   |   |
| Uses ( <i>Describe what is the end use of the commodity</i> )   |         | Thatching covers for bure roofing are the produce of sogā leaves, the palm heart is harvested as a source of food and is used in curries as the main ingredient as well as in palm heart salads and other foods but majority of the trade are purely artisanal while starch is also extracted however, it is occasionally used.  |   |
| Market (describe the market for this commodity – is it domestic or international. Is there an industry or subsector that uses it) |         | Soga thatching covers are heavily used by the country's tourism industry. There are no records of it being exported internationally.   |   |
| Known number of buyers and sellers (ballpark number)  |         | <ul style="list-style-type: none"> <li>• In 2010 - there were 4 villages and 2 settlements involved in thatch shingles selling which are exclusively sold to various resorts in the tourism industry.</li> <li>• In 2008 - there were around 10 - 15 families involved in the harvesting of palm heart from major areas with no middlemen confirmed or identified. There is no known number of palm heart buyers however, it was gathered that the buyers were usually middle to upper class urban community members.</li> </ul> |   |
| Market price (\$/unit)  |         | \$0.80 - \$2.00/ shingles (year: 2010)<br><br>\$ 1 per shingles and \$200 per order of thatching cover (year: 2019)<br><br>\$0.47/kg of palm hearts (year: 2019) - prepared or preserved, containing sugar. The price per unit decreased compared to the previous years.   |   |
| Operators<br><br>( <i>who sells and who buys</i> )  |         | Raw material   | Finished Product  |
|   | Sellers | <ul style="list-style-type: none"> <li>• Soga leaves are harvested by the women of Serua and are not sold.</li> <li>• Palm hearts are also harvested by the vendors</li> </ul>   | <ul style="list-style-type: none"> <li>• Women of Serua are the sellers of thatching covers while the families involved in the harvesting of palm hearts are also the sellers.</li> </ul> |
|   | Buyers  |  | Middlemen and the tourism industry (being the principal purchaser) are the buyers of sogā thatching covers  |

|  |  |  |  |
|--|--|--|--|
|  |  |  | while it was gathered that the users of palm hearts were mainly Fijians of Indian descent who practiced the Hindu religion as well as certain rural Fijians who would use the product on a subsistence level. However, it was usually the middle to upper class urban community members who were the buyers. |
|--|--|--|--|

| Commodity: Masi   | Latin name: <i>Broussonetia papyrifera</i>   |
|---|--|
| Biological Description ( <i>describe the natural status of the source plant for this commodity</i> )                              | Made from the inner bark of the paper mulberry tree ( <i>Broussonetia papyrifera</i> ), Masi is a commodity that is widespread throughout the Pacific and is heavily used and produced in Fiji. The designs and methods of decorating the barkcloth varies within the provinces in the country with particular designs being unique to certain provinces. Masi is known to be exclusively made by women.   |
| Commodity Description: ( <i>describe the part of the forest plant that is used/processed for sale/market</i> )                    | The bark of the paper mulberry tree is stripped from the stem and then soaked before being beaten with a wooden mallet into sheets of various sizes and thickness.   |
| Uses ( <i>Describe what is the end use of the commodity</i> )   | Masi is the product produced which is mainly used in the iTaukei traditions and ceremonies with examples of attire (both sulu vaka-Viti and modern-day attire) which includes weddings, birthdays, meke costumes, and rituals such as the installation of chiefs. The masi is also included as the "i vakamalumu" in layers of mats to be presented during occasions. Moreover, masi is produced as decorative wall pieces and ornaments as well as items used in ceremonies even as a form of gift, mostly exchanged during events.   |
| Market (describe the market for this commodity – is it domestic or international. Is there an industry or subsector that uses it) | The market for masi is both domestic and international with masi being extensively used in the iTaukei culture which includes the Fijian diaspora in other parts of the world. The fashion industry through fashion designers also heavily incorporates masi in their pieces. Internationally, masi is sold to neighbouring countries such as Tonga and New Zealand and as far as the United States of America thus, it is used worldwide mainly depending on the type of order.<br><br>Sectors - Ministry of Local Government, Department of Heritage & Arts, fashion industry, Tourism industry. |
| Known number of buyers and sellers (ballpark number)  | The number of buyers and sellers is not exactly known. However, it was reported that the province of Lau produced the largest volume (tonnes) of masi.<br><br>There are 176 producers in Vatulele alone (Huffer 2020).   |
| Market price (\$/unit)  | The price varies depending on the length/size of the masi and the method of designing it. There is no standard price at the  |

|                          |         |  |   |
|--------------------------|---------|--|---|
|                          |         | moment as it ranges from \$20 for small pieces to \$1000 for large pieces.   |   |
| Operators                |         | Raw material   | Finished Product  |
| (who sells and who buys) | Sellers | Mature paper mulberry tree are not sold but the stripped bark are sold after being processed into large paper sheets called <i>Masi</i> .                                    | It is mainly the women (iTaukei) who are sellers of masi. However, Masi can also be sold by middlemen such as the Soqosoqo vakamarama ni tikina ko Moce. Moreover, There are other fashion businesses that create masi attire such as Tabuadrau designs and Adi Gani Fiji according to the orders received. |
|                          | Buyers  | Local Masi crafts men and women buy raw materials such as dyes and stencils. Often the crafts-person have their own supply of raw masi material which they process for sale. | Locals, tourists, Fashion industry, organizations dedicated to preserving the iTaukei culture, other countries in the region such as Tonga, Fijians living abroad and others.   |

|  |  |
|--|--|
| <b>Commodity: Voivoi</b>   | <b>Latin name: <i>Pandanus caricosus</i>, <i>Pandanus tectoris</i></b>   |
| Biological Description ( <i>describe the natural status of the source plant for this commodity</i> )           | There are various pandanus species existing in Fiji however, it has been recorded that the <i>Pandanus caricosus</i> species is mainly utilised. Belonging to the genus Pandanus, the voivoi has numerous long, parallel-veined palm-like leaves that have margins and midribs. The voivoi tree also grows along seacoasts, marshy places as well as forests in countries similar to Fiji's climate. |
| Commodity Description: ( <i>describe the part of the forest plant that is used/processed for sale/market</i> ) | The leaves of the pandanus tree are cut, collected, then the spiny spiky edges are removed before the leaves are rolled into bundles and placed in boiling water to soften. The leaves are then removed and placed to dry in the sun. After drying, the voivoi leaves will then be flattened and once again softened with the use of a mussel shell before being stored properly for later use.      |
| Uses ( <i>Describe what is the end use of the commodity</i> )  | From the voivoi, mats are woven. Other handicrafts include baskets, Fijian trays and woven decorative pieces. The items such as mats are used in Fijian households for everyday living which includes sleeping mats or decorative floor covering. Other uses include voivoi mats being used for important events such as funerals and weddings being presented as "vivivi" or                        |

|   |         |  |  |
|---|---------|--|--|
|   |         | consortium of colourfully woven mats that are laid out during ceremonies. Mats were also presented as gifts.   |  |
| Market (describe the market for this commodity – is it domestic or international. Is there an industry or subsector that uses it) |         | <p>The market is mainly domestic with mats being used and purchased by the majority of the households in Fiji. Moreover, municipal markets are also involved in the trade under the Ministry of Local government with a dedicated section or centre that focuses on handicraft sales which includes the sales of voivoi and its products.</p> <p>Government Ministries affiliated with traditional mats include the Department of Heritage &amp; Arts, Tourism industry, Local Government, as well as Ministry of Women and Culture.</p> |  |
| Known number of buyers and sellers (ballpark number)  |         | There is no known number of buyers and sellers of the commodity.   |  |
| Market price (\$/unit)  |         | The prices vary since it is mainly the harvesters who would directly sell the voivoi. At the Suva market, this is sold at 120 pieces in a roll for \$25. The black dyed voivoi are sold at \$60/120 pcs in a roll.   |  |
| Operators<br>(who sells and who buys)   |         | Raw material   | Finished Product   |
|   | Sellers | Farmers<br>Harvesters<br>middlemen   | Dried voivoi leaves  |
|   | Buyers  | Locals   | Local weavers who use voivoi to make mats and other products |

| Commodity: Wooden carving & Artefacts  | Carved artifacts include the Tanoa, war clubs, fishhooks, turtles, and masks.   |
|--|---|
| Biological Description ( <i>describe the natural status of the source plant for this commodity</i> ) | <p>Wooden carving is a skill that is still practised today in the Fiji islands. The artefacts are usually carved for commercial purposes in terms of decoration, souvenir and gifts and are rarely for use for their intended purposes except for certain items such as the tanoa.</p> <ul style="list-style-type: none"> <li>The tanoa is a large wooden bowl that is carved from the native hardwood vesi (<i>Instia bijuga</i>). It is usually round in shape, wide instead of deep, which is unique to Fiji and is used in the preparation of yaqona. It has also been recorded that the tanoa is also being produced from mahogany (<i>Swietenia macrophylla</i>) and raintree (<i>Samanea saman</i>) given the fact that vesi is now an endangered species.</li> <li>Other carved artifacts such as war clubs, fishhooks and toys are made from vesi with mako wood (<i>Trichospermum richii</i>) also being utilised to carve items such as masks, and animals.</li> </ul> |



|   |         |   |  |
|---|---------|---|--|
|   |         | Various other artifacts that are carved from the woods mentioned include wooden toys, other decorative pieces and ornaments.  |  |
| Commodity Description: <i>(describe the part of the forest plant that is used/processed for sale/market)</i>                      |         | The artifacts are carved from pieces of wood of the mentioned trees (vesi and mako).  |  |
| Uses <i>(Describe what is the end use of the commodity)</i>   |         | As described, through wooden carving, artifacts such as the tanoa, fishing hooks, war clubs, carved animals, toys, decorative pieces and ornaments are produced.  |  |
| Market (describe the market for this commodity – is it domestic or international. Is there an industry or subsector that uses it) |         | <p>The market for the artifacts is mainly for the tourism sector where the items are sold as souvenirs. In the domestic market, the tanoa is mainly sold while the other artifacts are mostly produced for home decor, as ornaments and gifts.</p> <p>Sectors - Department of Heritage &amp; Arts, Tourism, Trade industry (commercial and retail), fashion industry.</p>                           |  |
| Known number of buyers and sellers (ballpark number)  |         | No known number of sellers and buyers.  |  |
| Market price (\$/unit)  |         | There is no standard price for the artifacts. There are factors taken into account to determine the price such as the type of artifact to be carved and the size along with other considerations and requests. However, it can be noted that retailers would sell the artifacts at a higher price such as the tanoa (30") being sold for \$6,295 by Jack's of Fiji (Jack's Handicraft Private Ltd). |  |
| Operators<br><i>(who sells and who buys)</i>  |         | Raw material  | Finished Product   |
|   | Sellers | Carvers such as the men from the island of Kabara, and mostly the carvers would harvest the woods without selling.  | Retailers such as Jack's of Fiji (Handicraft Private Ltd), Tapoos, Carvers, middlemen, |
|   | Buyers  | Jack's of Fiji, Tapoos in terms of carved items where the retailers would add some finishing work.  | Middlemen, Local citizens, tourists, retailers (Jack's of Fiji, Tapoos)                |

| Commodity: Kura  |         | Latin name: <i>Morinda citrifolia</i>  |   |
|--|---------|--|---|
| Biological Description ( <i>describe the natural status of the source plant for this commodity</i> )                                       |         | Also known as noni, kura is a small evergreen tree that is commonly found in the region and has large green leaves with distinctive fruits. The noni fruit is green when immature which then ripens to white before turning to a semi translucent pale grey-white state. The kura tree is easy to grow and is tolerant of conditions including drought, salt and rocky soil as well as severe pruning. The tree can be kept small for easier harvesting which could thrive on only rainfall and bearing fruit all throughout the year.   |   |
| Commodity Description: ( <i>describe the part of the forest plant that is used/processed for sale/market</i> )                             |         | <p>All parts of the kura tree are used. The fruit alone is used to produce various products in the market while the kura leaves and seeds are also utilised.</p> <p>In a production, kura fruits are collected and sent to the factory for grading, cleaning (several times) where only the best fruits are allowed into the processing system. There are quality checks conducted to ensure that the noni fruits meet the expected requirements. The fruits are then stored in food grade stainless steel containers just so the optimum maturity is reached before being further processed. After maturation, juice extraction occurs which will then be pasteurized (according to requirements), cooled and tested. This juice will be bottled and capped once the test is proven negative before all the finishing work such as labelling takes place. Sometimes noni leaves are added during the process.</p> <p>There is also a process that utilizes dried noni fruits which are oven dried under specific temperatures and results in a powdered form.</p> |   |
| Uses ( <i>Describe what is the end use of the commodity</i> )  |         | Noni juice is produced from the extraction process while noni powder is used as noni capsules which is somewhat an alternative of noni juice.  |   |
| Market ( <i>describe the market for this commodity – is it domestic or international. Is there an industry or subsector that uses it</i> ) |         | The company's Herbex noni products are sold in both overseas markets and in the country. Due to the abundance of noni trees in Fiji, the noni business is successful in terms of exporting products all around the world.  |   |
| Known number of buyers and sellers (ballpark number)   |         | There are no known records of sellers and buyers of the commodity.   |   |
| Market price (\$/unit)   |         | Not available. The prices for noni products vary.  |   |
| Operators<br><br>( <i>who sells and who buys</i> )   |         | Raw material   | Finished Product  |
|  | Sellers | Farmers, collectors  | Production / manufacturing companies                              |
|  | Buyers  | Production companies   | Retailers (includes supermarkets and pharmacies), Local citizens, |

|  |  |   |   |
|--|--|---|---|
|  |  | (includes Pure Fiji, Herbex, Herbal Fiji) | Overseas buyers where the purpose of buying is mainly for health reasons. |
|--|--|---|---|

| Commodity: Fijian Medicine  |         | Assorted medicinal trees - Juice Fiji   |   |
|---|---------|---|---|
| Biological Description ( <i>describe the natural status of the source plant for this commodity</i> )                              |         | Juice Fiji is an original detox juice that is made up of 9 ingredients which are superfoods namely ginger ( <i>Zingiber officinale</i> ), turmeric ( <i>Curcuma longa</i> ), layalaya ( <i>Zingiber zerumbet</i> ), beetroot ( <i>Beta vulgaris</i> ), warusi ( <i>Smilax vitiensis</i> ), pineapple ( <i>Ananas comosus</i> ), watermelon ( <i>Citrullus lanatus</i> ), lime ( <i>Citrus aurantiifolia</i> ) and papaya ( <i>Carica papaya</i> ). The ingredients have medicinal properties such as helping with inflammation and reducing high blood pressure, helping in cleansing the blood, gut cleansing and warming up the body along with various other benefits. |   |
| Commodity Description: ( <i>describe the part of the forest plant that is used/processed for sale/market</i> )                    |         | As previously mentioned, the 9 ingredients are farm produce and utilised in the production of the juice which means harvesting from the farms, sent to the factory (Agrana factory) for processing and packaging. In the production, the roots, leaves and fruits of the ingredients are used including fruit seeds and skin.   |   |
| Uses ( <i>Describe what is the end use of the commodity</i> )   |         | Juice Fiji is the finished product and is consumed for medicinal or health benefits such as previously mentioned (Biological description). Moreover, it is produced to be a natural alternative to pharmaceutical medicine.   |   |
| Market (describe the market for this commodity – is it domestic or international. Is there an industry or subsector that uses it) |         | Juice Fiji has been sold locally (reported in 2020) with hopes of expanding to the US market which has been achieved along with exports to the United Kingdom, Australia and New Zealand.<br><br>Sectors - Crop farming and Manufacturing   |   |
| Known number of buyers and sellers (ballpark number)  |         | No known number of buyers and sellers.  |   |
| Market price (\$/unit)  |         |   |   |
| Operators<br><br>( <i>who sells and who buys</i> )  |         | Raw material  | Finished Product  |
|   | Sellers | Small farmers   | Juice Fiji Pte Ltd, Supermarkets, service stations  |
|   | Buyers  | Juice Fiji Pte Ltd  | Major supermarkets in the country (Kundan Singh, Max-Val-U Supermart, Extra Supermarket, NewWorld Supermarket, CJS supermarket)a few service stations (Total Fiji Service stations), cafe 30, consumers (locals and others) |

| Commodity: Yaqona/ Waka   |  | Latin name: <i>Piper methysticum</i>   |                  |
|---|--|--|------------------|
| Biological Description ( <i>describe the natural status of the source plant for this commodity</i> )                              |  | Yaqona is a shrub originating in the Pacific region. It has over 100 different varieties, each possessing unique properties. When consumed, the active ingredients in yaqona results in soothing effects.  |                  |
| Commodity Description: ( <i>describe the part of the forest plant that is used/processed for sale/market</i> )                    |  | Mature yaqona plants (3-5 years) are harvested where the kavalactones are developed depending on the number of years the plant is grown. The stems and roots of yaqona are separated from the stalks and then thoroughly washed, removing dirt. The stems would be peeled and together with the roots, be laid out to dry in the sun or drying houses. Once completely dried, the yaqona is pounded into powder form or could be sold as it is.  |                  |
| Uses ( <i>Describe what is the end use of the commodity</i> )   |  | Yaqona is usually sold or used as it is (waka, lewena) for consumption including pounded waka (powdered kava). However, most companies involved in kava trading would sell kava in powdered form and liquid form that is packed with their labels. There are also productions of supplement kava capsules. Both the kava capsules and powdered kava are promoted to be traditionally islander medicine (with benefits including dietary supplements, promoting sleep, reducing anxiety, increasing body relaxation, calm and soothing the nerves and relaxation of the mind) |                  |
| Market (describe the market for this commodity – is it domestic or international. Is there an industry or subsector that uses it) |  | Domestic - Widely purchased and used in the country (national drink)<br><br>International - Exported overseas and remains a substantial earner for the country. There is a foreign medicinal noble kava company (FijiKava) that is approved by the government and is based in Australia.   |                  |
| Known number of buyers and sellers (ballpark number)  |  | There is no known number of sellers and buyers, however, Yaqona is produced in all provinces as well as Rotuma with the Cakaudrove province being the largest producer in 2022.<br><br>Sectors - Pharmaceutical sector, Tourism sector, Agriculture sector   |                  |
| Market price (\$/unit)  |  | June 2020 Local market price - waka: \$107.50/kg<br>- Lewena: \$74.58/kg<br><br>October 2022 - waka: \$68.07<br><br>September 2022 - lewena: \$47<br>- Pounded: \$60   |                  |
| Operators   |  | Raw material   | Finished Product |

|                                 |         |   |  |
|---------------------------------|---------|---|--|
| <i>(who sells and who buys)</i> | Sellers | Harvested and sold by the farmers, Kava shops and bars, Cooperatives and Associations   | Farmers, middlemen, Companies such as Lami Kava, FijiKava, Taki mai, retailers (Tapoos, Prouds and Jack's of Fiji), wholesalers  |
|                                 | Buyers  | Retailers, wholesalers supermarkets, Middlemen, Processors and manufacturers, kava shops or bars, research institutions, tourists, locals | <ul style="list-style-type: none"> <li>Overseas markets (USA being the biggest importer of Fiji kava, other countries include New Zealand, Marshall Islands, Nauru, Hawaii, Australia, Wallis and Futuna, Samoa and Tuvalu - year: 2022)</li> <li>Locals, tourists (for sevusevu)</li> </ul> |

### Food – Honey, Ota, Coconut, Vanilla

|   |  |
|---|--|
| <b>Commodity: Honey</b>   | -  |
| Biological Description ( <i>describe the natural status of the source plant for this commodity</i> )                              | Honey is an organic, sweet and viscous liquid produced by honeybees ( <i>Apis mellifera</i> ). It is a natural alternative to sugar and has an indefinite shelf-life. There are a variety of honey which are distinguished by the types of flowers frequented by bees.   |
| Commodity Description: ( <i>describe the part of the forest plant that is used/processed for sale/market</i> )                    | The raw materials needed for the production of honey include honeybees (Queen bees, worker bees), beeswax and hives. In Fiji, Italian bees are used. The beeswax aid the bees in building honeycombs on removable frames where honey would be stored; all of which occur in hives. Nectar is collected and regurgitated by honeybees which are then stored as previously mentioned before being harvested. Honey is uncapped, extracted (using the honey extractor or cheesecloth for some small apiary farmers), filtered and then bottled. |
| Uses ( <i>Describe what is the end use of the commodity</i> )   | Honey is produced for human consumption as a table food product as well as in cooking.   |
| Market (describe the market for this commodity – is it domestic or international. Is there an industry or subsector that uses it) | <p>Honey is mostly sold in the Domestic market but has extended to export markets with countries such as Australia being the biggest importer, New Zealand, Malaysia, USA, Vanuatu, Samoa, Tonga and Kiribati (Year 2022).</p> <p>Sector - Agriculture, food and beverage sector, tourism sector.</p>  |
| Known number of buyers and sellers (ballpark number)  | No known number of sellers and buyers.   |

| Market price (\$/unit)                       |         | \$25.02 per kg (Year: 2022)   |   |
|--|---------|---|---|
| Operators<br><i>(who sells and who buys)</i> |         | Raw material  | Finished Product  |
|  | Sellers | Various beekeeping farms both commercial and small farmers, retail companies such as Jacks of Fiji. | Various beekeeping farms both commercial and small farmers, wholesalers (Fiji Agromarketing), retailers (Hansons Supermarket, Kundan Singh Supermarket, Tavua Halal meat, Tapoos, Jack's of Fiji, Max-Val-U, IGA, Ram Jattan Supermarket, RB Patel, local markets stalls, Nahls pure honey. |
|  | Buyers  | Beekeepers, Skincare and beauty companies such as Pure Fiji, such as Punjas Fiji Ltd                | Local citizens, Food processing companies such as Punjas Fiji Ltd, Hotels and resorts (Shangri-la resorts).   |

| Commodity: Ota  |         | Latin name: <i>Diplazium esculentum</i>   |  |
|---|---------|---|--|
| Biological Description <i>(describe the natural status of the source plant for this commodity)</i>                                |         | An edible fern, ota is found in humid tropics such as Fiji. It grows in wetland areas and is common and widespread. The fern is classified as a leafy vegetable and under the International Union for Conservation of Nature, it is not under threat belonging to the least concern category. |  |
| Commodity Description: <i>(describe the part of the forest plant that is used/processed for sale/market)</i>                      |         | Both the leaves and stems of ota are harvested and sold as it is usually in bundles.  |  |
| Uses <i>(Describe what is the end use of the commodity)</i>   |         | The fern is used for human consumption as a functional food.  |  |
| Market (describe the market for this commodity – is it domestic or international. Is there an industry or subsector that uses it) |         | Ota is sold in local markets with no record of international markets existing. It is widely used by the tourism and agriculture sectors.  |  |
| Known number of buyers and sellers (ballpark number)  |         | No known number of sellers and buyers as the fern is widely consumed all over the country and is easily obtained.   |  |
| Market price (\$/unit)  |         | \$24/kg (Year: 2022)  |  |
| Operators   |         | Raw material  | Finished Product                           |
|   | Sellers | Harvesters (farmers)  | Hotels, resorts, restaurants (when cooked) |

|                                 |        |                                      |                         |
|---------------------------------|--------|--------------------------------------|-------------------------|
| <i>(who sells and who buys)</i> | Buyers | Locals, Hotels, resorts, restaurants | Locals, other consumers |
|---------------------------------|--------|--------------------------------------|-------------------------|

| Commodity: Coconut  |  | Cocos nucifera  |                  |
|---|--|---|------------------|
| Biological Description ( <i>describe the natural status of the source plant for this commodity</i> )                              |  | Known locally as “niu”, the coconut is the fruit of the coconut tree, an adaptable member of the palm family. It is also referred to as “the tree of life”, having multiple uses and benefits. The tree thrives in tropical climates and is mostly found along seacoasts. In Fiji, the tree is culturally significant, having vital natural resources.  |                  |
| Commodity Description: ( <i>describe the part of the forest plant that is used/processed for sale/market</i> )                    |  | <ul style="list-style-type: none"> <li>• Young coconuts are harvested for their water and mature coconuts are harvested for their meat. The coconut usually falls to the ground and can also be picked from the tree which would then be processed for use or sale. The coconuts are opened, and the coconut water is extracted. The water may undergo filtration, pasteurization, and packaging for sale; however, green coconut water straight from picking is mainly sold without processing.</li> <li>• The mature coconut meat is mainly what is required for processing thus, it is scraped before being processed. It is also grated or shredded depending on production companies. For some manufactured products, the meat is dried after grating whereas coconut milk is also extracted for use.</li> </ul> |                  |
| Uses ( <i>Describe what is the end use of the commodity</i> )   |  | <p>Coconut is mainly used for human consumption as in food, cooking and baking.</p> <ul style="list-style-type: none"> <li>• Coconut water from young coconuts is harvested and consumed either as it is or produced as a beverage (have been processed).</li> <li>• Products produced from mature coconut meat include desiccated coconut as well as coconut cream and milk.</li> </ul>  |                  |
| Market (describe the market for this commodity – is it domestic or international. Is there an industry or subsector that uses it) |  | <p>Coconut is heavily traded in the local markets while in overseas markets, Australia and New Zealand were importers (Year: 2022).</p> <p>Sector - Food and beverage sector, Agriculture sector, Tourism sector, pharmaceutical industry.</p>  |                  |
| Known number of buyers and sellers (ballpark number)  |  | No known number of buyers or sellers. Coconut is heavily used in the country which could be easily obtained.  |                  |
| Market price (\$/unit)  |  | <p>June 2020 Local market price - \$4.91/kg</p> <p>October 2023 - \$2.43/kg</p>   |                  |
| Operators   |  | Raw material  | Finished Product |



|                                 |         |  |   |
|---------------------------------|---------|--|---|
| <i>(who sells and who buys)</i> | Sellers | Farmers, vendors, wholesalers, processing mills (local), agriculture stations, distributors, suppliers, cooperatives                   | Retailers, supermarkets, distributors, exporters, pharmacies.   |
|                                 | Buyers  | Traders, exporters, manufacturers (food and beverage), cosmetics and skin care product companies, pharmacies, retailers, supermarkets. | Supermarkets, pharmacies, bakeries, cafes, manufacturers (food and beverage), restaurants, resorts and hotels, catering companies, exporters, distributors. |

| <b>Commodity: Vanilla</b>  | <b><i>Vanilla planifolia</i></b>   |
|--|--|
| Biological Description ( <i>describe the natural status of the source plant for this commodity</i> )                                       | Vanilla is a spice that is initially obtained from vanilla orchid beans. The orchids are epiphytic and are grown in warm, tropical countries such as Fiji. It has been assessed and listed as endangered on the IUCN red list (year: 2017) with the population in decline.   |
| Commodity Description: ( <i>describe the part of the forest plant that is used/processed for sale/market</i> )                             | The beans or pods of vanilla orchids are the parts used in the production of the commodity. Once harvested, the beans would be cured and dried involving processes such as blanching, sweating, sun drying and conditioning which develops the distinct vanilla flavour. The beans could briefly be boiled, steamed or fermented during processing. The dried and cured forms of vanilla beans are sold. |
| Uses ( <i>Describe what is the end use of the commodity</i> )  | Vanilla is mostly used as an ingredient in culinary applications (baking, pastries, desserts, cooking, flavoured beverages, flavouring agents such as in vanilla flavoured ice-cream)  |
| Market ( <i>describe the market for this commodity – is it domestic or international. Is there an industry or subsector that uses it</i> ) | <p>International market - In 2019, there were countries that imported vanilla from Fiji which were Australia, New Zealand and Germany.</p> <p>In the domestic market, vanilla is used by food service companies as well as manufacturing companies</p> <p>Sectors - Export markets, manufacturing, tourism, food &amp; beverage, foodservice sector</p>  |

|  |         |  |  |
|--|---------|--|--|
| Known number of buyers and sellers (ballpark number) |         | Approximately 100 families (sellers) have benefitted from vanilla sales in 2014 while the buyers were Koko Siga Ltd and Spice Fiji Ltd also in the same year. In 2013, the western division produced the highest volume of vanilla, mainly the Ra province (1282 tonnes) and Ba (1 tonnes). However, the recent production of vanilla was in 2022 by the provinces of Tailevu and Naitasiri. |  |
| Market price (\$/unit)                               |         | In 2019, vanilla was being exported at \$14.63 per kg which was less than the price of previous years.   |  |
| Operators<br><i>(who sells and who buys)</i>         |         | Raw material   | Finished Product   |
|  | Sellers | Farmers  | Manufacturing companies, Koko Siga Ltd, Spice Fiji Ltd, retailers, wholesalers, supermarkets |
|  | Buyers  | Manufacturing companies (Tuckers ice cream), Koko Siga Ltd, Spice Fiji Ltd, locals   | Locals, Foodservice companies, hotels and resorts  |

### Perfume & Oil – Yasi, Lauci, Dilo

| Commodity: Yasi  | <i>Santalum yasi</i><br><i>Santalum album</i>   |
|--|---|
| Biological Description ( <i>describe the natural status of the source plant for this commodity</i> )           | Yasi is a small shrub or tree that has a maximum height reaching 8-10 metres. The trees grown in open habitats have twisted trunks and spreading crown while yasi species grown in forests and sheltered areas have straight trunks for more than half of their lengths. The leaves range from light to dark green, having narrow to broadly lanceolate shape and are oppositely arranged along the stems. The species is root parasitic, depending on host plants for nutrients. It is native to Fiji and can also be found in Tonga and Niue. The yasi species has been assessed and classified as endangered under the IUCN red list (year: 2019). |
| Commodity Description: ( <i>describe the part of the forest plant that is used/processed for sale/market</i> ) | The heartwood is the part of the yasi tree that is processed for sale possessing a distinct aroma. It is harvested by tree felling of mature yasi trees containing the heartwood, unearthing of the roots (excavation, manual cutting) and the removal of sapwood. The de-sapped heartwoods are then stored and dried for sale. Further processes then occur to produce finished products such as oil extraction, grading and sorting, packaging and distribution.  |

|  |         |   |  |
|--|---------|---|--|
| Uses ( <i>Describe what is the end use of the commodity</i> )  |         | Sandalwood essential oil is used for incense production, incorporated in perfume production, as well as in skin care and cosmetic products (cream, soap, lotion, body oil, and in formulating of beauty products) as an ingredient.   |  |
| Market (describe the market for this commodity – is it domestic or international. Is there an industry or sub sector that uses it) |         | There are the existence of buyers and local processors of yasi in the country while the commodity is heavily utilized by international markets through exports (international buyers and end-use consumers). The raw material (heartwood) is usually sought after in the markets. |  |
| Known number of buyers and sellers (ballpark number)   |         | From 1948-2018, there were records of 5 local buyers, mainly companies and 3 international buyers however, the number does not represent other types of buyers such as end-use consumers. The number of harvesters and sellers is not known.                                      |  |
| Market price (\$/unit)   |         | \$100/kg heartwood (year: 2019)   |  |
| Operators<br><br>( <i>who sells and who buys</i> )   |         | Raw material  | Finished Product   |
|  | Sellers | Tree owners, harvesters, middlemen  | Processing companies [includes Aromatic Oils (Fiji) Ltd, Blue Ocean Marine Ltd, GoldHold Co. Ltd and Wee Kong Marine Products & Exporters], retailers, wholesalers |
|  | Buyers  | Local processors [Aromatic Oils (Fiji) Ltd, Blue Ocean Marine Ltd, GoldHold Co. Ltd and Wee Kong Marine Products & Exporters], International buyers [Tropical Rainforest Aromatics, etc.], Middlemen  | End-use consumers in Asia [China, Vietnam, Singapore, Republic of Korea, Japan, etc.], Middle East (Saudi Arabia, Dubai), Australia, retailers, wholesalers        |

|  |   |
|--|---|
| <b>Commodity: Lauci</b>  | <b><i>Aleurites moluccanus</i></b>  |
| Biological Description ( <i>describe the natural status of the source plant for this commodity</i> )           | Also known as sikeci, Lauci is produced from the lauci tree which is a medium to large sized tree that thrives in a variety of soil types in the Pacific and in other tropical countries. The fruit of the lauci tree is a round drupe in which the seed is creamy in colour and rich in oil. |
| Commodity Description: ( <i>describe the part of the forest plant that is used/processed for sale/market</i> ) | Harvesting of lauci seeds usually occurs within 3 years of planting the trees where the seeds are collected and processed for oil which leads to the manufacture of lauci   |

|   |         |  |  |
|---|---------|--|--|
|   |         | based products. For some companies, the oil is cold pressed at source  |  |
| Uses ( <i>Describe what is the end use of the commodity</i> )   |         | Sikeci oil is incorporated in the manufacturing of cosmetics and skin care products including body oil, soap manufacture, in cooking, to prepare paints and varnishes and is also utilized in hair treatments (conditioning and nourishing the hair) |  |
| Market (describe the market for this commodity – is it domestic or international. Is there an industry or subsector that uses it) |         | Lauci based products are distributed in the domestic market as well as in international markets through various manufacturing companies mainly in cosmetics and skin care production companies   |  |
| Known number of buyers and sellers (ballpark number)  |         | No known number of buyers and sellers.   |  |
| Market price (\$/unit)  |         | Not known since there are various manufacturers producing a variety of lauci based products where the prices would vary.   |  |
| Operators<br><br>( <i>who sells and who buys</i> )  |         | Raw material   | Finished Product   |
|   | Sellers | Harvesters (farmers), middlemen  | Manufacturing companies (Loaloa Naturals, Pure Fiji), retailers, wholesalers, supermarkets |
|   | Buyers  | Manufacturing companies, middlemen   | Locals, retailers, wholesalers, supermarkets.  |

| Commodity: Dilo  | <i>Calophyllum inophyllum</i>   |
|--|---|
| Biological Description ( <i>describe the natural status of the source plant for this commodity</i> )           | The dilo tree is a tropical species found in various coastal and lowland regions of the Pacific. It is a medium-to-large tree that could reach a maximum height of about 20 metres. The tree has a dense, rounded crown with shiny, elliptical leaves. The tree produces round, green fruits which would turn yellow when ripe. The dilo tree is native to the Fiji Islands and is highly valued for having various traditional as well as modern uses.   |
| Commodity Description: ( <i>describe the part of the forest plant that is used/processed for sale/market</i> ) | The seeds are the parts of the dilo tree used. They are found inside the round dilo fruits. When harvested, the seeds would be extracted from the dilo fruits which are then cleaned and thoroughly dried (reducing moisture content). After drying, the seeds would be crushed or pressed in order to extract the oil that would be collected followed by filtration and clarification before storing in suitable conditions. Quality checks are conducted to ensure all desired standards are met before packaging occurs for sale. |
| Uses ( <i>Describe what is the end use of the commodity</i> )  | Dilo oil is a key ingredient in cosmetics and skincare products (lotions, soaps, creams, body oil) as well as the   |

|   |         |   |   |
|---|---------|---|---|
|   |         | formulation of beauty products, it is also incorporated into haircare products promoting hair health.   |   |
| Market (describe the market for this commodity – is it domestic or international. Is there an industry or subsector that uses it) |         | Dilo based products are distributed to both the Fiji market and internationally through manufacturing companies mainly involved in the skincare and cosmetics industry. |   |
| Known number of buyers and sellers (ballpark number)  |         | No known number. Prices vary.   |   |
| Market price (\$/unit)  |         |   |   |
| Operators<br><i>(who sells and who buys)</i>  |         | Raw material  | Finished Product  |
|   | Sellers | Harvesters, Middlemen   | Manufacturing companies (Pure Fiji, Loaloea Naturals), retailers, distributors, wholesalers |
|   | Buyers  | Middlemen, Manufacturing companies (Pure Fiji, Loaloea Naturals),   | Retailers, distributors, wholesalers, locals (users)  |

### Restoration – Assorted Native tree species,

| Commodity: Tree seeds   | Assorted native tree species   |
|---|--|
| Biological Description <i>(describe the natural status of the source plant for this commodity)</i>                                | Tree seeds play an important role in ecosystem restoration efforts. They support the re-establishment of various plant communities. There are various types of seeds used ranging from native seeds, exotic seeds, to sandalwood species seeds.  |
| Commodity Description: <i>(describe the part of the forest plant that is used/processed for sale/market)</i>                      | Preparing and distributing tree seedlings involves careful attention to quality to ensure successful tree establishment and healthy ecosystem. Tree seeds are collected from mature trees and can be done by hand picking, shaking or harvesting from the ground. The seeds would then be cleaned, dried (lower moisture content) and stored in suitable conditions to maintain viability. Some tree seeds could be treated to enhance germination before packaging and distribution mainly through forestry and agriculture agencies. |
| Uses <i>(Describe what is the end use of the commodity)</i>   | Tree seeds are utilised in ecological restorations, afforestation projects, commercial forestry, agroforestry, enhancement of wildlife habitat, soil erosion control, food security and in biodiversity conservation.  |
| Market (describe the market for this commodity – is it domestic or international. Is there an industry or subsector that uses it) | Tree seed production in the country is mostly domestic through the Ministry of Agriculture and Ministry of Forestry  |

|  |         |  |                  |
|--|---------|--|------------------|
| Known number of buyers and sellers (ballpark number) |         | No known number of buyers and sellers even though the ministries are known to be sellers, there could be other tree seed sellers existing. |                  |
| Market price (\$/unit)                               |         | Prices vary depending on the type of tree seed.  |                  |
| Operators  |         | Raw material   | Finished Product |
| (who sells and who buys)                             | Sellers | Ministry of Agriculture, Ministry of Forestry  |                  |
|  | Buyers  | Locals, other companies or organizations supporting restoration works of the ecosystems.   |                  |

|   |         |  |                  |
|---|---------|--|------------------|
| <b>Commodity: Tree seedlings (latin name)</b>   |         | <b>Assorted native tree species</b>  |                  |
| Biological Description ( <i>describe the natural status of the source plant for this commodity</i> )                              |         | Tree seedlings also play important roles in ecological restoration efforts being utilized as the starting point in establishing new trees in various ecosystems. The seedlings emerge upon germination of tree seeds which have been planted in suitable conditions. |                  |
| Commodity Description: ( <i>describe the part of the forest plant that is used/processed for sale/market</i> )                    |         | Tree seedlings are usually sold as they are in plant pots.   |                  |
| Uses ( <i>Describe what is the end use of the commodity</i> )   |         | Tree seedlings are utilised in ecological restorations, afforestation projects, commercial forestry, agroforestry, enhancement of wildlife habitat, soil erosion control, food security and in biodiversity conservation.  |                  |
| Market (describe the market for this commodity – is it domestic or international. Is there an industry or subsector that uses it) |         | Tree seedling production in the country is mostly domestic through Ministry of Agriculture and Ministry of Forestry  |                  |
| Known number of buyers and sellers (ballpark number)  |         | No known number of buyers and sellers even though the ministries are known to be sellers, there could be other tree seedling sellers existing as observed in local markets such as sellers of yasi tree seedlings.   |                  |
| Market price (\$/unit)  |         | Prices vary depending on the type of tree seed.  |                  |
| Operators   |         |  |                  |
|   | Sellers | Raw material   | Finished Product |

|                          |        |   |  |
|--------------------------|--------|---|--|
| (who sells and who buys) | Buyers | Ministry of Agriculture, Ministry of Forestry                                     |  |
|                          |        | Locals, other companies or organisations supporting ecological restoration works. |  |

### Landscape – Agroforestry - firewood

|   |         |  |                  |
|---|---------|--|------------------|
| <b>Commodity: Firewood</b>  |         | -  |                  |
| Biological Description ( <i>describe the natural status of the source plant for this commodity</i> )                              |         | Firewood is a traditional and widely used source of energy for cooking and heating. In Fiji, firewood is gathered primarily from various types of trees and shrubs. Common source trees include the mango tree ( <i>Mangifera indica</i> ), guava tree ( <i>Psidium guajava</i> ), mahogany tree ( <i>Swietenia macrophylla</i> ) and eucalyptus tree ( <i>Eucalyptus spp.</i> ). Many households, especially in rural areas, rely on open fire or traditional stoves for daily cooking in which firewood is utilized. |                  |
| Commodity Description: ( <i>describe the part of the forest plant that is used/processed for sale/market</i> )                    |         | The wood in the form of branches, twigs and trunks of trees can be collected. When gathered, the woods could be cut into manageable lengths before being dried to improve the chances of burning. The woods are then bundled and stored properly under suitable conditions to be sold.   |                  |
| Uses ( <i>Describe what is the end use of the commodity</i> )   |         | Firewood is mainly used for cooking as a source of energy. This also includes earth oven (lovo) cooking.   |                  |
| Market (describe the market for this commodity – is it domestic or international. Is there an industry or subsector that uses it) |         | Firewood is widely sold in the domestic market.<br><br>Sectors that use firewood include the tourism sector since traditional food cooking is also utilized with addition to being a source of heat.   |                  |
| Known number of buyers and sellers (ballpark number)  |         | No known number of buyers or sellers.  |                  |
| Market price (\$/unit)  |         | Prices vary.   |                  |
| Operators   |         | Raw material   | Finished Product |
| (who sells and who buys)  | Sellers | Harvesters, local vendors (including roadside stalls vendors),   |                  |



|  |        |   |  |
|--|--------|---|--|
|  |        | farmers,<br>cooperatives  |  |
|  | Buyers | Locals,<br>wholesalers,<br>distributors,<br>retailers, market<br>vendors,<br>community-<br>based enterprise<br>(community<br>shops/stores),<br>hotels and<br>resorts, |  |

## ANNEX 2: TEMPLATE FOR Case Study Summary

With the assistance of the Focal Group discussion on 06 Feb 2024, the following NTFP producers were listed as possible informants. The team approached all and were able to meet with all individuals shaded grey below:

| Group                               | Commodity              | Location             |
|-------------------------------------|------------------------|----------------------|
| Abhay Chaudhary-Avrilfiji           | Lauci                  | Baulevu              |
| Gaunavou Copoerative                | Wastewood              | Nasinu               |
| Seta Qaliduadua                     | Wastewood              | Nasinu               |
| Ministry of Forestry                | Sandalwood             | Forestry-Colo-I-Suva |
| Drani & Susana                      | Magimagi/Lauci/Dilo    | Davuilevu Housing    |
| William Seetto                      | Kua                    | Vatuwaqa             |
| Peter Chiang                        | Kura                   | Walu Bay             |
| Sitiveni Waqa-                      | Tree seedling-Rakiraki | Rakiraki             |
| Sivnesh (8347817)                   | Tree seedling-Central  | Korociriciri         |
| Apisai Ucuiboi                      | Tree seedling-Central  | Verata-Wailevu       |
| Balbair-Futuristic Farm (7299900)   | Tree seedling-West     | Rabulu               |
| Waisea Vakalevu-Northland Pure Noni | Noni                   | Natovi               |
| Sukulu Soko                         | Bamboo                 | Wainibuku            |
| Korova                              | Masi                   | Korova/Maritime      |

The assessment team collected information from all the above informants using a questionnaire listed below to gather relevant information about the value chain actors, and market quantification for each NTFP commodity. These assessments provide an indication of the status of the NTFP subsector at grassroot level. An outline of the questionnaire is listed below.

### Contact Information of informant

Interviewer /

Date of interview /

Firm Name /

Principal product or service/

No. of employees /

The owner (or contact) /

Legal status /

Address /

Telephone /

Email/

## Market Access, Trends, and Governance

1. What are your main needs/opportunities in accessing markets?
2. To whom do you sell your product or service (large firms, small firms, wholesalers, exporters, retailers, direct to consumers, etc.)? What percentage goes to each?
3. Describe the relationships you have with these buyers (who determines what to produce, product specifications, prices, and amount purchased?). How much input do you have?
4. How do you promote and market your products/services?
5. How strong is the market for your products/services right now? Next year? What trends do you see?
6. Are some customer groups better than others in terms of sales and revenue growth? Which ones?
7. Do you ever collaborate with other firms on promotion and/or marketing?
8. Who are your major competitors?
9. Do you have a means of communicating information about your firm to others?
10. Is there a Government organization that you are working with or regulating your market?
11. (Attach any brochures, list of products, etc.)

## Standards and Certifications

12. What standards or certification requirements do your products need to conform to?
13. Who sets these standards and requirements?
14. Who helps you to conform to these standards and requirements?
15. Do you have any problems in this regard?

## Technology / Product Development

1. What are your major needs/ opportunities in product design and manufacturing (or service delivery)?
2. What other products do you produce/sell? What percentage does each product represent in terms of your gross revenue?
3. What have you done recently to improve your products or services?
4. Is your current equipment or machinery an impediment to growth? Explain. If so, what kind of equipment or machinery could improve your business? What is an estimated cost of this improvement?
5. Is the current level of your workers training/skills holding back growth? If so, what additional training do they need?

## Management/Organization

1. With respect to the management of your production, are you registered as a company? Please elaborate.
2. In the area of organization and management, what are your major needs/opportunities?
3. Who does most of the work in the areas of: general management/supervision, product design, purchasing, production, shipping, accounting, marketing, repairs, etc. (owner, employees, or external)?
4. What functions do you subcontract/outsource?
5. Do you sometimes collaborate with other firms to produce and deliver customer orders?
6. Which aspects of your business do you intend to change in the next 2 years (machinery, equipment, computers, new products, marketing strategy, quality control, management system, worker skills, etc.)?
7. What management skills would you like to strengthen in order to grow your business?

## Input Supply

1. What are your major needs/opportunities in the areas of input cost, quality, and availability?
2. Who are your *most important suppliers* and what do you buy from each?
3. How many suppliers do you rely on? How many regular suppliers and irregular/informal suppliers
4. Are there problems in obtaining some important inputs? Explain.
5. Have you ever purchased inputs jointly with other business? Explain.

## Finance

1. Where do you go when you need money for your business?
2. Do you get credit from input suppliers? What are the terms?
3. Do you get production financing from your buyers? What are the terms?
4. Do you have need for additional financing at the moment? If so, what would it be used for?
5. What sources (formal or informal) have you approached for loans, and what have been the key problems, if any?
6. Have you had training on Business Plan Development and Financial Literacy?
7. Other (repayment rates in the sector, risk management insurance, etc.)

## COST BENEFIT

1. Identify the production process from start to finish.
2. Determine the cost of raw materials including transportation from the forest/source to your plant.
3. Estimate the cost of each process.
4. Estimate the price of outputs or commodity produced at each step.

## Policy/Regulation

5. What government policies/regulations benefit your business (registrations, inspections, subsidies, incentives, etc.)?
6. What government policies/regulations are obstacles to growing your business?

## Infrastructure

1. What is the most important infrastructure/challenge constraints affecting your business' growth and profitability (road/transport conditions, telephone service, electric supply, crime/corruption, storage, etc.)?
2. What is your industry doing about these problems?

## Business Membership Organizations

7. Is your industry/trade sector represented by national or local business associations? If so, please name them.
8. Are you a member? If not, why?
9. What are the primary functions and benefits of these associations?
10. What additional services should they provide?

## Critical Success Factors

|       | Non-Timber Forest Product Specificity                              | Core Manifestation criteria  | Consider each variable and potential impact on profit<br>Using a scale of 0 to +3 to rank opportunity and 0 to -3 to rank level of constrain: |
|-------|--|--|---|
| Niche | Growth opportunity (Unique/niche market)                           | <ul style="list-style-type: none"> <li>• Presence of unique/niche products or services due to location specific diversity (in the form of products, culture, or knowledge)</li> <li>• Potential for pro-poor income increase</li> <li>• Existence of backward linkages (in terms of both investment and knowledge transfer)</li> </ul> |   |
|       | Availability of human resources (Inclusiveness and Capacity Needs) | <ul style="list-style-type: none"> <li>• Equitable participation of poor/disadvantaged groups as producers or labourers</li> </ul>   |   |

|                                    |  |   |  |
|------------------------------------|--|---|--|
|                                    |  | <ul style="list-style-type: none"> <li>• Strengthening women's negotiating power within markets and enterprise</li> <li>• Gender training for women and their families to increase women's power in the family.</li> <li>• Strengthening support networks in the community including protection of women against violence</li> </ul>  |  |
| Accessibi<br>lity                  | Accessibility to market (high value/low volume)                                  | <ul style="list-style-type: none"> <li>• Remoteness</li> <li>• Distance to markets</li> <li>• Efficiency of infrastructure</li> <li>• Weight/volume of products</li> <li>• Availability of communication infrastructure</li> </ul>  |  |
|                                    | Availability/ access to technology (Opportunity for Value Addition)              | <ul style="list-style-type: none"> <li>• Improved access to financial services for improved technology</li> <li>• Ability to identify gaps and deficiencies.</li> <li>• Identification of appropriate technology</li> </ul>   |  |
| Fragility                          | Fragility (sustainable resource management)                                      | <ul style="list-style-type: none"> <li>• Vulnerability to irreversible damage</li> <li>• Carrying capacity for sustainable supply of raw material</li> </ul>  |  |
|                                    | Impact of Climate Change on access or raw material (climate resilience)          | <ul style="list-style-type: none"> <li>• Vulnerability to impact of climate change on resource availability</li> <li>• Ability to resist drought, floods, and tropical cyclones</li> <li>• Improvements in wider social security, health and education provision for all women, youth and vulnerable in society.</li> </ul>   |  |
|                                    | Access to finance (Bankability of the enterprise)                                | <ul style="list-style-type: none"> <li>• Potential for economies of scope through diversified but interlinked activities</li> <li>• Improved facilities for women in markets and measures to counter discrimination</li> </ul>  |  |
| Diversity (economy<br>es of scope) | Impact of other land use (e.g. livestock, mining, fire, etc.)(Resource Planning) | <ul style="list-style-type: none"> <li>• Capacity to understand/ fulfil market demand.</li> <li>• Negotiation capacity</li> <li>• Ability to bear with market risks.</li> </ul>   |  |
|                                    | Access to information  | <ul style="list-style-type: none"> <li>• Linked to mainstream market</li> <li>• Improve collation and dissemination of market information, product demands, weather forecast, latest technology and other important information.</li> <li>• Improve collaboration with policy makers to develop consumer guidelines for expected standards and after sales services.</li> </ul> |  |

### Final Open-Ended Questions

- What are the major incentives you have for investing in / promoting change in the value chain?
- What risks or constraints do you face in making these investments?
- What do you think are the strengths of your industry locally and/or internationally? \*
- What are the main weaknesses of your industry?
- What do you think is the greatest challenge facing your industry today?
- Can you name some business owners in your industry who are leaders –for example, in terms of technology, product design, quality, or marketing?
- How did you get into your business?

All information gathered are summarised into the case study template (see Annex 5 of Output 1: Report on Comprehensive Market Analysis. *Value Chain Assessment of Fiji's Forest Sector with particular emphasis on non-timber-forest-products Small Micro Enterprise*).

All the informants were invited to a validation workshop to ensure the information captured in the case study are accurate. Notes from the validation workshop are outlined in Annex 3.

### **ANNEX 3: Value Chain Validation Meeting**

A three-day validation meeting took place for the nine operators chosen for the proposed Non-timber Forest Products (NTFP) initiative. Drawing from interviews conducted during field visits, the validation process meticulously examined the collected data. Each value chain was thoroughly explored during presentations, allowing operators to confirm, dispute, or provide additional insights on the information presented. This format also enabled team members to raise any concerns or issues pertaining to specific areas. Discussions spanned various topics related to each NTFP, aimed at gaining a comprehensive understanding of their respective value chains.

**Date: 12/03/2024**

**Name of Operator: Sukulu Soko of Sunnyville Bamboo, Matanikoro, Wainibuku**

#### **Key Issues:**

- The Ministry of Forestry have shown limited commitment to bamboo despite its substantial benefits and potential. Bamboo has not received adequate attention or support from policymakers. This lack of commitment has hindered the development of bamboo in Fiji.
- There is a great need to take stock of our local bamboo species and raise awareness among communities about their significance and potential. This is to allow the Ministry of Forestry to better understand their value and implement targeted strategies for their sustainable management and utilization.
- Communities need to be educated about the benefits of bamboo cultivation and processing. Training initiatives can empower local stakeholders with the knowledge and skills needed to harness the full potential of bamboo resources while promoting environmental conservation and economic development.
- A concerted effort involving governments, communities, and other stakeholders is imperative to acknowledge the significance of bamboo and prioritize its sustainable utilization and development.

**Date: 12/03/2024**

**Name of Operator: Waisea Vakalevu of Northland Pure Noni, Namena, Tailevu**

#### **Key Issues:**

- There is a lack of clarity regarding government interest and investment in noni production, including uncertainty about which ministry is responsible for overseeing this sector.
- It is essential for the responsible ministry to develop a clear framework for noni cultivation, processing, and marketing to provide formal recognition and certification for farmers involved in noni production.
- The government should take proactive steps to explore and secure overseas markets for Fijian noni products. This entails identifying potential international buyers, establishing trade agreements, and promoting Fijian noni products abroad.

- Government to encourage community-based noni planting initiatives can ensure a consistent and sustainable supply of fruits to processing facilities and at the same time enhancing rural livelihoods.
- There is a pressing need for government-funded research to enhance Noni cultivation techniques and improve product quality. This research should focus on identifying best practices, optimizing growing conditions, and developing standards for Noni cultivation.

**Date: 12/03/2024**

**Name of Operator: Eroni Delai of Babavoce, Tailevu and Eta Tabuagusuna of Nabukaluka, Naitasiri**

**Key Issues:**

- Research is needed to explore methods for prolonging the freshness of harvested *Ota*.
- Efforts are required to establish secure markets for *Ota* exports.
- There is a need to develop methods for preserving and processing *Ota* into canned products.
- Addressing the availability and abundance of wild ferns by implementing cultivation practices.

**Date: 13/03/2024**

**Name of Operator: Abhay Chaudary of Time Fiji Limited and Avril Fiji, Baulevu, Nausori**

**Key Issues:**

- Government Recognition of Candlenut Potential: It is crucial for the government to acknowledge the economic significance of candlenut and actively promote its cultivation and marketing.
- Scaling Up Candlenut Planting: There is a need to expand the planting of candlenut on a large and commercial scale, potentially through initiatives led by the Ministry of Forestry.
- Ban on Imported Personal Care Products: Implementing a ban on imported hair food, body lotion, soap, etc., and advocating for the use of locally made Fijian products.

**Date: 13/03/2004**

**Name of Operator: Sanjay Kumar of Sital Investment, Suva**

### Key Issues:

- Availability of Matured Sandalwood: Ensuring an adequate supply of matured sandalwood in Fiji is essential for the sustainability of the industry.
- Sandalwood Inventory Priority: Establishing a comprehensive sandalwood inventory is crucial for investors to accurately assess the current stock and make informed decisions.
- Cost of Processing Plants: The high cost of establishing processing plants poses a significant challenge for private companies due to the current stock situation. There is a need for the Ministry of Forestry to consider establishing its own oil processing plant to alleviate this burden.
- Impact of Synthetic Sandalwood Oil: The presence of synthetic sandalwood oil in the market is negatively affecting the demand for natural sandalwood products, posing a threat to the industry's viability.



Date: 14/04/2024

Name of Operator: Susana Yalikanacea of Organic Selavo, Cicia, Lau

### Key Issues:

- Government Support for Small and Micro-Scale Businesses: Government intervention plays a crucial role in promoting and facilitating the growth of small and micro-scale businesses.
- Weather-Dependent Traditional Processing: The traditional and manual processing of oil and soap relies heavily on favorable weather conditions, which can impact production efficiency and output.
- Competition with Copra Industries: Small-scale businesses face competition from larger copra industries, posing challenges for community and individual-based enterprises in the market.
- Storage and Transportation Challenges: There are logistical hurdles involved in storing and transporting products from remote islands to urban centers like Suva, which can affect supply chain efficiency and product quality.





Discussion with Selavo Organic Cicia, Lau

**Date: 14/04/2024**

**Name of Operator: Selai Buasala and Lijia Jiko of Korova Women Group, Suva**

**Key Issues:**

- Rural women face significant barriers due to the lack of external support, hindering their ability to fully participate in and benefit from the industry. They often miss out on crucial opportunities necessary for industry development, including access to market facilitation services. Key aspects such as product development, quality monitoring, price setting, and market linkages are inaccessible to many rural women producers, limiting their capacity to grow their businesses and access lucrative markets.
- Despite the substantial number of women engaged in masi production, there is a notable absence of a collective structure or organization among producers. This lack of coordination prevents them from effectively addressing shared challenges and seizing collective opportunities. Masi producers struggle to address critical issues such as price regulation, negotiation with retailers, and distribution challenges.
- Masi production faces constraints related to limited access to raw materials, particularly for rural women producers. High dependence on masi sourced from outer islands and transported to Viti Levu exacerbates this challenge. The reliance on shipping for raw material supply imposes logistical constraints and compromises quality control measures.

**Date: 14/04/2024**

**Name of Operator: Sitiveni Waqa of Veitacini Nursery, Vatumami place and Samuela Naborokia of Yavusa Vatudamu, Rewasa, Ra**

**Key Issues:**

- **Lack of Phenology Knowledge:** There is a notable gap in understanding tree phenology and seedlings demand. This is crucial for effective tree seedling production and management.
- **High Demand for Tree Seedlings:** There is a significant demand for tree seedlings, particularly for projects like Job for Nature (JN) and Restoration of Degraded Forests (RDF). This heightened demand underscores the importance of efficient seedling production and distribution systems to meet project objectives and environmental restoration targets.
- **Community Seed Collection Practices:** Communities are engaged in mass seed collection activities, often sourcing seeds from natural environments rather than designated seed stands. This practice raises concerns about genetic diversity conservation and quality control.
- **Impact of Increasing Seedling Suppliers:** The increase of seedling suppliers in the market poses challenges for businesses, especially considering the slim profit margin of \$2 per seedling.
- **Alterations in Tender Specifications:** There have been instances of tender specifications being altered by the government after tender awards have been made. There is a mismatch in the tender documents and actual seedlings needed in the actual planting. Such alterations undermine bidder confidence, and introduce uncertainties in project execution and delivery.

## ANNEX 4: Market Assessment for all commodities assessed

| Category      | Consumer Preference | Handicraft |      |          | Restoration      |    | Medicine | Perfume/Oil |      |      | Food | Landscape | Avg Scores |
|---------------|---------------------|------------|------|----------|------------------|----|----------|-------------|------|------|------|-----------|------------|
|               |                     | Voivoi     | Masi | Magimagi | ry Tree Seedling |    | Kura     | Candlenut   | Dilo | Yasi | Ota  | Bamboo    |            |
| Accessibility | high quality        | 7          | 8    | 9        | 8                | 8  | 10       | 8           | 10   | 8    | 10   | 10        | 8.727273   |
|               | available           | 8          | 8    | 6        | 8                | 8  | 10       | 8           | 10   | 7    | 10   | 10        | 8.454545   |
|               | affordable          | 8          | 8    | 7        | 7                | 8  | 10       | 7           | 10   | 8    | 9    | 10        | 8.363636   |
| Diversity     | available info      | 7          | 9    | 7        | 2                | 2  | 9        | 7           | 9    | 5    | 9    | 9         | 6.818182   |
| Niche         | reliable            | 8          | 8    | 7        | 6                | 8  | 10       | 6           | 8    | 7    | 8    | 10        | 7.818182   |
|               | unique              | 8          | 9    | 9        | 2                | 1  | 10       | 8           | 10   | 8    | 8    | 10        | 7.545455   |
| Fragility     | sustainable         | 9          | 9    | 9        | 8                | 9  | 10       | 8           | 10   | 9    | 10   | 10        | 9.181818   |
|               | environmental       | 9          | 10   | 9        | 8                | 10 | 10       | 8           | 8    | 9    | 10   | 10        | 9.181818   |
| avg           |                     | 8          | 9    | 8        | 6                | 7  | 10       | 8           | 9    | 8    | 9    | 10        |            |

