



Food and Agriculture Organization
of the United Nations

Feasibility Study – Appendix 6:

Value Chain Assessment of Fiji's Forest Sector

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

Contents

ACRONYMS	5
EXECUTIVE SUMMARY	6
KEY RECOMMENDATIONS FROM THE CASE STUDY	7
<i>Critical Success Factor</i>	7
<i>Enabling Environments</i>	8
Short term plan	8
Long Term Plan	8
<i>Services & Extension</i>	9
Short Term Plan	9
Long Term Plan	9
INTRODUCTION	11
LITERATURE REVIEW.....	13
METHODOLOGY	17
VALUE CHAIN AT SECTORAL LEVEL.....	17
FOCUS ON SELECTED SUB-SECTOR.....	18
FOREST SECTOR ANALYSIS	13
PORTERS VALUE CHAIN FRAMEWORK.....	20
<i>Primary Activities</i>	21
Inbound logistics.....	21
Operations.....	23
Outbound logistics	25
Marketing & Sales.....	27
Supporting Activities	20
Technology development.....	34
Human Resources Management	35
Infrastructure	36
<i>Value and Cost</i>	37
Price determination and discovery	37
Associated Costs.....	41
Cost of Processing (sawmill to consumers).....	42
<i>Competitive Advantage and Opportunities</i>	42
CASE STUDY – FIJI MAHOGANY	46
MAHOGANY SUBSECTOR.....	46
<i>Value chain map</i>	47
<i>Quantification of the Value Chain</i>	48
<i>Role and Contribution of all Actors</i>	49
<i>Market Assessment</i>	51
<i>SWOT analysis of the Value Chain</i>	54
<i>Propose a plan to improve the value chain</i>	55
Short-term plan.....	55
Long term plan.....	56
SUBSECTOR ANALYSIS OF MSME IN FIJI'S FOREST AND SUSTAINABLE LANDSCAPE SECTOR	57
NON-TIMBER FOREST PRODUCTS IN FIJI.....	58
CRITERIA AND INDICATORS FOR SELECTION OF MSME FOR MARKET ANALYSIS	58
<i>Ranking of NTFP focusing on Challenges and Opportunities</i>	59
<i>Ranking NTFP using critical criteria for success indicators</i>	60
CASE STUDY - MAHOGANY MSME COTTAGE INDUSTRY	62
MAHOGANY RESIDUAL LOGS.....	62
<i>Value chain map</i>	63
<i>Quantification of the Value Chain</i>	65
<i>Role and Contribution of all Actors</i>	66
<i>Market Assessment</i>	66
<i>SWOT analysis of the Value Chain</i>	69
<i>Propose a plan to improve the value chain</i>	70
Short-term plan.....	70

Long term plan.....	71
CONCLUSION	71
ORGANISATION & REPRESENTATIVES CONSULTED	73

TABLES & FIGURES

TABLE 1: THREE TYPES OF GOVERNANCE IN VALUE CHAIN (KAPLINSKY & MORRIS, 2001)	15
TABLE 2: PRODUCTION SYSTEMS UNDER TWO TYPES OF VALUE CHAIN (GEREFFI, 1999)	16
TABLE 3: MATRIX FOR CRITERIA OF SUCCESS FOR NTFP	19
TABLE 4: TYPICAL PARAMETERS FOR SAWMILL OPERATION (WHITEMAN, 2005)	26
TABLE 5: ENTRY AND EXIT OF PLAYERS IN THE SAWN TIMBER PROCESSING INDUSTRY 1986-1989 –WHITEMAN (2005)	27
TABLE 6: LEGISLATIVE FRAMEWORK THAT GOVERNS THE FOREST SECTOR MANAGEMENT (ADAPTED FROM THE MINISTRY OF FOREST ²²)	32
TABLE 7: PARAMETERS OF A TYPICAL HARVESTING OPERATION IN NATIVE FORESTS (WHITEMAN, 2005).....	33
TABLE 8: PROFILE OF WESTERN DIVISION TIMBER INDUSTRY, BASED ON 2003 DATA (WAQAINABETE, 2006) ²	35
TABLE 9: WHO DOES WHAT IN THE FOREST INDUSTRY MARKETING CHANNEL	36
TABLE 10: NUMBER OF TIMBER MANUFACTURERS IN FIJI 2004 (MFF 2005)	38
TABLE 11: MILL GATE PRICE FOR NATIVE SPECIES (2023).....	39
TABLE 12: MILL GATE PRICE & GRADE FOR MAHOGANY	40
TABLE 13: COMPARATIVE VALUE OF LOGS AT MILL GATE	41
TABLE 14: COMPARATIVE VALUE OF SAWN TIMBER	41
TABLE 15: TREND IN CONTRIBUTION OF FOREST ACTIVITIES TO GDP (THE MINISTRY OF FORESTRY 2020-2021 ANNUAL REPORT)	41
TABLE 16: 5-YR PRODUCTION AGAINST SUSTAINABLE HARVEST LEVELS	43
TABLE 17: EXPORT OF WOOD PRODUCTS (2018-2019) FJ\$ MILLION <i>SOURCE- THE MINISTRY OF FORESTRY ANNUAL REPORT 2020-2021</i>	43
TABLE 18: PRODUCTION PARAMETERS FOR KEY PLAYERS IN THE FHCL VALUE CHAIN	49
TABLE 19: PERFORMANCE OF MAHOGANY LOG BUYERS 2019 – 2023 (SOURCE FHCL)	50
TABLE 20: AVERAGE LOG COST OF EACH MAHOGANY LOG GRADE	52
TABLE 21: SWOT ANALYSIS FOR FIJI MAHOGANY	54
TABLE 22: FINANCIAL ASSISTANCE SCHEME AVAILABLE TO SUPPORT SMSE IN THE FOREST SECTOR.....	57
TABLE 23: CRITERIA FOR SUCCESS AND STRATEGY FOR NTFP	60
TABLE 24: KEY ACTORS IN THE RESIDUAL WOOD VALUE CHAIN AND CORE COMMODITIES PRODUCED.	64
TABLE 25: PRODUCTION LEVEL FOR EACH LEADING ACTOR IN THE MAHOGANY RESIDUAL WOOD SUB-SECTOR.....	65
TABLE 26: REVENUE FOR MAHOGANY RESIDUAL WOOD ENTERPRISES – 2023 (SOURCE THE MINISTRY OF FORESTRY FPTT)	67
TABLE 27: SWOT ANALYSIS FOR MAHOGANY RESIDUAL WOOD	69
TABLE 28: FINAL LIST OF NTFP SELECTED FOR FURTHER CONSIDERATION.	73
 FIGURE 1: METHODOLOGY OF SECTOR ANALYSIS ADOPTED IN THIS ASSESSMENT.....	18
FIGURE 2: METHODOLOGY FOR SUBSECTOR ANALYSIS USED IN THIS ASSESSMENT.....	19
FIGURE 3: PORTER VALUE CHAIN FOR FIJI'S FOREST INDUSTRY	21
FIGURE 4: TREND IN THE NUMBER OF TIMBER HARVESTING LICENSE ISSUED PER YEAR OVER A YEAR.....	23
FIGURE 5: TREND IN LOG PRODUCTION 2017-2021 SHOWING LOG SOURCES.....	24
FIGURE 6: MARKET MAP OF TIMBER AND WOOD PANEL LOGS PRODUCTS IN FIJI.....	25
FIGURE 7: FIVE-YEAR TREND IN THE NUMBER OF SAWMILLS OPERATING IN FIJI	27
FIGURE 8: TREND IN THE NUMBER OF LICENSES IN PRIMARY AND SECONDARY PROCESS 2017-2021.....	28
FIGURE 9: PERCENT OF FOREST SECTOR CONTRIBUTION TO FIJI'S GDP	33
FIGURE 10: PERCENTAGE OF TOTAL VALUE OF IMPORT ATTRIBUTED TO WOOD & ARTICLES OF WOOD: 2016-2020	34
FIGURE 11: TREND IN LOG PRODUCTION FROM ALL FOREST TYPES.....	39
FIGURE 12: AREA OF FIJI'S PRINCIPAL FOREST TYPES (HA)	42
FIGURE 13: AVERAGE VALUE OF FOREST ACTIVITIES 2018-2020 (FJ\$ MILLION)	44
FIGURE 14: VALUE CHAIN FOR FIJI MAHOGANY LOGS	48
FIGURE 15: PRODUCTION TREND FOR FIJI HARDWOOD 2018-2023	48
FIGURE 16: SUSTAINABLE HARVESTABLE VOLUME 1992: VALUATION AND YIELD FORECASTING	51
FIGURE 17: A MARKET MAP FOR FIJI MAHOGANY	52
FIGURE 18: MARKET STRATEGY BASED ON CRITICAL SUCCESS FACTORS FOR MAHOGANY.	53
FIGURE 19: NON-EXHAUSTIVE LIST OF NON-TIMBER FOREST PRODUCTS IN FIJI.....	58
FIGURE 20: USING QUADRANT TO RANK ENTRY POINT FOR NTFP	60
FIGURE 21: PRIORITY NTFP AND INDICATIVE STRATEGY.....	61
FIGURE 22: VALUE CHAIN FOR FIJI MAHOGANY LOGS	64
FIGURE 23: MARKET MAP FOR MAHOGANY RESIDUAL WOOD.....	67
FIGURE 24: CRITICAL SUCCESS STRATEGY FOR MAHOGANY RESIDUAL WOOD.....	68

FIGURE 25: VALUE CHAIN MARKET MAP FOR THE FOREST SECTOR IN FIJI	72
FIGURE 26: FINAL NTFP COMMODITIES TO BE ASSESSED IN DETAIL	72

Annexes

ANNEX 1: WORKSHOP REPORT	75
ANNEX 2 – ROYALTY CLASSIFICATION FOR NATIVE SPECIES	76
ANNEX 3: 2023 MARKET PRICES FOR SELECTED GRADES (SOURCE THE MINISTRY OF FORESTRY).....	77
ANNEX 4 TEMPLATE FOR QUESTIONNAIRE.....	78
ANNEX 5 TEMPLATE FOR CASE STUDY VALUE CHAIN ASSESSMENT.....	82
ANNEX 6 FIJI MAHOGANY (FILLED) QUESTIONNAIRE.....	85
ANNEX 7: MAHOGANY RESIDUAL WOOD (FILLED) QUESTIONNAIRE	95

ACRONYMS

CDB	Convention on Biological Diversity
CITES	Convention on International Trade of Wild Fauna and Flora
CR	Carbon Removals
CSF	Critical Success Factor
EIA	Environment Impact Assessment
ER	Emission Reduction
FAO	Food and Agriculture Organisation of the United Nations
FFPA	Fiji Forestry Professional Association
FHCL	Fiji Hardwood Corporation Ltd.
FMT	Fiji Mahogany Trust
FPL	Fiji Pine Ltd.
FPT	Fiji Pine Trust
FPTT	Forest Processing Timber and Training Division
FTC	Forestry Training Center
GDP	Gross Domestic Product
ITTO	International Tropical Timber Organisation
MIDA	Mahogany Industry Development Act
MIC	Mahogany Industry Council
MSME	Micro, Small and Medium Enterprise
NTFP	Nontimber forest product
TLTB	iTaukei Lands Trust Board
TITC	Timber Industry Training Center
UNCCCD	United Nations Convention on Combating Desertification

Executive Summary

Fiji's forest sector value chain markets have distinct structures between primary and secondary production, where the primary market structure is considered oligopoly. In contrast, the secondary processing markets conform to oligopoly (Waqainabete, 2006)². The players in the value chain thus operate in contestable markets where they use strategies (games theory) to maximize profits. It is assumed that entry and exit are costless, particularly in the logging activity where equipment can be resold and used in another sector, such as infrastructure (building and road constructions). Trends also indicate that the number of sawmills and harvesting licenses issued annually has declined since 2017. The level of log production and subsequent contribution of the forest sector to Fiji's Gross Domestic Product (GDP) has dropped.

This report focuses on examining the value chain of the forest sector in Fiji, exploring opportunities for growth at the sectoral level, and providing case studies of promising subsectors. Fiji's forest sector comprises native, pine, and mahogany resources. While native log production is declining, pine is at its peak level, while mahogany grows consistently. The comparative price of the three subsectors indicates that mahogany is the most valuable.

The decline in production in native forests may be attributed to challenging requirements associated with securing logging licenses such as Environment Impact Assessments (EIA), trade requirements under the Convention on International Trade of Wild Fauna and Flora (CITES), scarcity of available logs in nearby forests, increasing cost of doing business, opportunities outside the forest sector that are more lucrative such as infrastructure (road and civil works) as well as long and intense rainy seasons.

The pine subsector is currently operating at maximum production capacity, perhaps to retain the foreign revenue earned, given the loss in export revenue from pine chips. There is an expected slump in the chip market as the world becomes paperless, but this provides an opportunity for the pine industry to maximize the productivity of its state-of-the-art sawmill and utilize old-growth forest from its plantation estate.

The mahogany subsector has shown consistent performance in log production with a high potential for continued growth, given that the current level of harvesting falls far below sustainable levels. A significant reason for this phenomenon is the marketing challenges of end products currently produced in Fiji. With the support of the Fiji Government, the Fiji Hardwood Cooperation Ltd. (FHCL) is committed to completing its forest management certification under the Forest Stewardship Council. With a certified production line, the value of Fiji mahogany will double as market access to high-end markets may be assured.

The assessment constructed two case studies to understand opportunities in the mahogany subsector by examining the value chain of FHCL and MSME currently involved in using residual Wood from mahogany plantations to produce furniture and an assortment of products. Key recommendations are constructed through the framework of market analysis, considering the enabling environment and services required in the short and long term to ensure the efficiency of the value chain that will support the growth of the mahogany industry.

Apart from the impact of logging, Fiji's forests are threatened by deforestation and forest degradation due to agricultural expansion and other land uses. These contribute to increased carbon emissions; however, current efforts by the Ministry of Forestry to plant 30 million trees by 2036 will ensure net

carbon removal. Harvesting non-timber forest products is often viewed as less destructive, with opportunities to contribute to forest ecosystem health and carbon removal, particularly in cultivated products that do not disturb natural forest habitats.

The assessment listed more than 30 NTFPs at various stages of development. These commodities are driven by passionate individuals who recognize the opportunity and embrace their development with little Government assistance. Focused group discussions among practitioners of NTFP were held on Feb 06, 2024, to assess and select NTFP that will be evaluated in detail in the Market Analysis. The following NTFP will be considered in detail: Handicraft - Magimagi (coconut coir), Masi (mulberry cloth), Voivoi (pandanus leaves); Traditional Medicine – Kura (Nonu Juice); Perfume and Oils – Lauci (candlenut), Dilo, Yasi; Restoration – tree seedling; Food – Ota (edible ferns). Further convening will validate the value chain developed from subsequent discussions and data collected through formal questionnaires. A validated market analysis of NTFP listed above will be submitted in due course.

Key Recommendations from the Case Study

The two-case study presents opportunities to understand potential growth for primary and secondary production along the mahogany wood-based value chain, the most promising game changer among the three key forestry subsectors.

Primary production focused on FHCL – a government-owned entity that manages and monopolizes the flow of mahogany logs in Fiji. Secondary production is viewed through the lenses of startup MSMEs currently under business incubation with the Ministry of Forestry. The scope of the value chain assessed in the case studies presents an insight into wood-based products from the forest to developing timber and timber products that will diversify players in the mahogany value chain.

Critical Success Factor

The case study points to critical success factors for both primary and secondary production. Interestingly, the common threads presented in both case studies indicate the need to focus on niche and accessibility, followed by diversity and fragility.

For FHCL, the critical success factor lies with the need to develop a niche market given the large volume of unique plantation mahogany in its ambit of influence, as well as the opportunity to strengthen and support networking with landowning units to build MSME in rural pro-poor communities.

In the case of mahogany MSME, the opportunity to engage presents itself with the availability of raw materials from mahogany plantations and the provision of policy support from the Ministry of Forestry. Growth opportunities for rural pro-poor landowners whose land is leased by plantation forests lie in creating niche products with appropriate training and coaching, as is the case with the MSME assessed. Coupled with unique high-value mahogany wood/timber, there is potential and opportunity to carve out meaningful engagement across pro-poor rural mahogany landowners. The opportunity to be inclusive in addressing capacity needs will allow women to be involved in marketing and enterprise management. It is also interesting to note that while the respondents recognize the need to be closer to the source of raw material, they were quick to point out that utility needs such as electricity and water are critical success factors coupled with the support of new technology and appropriate machinery.

Enabling Environments

Short-term plan

FHCL must be supported in pursuing certification as soon as possible to ensure enabling conditions to secure niche export markets. With the assistance of the Ministry of Forestry and the whole Government machinery, FHCL must secure new high-end markets through bilateral agreements, possibly with UK governments where mahogany timber is valued.

With recent changes in the chairmanship of MIC, there is an urgent need to review MIDA 2010 to ensure alignment with the Forest Decree 1992 and the National Foret Policy 2007. Such alignment will enable the Ministry of Forestry to provide technical support without limitations in developing the mahogany industry in Fiji. In reviewing MIDA 2010, it is imperative to reconsider the role and function of MIC to be governed by a Board of Trustees made of representatives of each association of all key players in the value chain. Possible objectives of the rejuvenated MIC may include the promotion of Fiji mahogany timber trade and marketing of the same; reviewing and expanding the industry's manufacturing technology and value add its production line; as well as enhancing the global credibility of the mahogany industry in Fiji.

At the same time, the review should explore and allow FHCL to set up incorporated subsidiary companies to focus on different elements of an integrated vertical operation that advocates zero waste in wood utilization and the diversification of product lines.

In alignment with the Forest Sector Study (FAO, 1988), the opportunity to strengthen links with FMT will secure FHCL's long-term sustainability and ensure meaningful engagement of Landowning units. Reversal of the 10% shares for FMT from the Fiji Government will entail policy and legislative changes in MIDA 2010 and incentivize full engagement by FMT in the development of the mahogany subsector on behalf of landowners.

The current cohort of MSMEs assessed in the case study indicates positive potential for real engagement of pro-poor landowning entities. The Ministry of Forestry needs to continue providing funding support and strengthen FMT's role in assisting the development of all mahogany landowners.

To support the continuous growth of the current MSME, the Ministry of Forestry FPTT will need to negotiate loan packages with financial institutions in Fiji to expand existing cohorts and include other landowning units that may want to enter the value chain. FPTT must also coordinate product development to enhance collaboration and reduce direct market competition among potential market players.

Long Term Plan

The high inefficiency in log utilization at FHCL has resulted in large volumes of residual and waste logs at primary production. In the long term, FHCL aspires to mitigate this by entering downstream processing to ensure the use of all log grades harvested from the forest. To facilitate such ambition, policy and legal institutional support are needed.

In terms of the mahogany MSME sub-sector, there is an urgent need to support the involvement and engagement of the FMT to enable FMT to look after the development of mahogany landowners through business mentoring, negotiation, and financial capacity building that the Ministry of Forestry is unable to provide. The Ministry of Forestry should continue focusing on its core function, providing technical support. Should FMT be limited in undertaking such a role, the Ministry of Trade, Cooperatives, Small and Medium Enterprises, and Communications is mandated to provide institutional support for the development of MSME in Fiji.

Services & Extension

Short Term Plan

Under FHCL's ambition to double its annual harvest volume, the Ministry of Forestry must consider training needs in primary and secondary production for the mahogany subsector to support primary activities as well as procurement, technology, human resources, and infrastructure development. There is an urgent need to ensure the availability of certified skilled operators for log production at FHCL.

As FHCL engages in developing FSC Certification, it may require external services that will support documentation and the articulation of matrices and indices relevant to its operation in fulfillment of FSC requirements. Depending on budget and technical needs, such services may be secured locally or externally.

For MSME players in the secondary production process, immediate needs include financial services to expand their operations. The Ministry of Forestry FPTT may need to engage and secure external financial assistance to design suitable loan facilities for forest sector wood-based MSME. Although there is no guarantee, it may be prudent for MSME players to form appropriate associations and be involved in such dialogue in a unified voice.

Long Term Plan

In the long run, FHCL will need to pay close attention to strengthening FMT to ensure that it continues supporting the development aspiration of mahogany landowners while securing support for extending its plantation land leases. FHCL may consider developing targeted FMT support linked to feasible and meaningful outcomes. FHCL pays a certain percentage of proceeds from logs to FMT without expectations. It may be prudent to review how FPL supported FPT in the early years of development and explore opportunities to build the capacity of landowning units to be involved in logging operation, cartage, log yard management, as well as joinery and wood processing, as is the case of the MSME assessed in the case study.

Upon reviewing MIDA 2010, the Ministry of Forestry may need to undertake a feasibility assessment to explore cost structures and business models of establishing Trade Centers for MSME Wood Processing that have the necessary utilities, such as 3-phase power and water, to support new entrant start-ups in joinery/woodwork. Allow interested landowners to rent spaces and operate mahogany MSME joinery/woodwork. Coordinate production among participants in the facility to meet quality control and reasonable business ethics requirements. The Trade Center may be under the direct management of the newly rejuvenated MIC.

Lastly, given the learnings from FPL and FPT, where landowners were supported to engage business interest in primary production, the model that the Ministry of Forestry is currently exploring with mahogany landowners is to open opportunities to enter secondary production and diverse players in the value chain. If not done thoughtfully and coordinately, the risks of flooding the market with too many players may be detrimental in the long run. Landowners must be allowed to choose the production segment they wish to engage with – primary or secondary and appropriate training should be made available to ensure successful engagement.

Introduction

Fiji is an archipelago of more than 300 islands located between latitude 150S and 220S and longitude 1770W and 1750E, with rainfall varying between 250 centimeters per annum on the windward, south-easterly side of the islands and 150 centimeters per annum on the leeward or northerly sides. The total land mass is estimated at 1.8 million hectares with more than 50 percent forest cover. Not all forest areas have timber production potential. It is estimated that the native forest covers 943,135 hectares, while the mahogany plantation is counted to cover 75,519 hectares and the pine plantation 85,275 hectares (MOF, 2021)¹.

The forest sector, a significant contributor to Fiji's economy, has experienced a consistent decline in productivity over the years. In 2016, it added FJ\$164m to Fiji's GDP, which decreased to FJ\$153m by 2020. Despite this decline, the forest industry contributed 1.5% to Fiji's GDP between 2016 and 2020, generating an average of FJ\$155 million per year. The decline in native forests is a concern attributed to receding forest cover and challenges with license procurement processes. Pine remains the leading producer in both volume and value. While the volume of mahogany production is slightly less than that of native forests, its value far exceeds that of native timber. The mahogany subsector, therefore, presents a promising opportunity for a detailed value chain and market assessment to ensure sustainable growth.

As the productivity of native forests declines, the potential for developing non-timber forest products becomes more apparent. This potential is further bolstered by the Ministry of Forestry's commitment to supporting such development. Additionally, the Ministry of Trade, Cooperatives, Small and Medium Enterprises, and Communications is fully dedicated to supporting Micro, Small, and Medium Enterprise (MSME) across all sectors, including forestry. This commitment is evident in the Fiji Government's incentives for rural communities aspiring to engage with MSME, as outlined in the Ministry of Forestry Business Guideline 2022-2023².

In 2004, the Food and Agriculture Organization of the United Nations (FAO) commissioned the review of the forest revenue system and taxation of the forest sector in Fiji, which indicated that the landowners received the most significant portion of economic rent in harvesting activities (Whiteman, 2005³) and that the barrier to entry in processing and down streaming is capital rather than access to raw material (Ibid). Waqainabete (2006)⁴ assessed the efficiency of supply from the forest to sawmills and concluded that sawmills are best placed nearest the source of their raw material due to high transportation cost.

At the same time, the Fiji Government endorsed and adopted a high-quality export-driven strategy for the sector, as stated in the Fiji National Forest Policy Statement in 2007⁵. The export is envisioned to capitalize on the mature mahogany plantations and advance the development of the cottage industry in the forest sector. At the same time, the National Forest Policy recognizes the potential of non-timber forest products. It suggests that it is a means of diversifying the commodity lines in Fiji's forest sector (ibid).

Assessment of Fiji's forest sector value chain indicates that the most valuable process within Fiji's forest sector lies with sawmilling at FJ\$ 66 million (3-year average between 2018-2020). Given the performance of log production from each forest type, the opportunity for intervention lies with the

¹ The Ministry of Forestry. 2021. The Ministry of Forestry Annual Report 2020-2021.

² The Ministry of Forestry, 2023. Business Guideline 2022-2023

³ Whiteman, A. (2005). A review of the forest revenue system and taxation of the forest sector in Fiji Rome, FAO.

⁴ Waqainabete, S.L. 2006. Coordination of the forest industry in Fiji using plant location model framework. Graduate Research Project. Master of Natural Resource Economics. School of Natural & Rural Systems Management. University of Queensland.

⁵ Fiji Government. 2007. Fiji National Forest Policy. The Ministry of Forestry. Suva. Fiji

mahogany subsector to improve global market access and possibly increase returns. The Fiji Hardwood Corporation Ltd. has identified its current market limitations and is actively pursuing forest management certification through the Forest Stewardship Council. The Ministry of Forestry is fully supportive of this initiative.

The consultancy team discussed and agreed on a definition of non-timber forest product (NTFP) specific to Fiji conditions to be used under this assignment (Seed Box 1). The team identified more than 15 NTFPs where markets in Fiji are at their infancy stage with no apparent commodity at the lead. The Ministry of Forestry is committed to investing in the Research and Development of non-timber forest products to diversify the forestry sector's economic performance and develop alternative commodities through NTFP for livelihood and poverty alleviation among the rural populace. The Ministry of Forestry emphasizes Sandalwood (Yasi), Candlenut (Lauci/Sikeci), Beach mahogany (Dilo), and coconut veneer.

A focus group discussion was held on 06 Feb 2024 (Annex 1) to determine the non-timber forest products (NTFPs) that should be assessed in line with the Terms of Reference for this assignment. The consultancy team consciously avoided misrepresenting potential NTFPs by considering various options. Despite using selection methodologies suggested in the literature, the final list of NTFPs was based on the best collective judgment of the team, with advice from the Fiji Forestry Professional Association (FFPA). The NTFPs that will be part of the market assessment include Coconut coir (magimagi), Tapa cloth (masi), Pandanus (voivoi); mix species tree seedlings; Noni (Kura), Candlenut (Lauci), *Calophyllum inophyllum* (Beach mahogany/Dilo), Mahogany Residual wood, Santalum Yasi (Yasi), and forest ferns (Ota). Mahogany residual wood is discussed as a case study in this report.

Literature Review

Development theory is a collection of theories about how desirable societal change is best achieved. These theories include modernization, structuralism, dependency, and neoclassical theory, to name a few. Such theories draw on a variety of social science disciplines and approaches. In this analysis, the fundamental theory adopted is that of sustainable development, which is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs,⁶ which is an integral component for the forest sector to grow. Coupled with the idea first expressed by the Club of Rome (1972) and more recently, *The Limits of Growth +50*,⁷ which outlines the *carrying capacity* of natural systems and the impact of exponential growth in population and industrialization where the earth will not be able to sustain current levels of provisioning sometime in the future; this report focuses on developing the value chain analysis of the forest sector in Fiji, identify entry point to subsector commodities and undertake market analysis focusing on various case studies of crucial subsectors and NTFPs.

Global warming has further brought the interconnectedness of nature to the attention of global leaders, and in 1997, through the Kyoto Accord, world leaders agreed to cap greenhouse gas emissions.

Box 1: Definition of Non-Timber Forest Product adopted.

Non timber forest product are resources of significant value to human society that **arise from the forest yet are not based explicitly on the wood** that is produced to **secure economic wellbeing to rural tribal communities** living in and around forest areas.

International trade has seen the development and boost of all sectors since World War II (Gereffi, 1994), fueled by the design and development of new products and technologies and the ability to communicate and transport commodities across the globe. Therefore, International producers and buyers can develop trade networks, thus expanding exports from developing countries (Ibid).

Although globalization has provided many opportunities to firms, it also presents several threats. Global competitive pressures require firms to continuously strategize and plan for change to be ahead of their game. Kaplinsky and Morris (2002)⁸ argued that firms must consider two systematic issues when facing competition: the need to collaborate with other firms, not innovate changes in isolation, and to have targeted areas to upgrade their operation. This is where value chain assessments are most meaningful.

The value chain describes the full range of activities required to bring a product or service from conception through the different production and delivery phases to final consumers and disposal after use⁹. Value chain refers to various business activities and processes in creating a product or performing a service. This may be a simple or multiple process involved in a chain of processes in a product life cycle. It should be noted that the Value Chain is not limited to sourcing materials and delivering to consumers (Supply Chain Analysis) but goes beyond the sale of goods to valuing the production of the

⁶ Brundtland, G.H. (1987) Our Common Future: Report of the World Commission on Environment and Development. Geneva, UN-Dokument A/42/427. <http://www.un-documents.net/ocf-ov.htm>

⁷ <https://www.clubofrome.org/ltg50/>

⁸ Raphael Kaplinsky; Mike Morris; Jeff Readman. 2002 Understanding upgrading using Value Chain Analysis https://cris.brighton.ac.uk/ws/files/151841/Understanding_value_Using_Value_Chain_Analysis.pdf

⁹ Kaplinsky, R., Morris M., 2001. A Handbook for Value Chain Research. International Development Research Center (IDRC), Brighton, United Kingdom.

commodity from source to finish product as well as after-service maintenance. Value Chain Analysis incorporates the Supply Chain Analysis as a tool or an integral part of the methodology by establishing the product's primary process and life cycle from start to finish. Von Geible et al. (2010)¹⁰ posed the question of assessing the contribution to the entire value chain and the best way to relay the results to decision-makers to promote sustainable development. Kaplinsky and Morris (2001) characterize the value chain as any activity necessary to get a product or service throughout different phases, from resource extraction, production, manufacturing, consumption, and disposal after use. Besides physical material flows that are assessed by material flow accounting or environmental life cycle assessments, the value chain perspective includes other aspects such as information, monetary flows, power play between actors involved, and their position within the socio-economic structure of the marketplace.

Drawing on past works by Gereffi and Korzeniewicz (1994)¹¹ as well as Kaplinsky (2000) von Geibler et al. (2010)⁸ suggested that the first approach is to observe and interpret the value chain to understand how it is coordinated and embedded in the socio-ecological systems of raw materials and other service providers. Furthermore, they argue that value chain indicators must be set up through stakeholder consultation to ensure a systematic approach to the product's life cycle. The methodology adopted includes a literature review and stakeholder consultation to review and refine the set of indicators (Ibid).

Kaplinsky (2000) noted an increasing tendency toward growing inequalities and poverty between countries when considering the distribution of gains from globalization. He concluded that there are three critical elements to value chain assessment: barriers to entry, economic rent, governance, and different types of value chains.

Economic rent may be endogenous and constructed by the players in the market to create barriers to entry, such as in the case of log production in Fiji – this included landowner commission and goodwill, landowner share of royalty (

¹⁰ Von Geibler et al. (2010). Sustainability assessment of entire forest value chains: Integrating stakeholder perspectives and indicators in decision support tools. In: *Ecological Modelling*, 221, 18, 2206-2214

¹¹ Gereffi, G., Korzeniewicz, M. (Eds.), 1994. *Commodity Chains and Global Capitalism*. Praeger, London, pp. 352.

Annex 2), iTaukei Lands Trust Board (TLTB) fees and royalty share as well as Forestry Department fees (Whiteman, 2005). Other types of economic rent may involve providing better technology, having access to better-skilled workers than competitors in the same market, organizational rent through mandated services, market rent by having brand names, or provision of better marketing proficiencies. Economic rents can also be exogenous to the chain and arise through nature's bounty, such as resource rents for accessing scarce natural resources. Economic rents are not stagnant but are dynamic to the chain to meet changing demands and conditions of trade.

Whiteman (2005) calculated the economic rent for forest harvesting and sawn timber in Fiji and indicated that loggers may be more attractive to harvest Royalty Class 1 and Class 2 species as they have favorable economic rent. Logs under Royalty Classes 3 and 4 have negative economic rent. Whiteman (2005) further suggests that royalty rates should be much higher for the top classes; however, for the sake of ecosystem health, loggers should be encouraged to harvest all merchantable species in Fiji's native forest, including species in the lower royalty category. Whiteman (2005) further suggested that the focus should be on developing markets for lower royalty classes.

A technical mission from the International Tropical Timber Organisation (ITTO) was commissioned by the Fiji Government in 2004 to analyze the barriers that prevent Fiji from adopting sustainable forest management. The report notes that Liebig's Law of Minimum governs many limiting constraints. The report notes that when a solution to a complex problem is identified, limitations by other factors may surface, such that corrective measures should be in an ordered sequence rather than a set of activities (ITTO 2004). In order of priority, the report recommends **(1) improvement of coordination of planning, development, and optimization of the wood flow from the forest to the market**, (2) improvement in the standard of harvesting under sustainable forest management principles, and (3) continue, expand and accelerate awareness among forest owners.

Gereffi (1994)⁵ identified the authority and power relationships that determine how financial, material, and human resources are allocated and flow within the supply process along the production chain. The flow between the supply and production process implies the repetitiveness of linkages and interactions. Governance ensures that the interactions between firms along the value chain are not random. Governance is organized by parameters requiring product, process, and logistical standards, which will have consequences up and down the chain, affecting the roles and functions of all players. Kaplinsky and Morris (2001)¹² point out that governance differs from the coordination of activities related to chain management. There are three types of value chain governance, including (1) legislative governance, (2) judicial governance, and (3) executive governance. Legislative governance sets out the rules of participation in the value chain and, apart from local laws, also includes international standards such as ISO9000 (on quality), ISO4000 (on the environment), SA8000 (labor standards), and industry-specific standards (Ibis). Judicial governance provides audits of performance and compliance checks. Executive governance assists players along the value chain in meeting quality standards.

Table 1: Three Types of Governance in Value Chain (Kaplinsky & Morris, 2001)

¹² Kaplinsky, R., Morris M., 2001. A Handbook for Value Chain Research. International Development Research Center (IDRC), Brighton, United Kingdom.

	Exercised by parties internal to chain	Exercised by parties external to chain
Legislative governance	Setting standards for suppliers in relation to on-time deliveries, frequency of deliveries and quality	Environmental standards Child labour standards
Judicial governance	Monitoring the performance of suppliers in meeting these standards	Monitoring of labour standards by NGOs Specialised firms monitoring conformance to ISO standards
Executive governance	Supply chain management assisting suppliers to meet these standards Producer associations assisting members to meet these standards	Specialised service providers Government industrial policy support

Two types of value chains (Table 2) are described by Gereffi (1999), where the first is driven by the buyer at the apex, who also provides the governance role, such as in the case of labor-intensive industries, including footwear, furniture, and toys. The second type involves producers along the value chain with vital technology and coordinating various links. The producer is thus in control of assisting their suppliers and customers, often associated with foreign direct investments. Each of these types of value chains is associated with different production systems, as outlined in **Error! Not a valid bookmark self-reference..**

A purely competitive market is assumed to fulfill four essential conditions, including homogenous goods with a perfect substitute that attracts many buyers and sellers and the availability of perfect information amongst all market participants with relative ease – considered as free entry and exit. For the forest sector in Fiji, there are distinct differences between primary and secondary production. The timber industry in Fiji was recorded to have a dual market structure where primary production consists of an oligopoly. In contrast, the secondary processing markets conform to an oligopoly structure (Waqainabete, 2006)².

The market for non-timber forest products (NTFP) in Fiji is at its initial development stages. The Ministry of Forestry is committed to investing in NTFP research and Development to diversify the forestry sector's economic performance and develop alternative commodities for livelihood and poverty alleviation targeted at forest landowners in rural areas¹³. The Ministry researches six NTFPs: agarwood, bamboo, beach mahogany (dilo), candlenut (sikeci), sandalwood, and coconut veneer¹⁴.

Table 2: Production Systems under two Types of Value Chain (Gereffi, 1999)

¹³ The Ministry of Forestry. 2021. The Ministry of Forestry Annual Report 2020-2021. Parliamentary Paper N0. 73 of 2022.

¹⁴ <https://www.forestry.gov.fj/pressdetail.php?id=136>

	Producer-Driven Commodity Chains	Buyer-Driven Commodity Chains
Drivers of Global Commodity Chains	Industrial Capital	Commercial Capital
Core Competencies	Research & Development; Production	Design; Marketing
Barriers to Entry	Economies of Scale	Economies of Scope
Economic Sectors	Consumer Durables Intermediate Goods Capital Goods	Consumer Non-durables
Typical Industries	Automobiles; Computers; Aircraft	Apparel; Footwear; Toys
Ownership of Manufacturing Firms	Transnational Firms	Local Firms, predominantly in developing countries
Main Network Links	Investment-based	Trade-based
Predominant Network Structure	Vertical	Horizontal

Commodities developed from non-timber forest products have different consumers and target groups; hence, the NTFP market is segmented. Kaplinsky and Moris (2001)¹¹ noted that distinctive market characteristics are Critical Success Factors (CSF), which are very important in final markets. In the case of NTFP among low-income rural communities, the market price is often the most critical parameter, together with quality, differentiation, and branding. Hakemulder (2015)¹⁵ noted that creating clear criteria is essential and must align with the initiative's objective, such as promoting better jobs for men and women. In mountain-specific economies, it is noted that there are as many as 20 different products and services (Hoermann et al., 2010)¹⁶ from NTFP. Market characteristics for mountain-specific economies include unique/niche products, inaccessibility, fragility, marginality, and diversity (Ibid).

Methodology

As a developing nation, Fiji is committed to accelerating integrated and sustainable resource management to inspire actions at all levels of the community aimed at strengthening resilience to climate change, enhancing environmental protection, and building socio-economic improvement that will reduce poverty while supporting economic growth (The Green Growth Framework, 2014)¹⁷.

¹⁵ Hakemulder, R. 2015. Value chain development for decent work: how to create employment and improve working conditions in targeted sectors / International Labour Office.- 2nd ed. - Geneva: ILO.

¹⁶ Hoermann, B.; Choudhary, D., Choudhury, D., Kollmair, M., 2010. Integrated Value Chain Development as a Tool for Poverty Alleviation in Rural Mountain Areas. An analytical framework. ICIMOD.

¹⁷ Fiji Government. 2014. A Green Growth Framework for Fiji. Restoring the balance in Development that is Sustainable for Our Future. The Ministry of Strategic Planning, National Development and Statistics.

The Ministry of Forest has been instrumental in advocating Sustainable Forest Management (National Forest Policy 2007)⁵ from nursery development, silviculture research and management, improving timber production efficiency through regularly updating the Fiji Harvesting Code of Practice, setting up a framework for forest certification systems; improving timber utilization efficiency and development of livelihood opportunities using NTFPs as well as exploring alternative revenue streams through carbon trading.

Value Chain Analysis attempts to understand all the interconnected activities that are required to produce a product or services from the beginning of the process to completion, which involves assessing the product lifecycle from commodity design and development, marketing, sales, consumption, and any after-sales services (Kaplinsky and Morris (2001)¹⁸. Among the many valuable guidelines on value chain research, a comprehensive list of manuals and tools used in Agriculture and Forestry is outlined in Nang'ole EM et al. (2011)¹⁹. In summary, the guidelines cover four broad stages of value chain analysis, which include:

- (i) Appraisal of value chain and related information outlining tool to choose the product or commodity to focus on. This stage involves stakeholder mapping, identification of MSME and product to be assessed, survey and information gathering, analysis of existing collaboration, and engagement with communities to identify challenges, risks, threats, and efficiency gaps.
- (ii) Design interventions to improve value chain performance, including technology, institutional innovations, and policies.
- (iii) Implementation of interventions.
- (iv) Monitoring and evaluation.

Value Chain at Sectoral level

The methodology outlined by Pyakurel and Pedal (2014)¹⁶ and Rengasamy (2017)²⁰ is considered in detail to guide the sequence of steps adopted in this analysis. Pyakurel and Pedal (2014) highlighted the *Value Chain Upgrading Strategy* as an alternative to undertaking a complete competitiveness strategy. Together with a market map (Rengasamy, 2017; Abul & Griffith, 2005), the value chain analysis at the sector level may be broad to assess climate readiness and the potential integration of emerging revenue streams such as carbon and biodiversity credits.

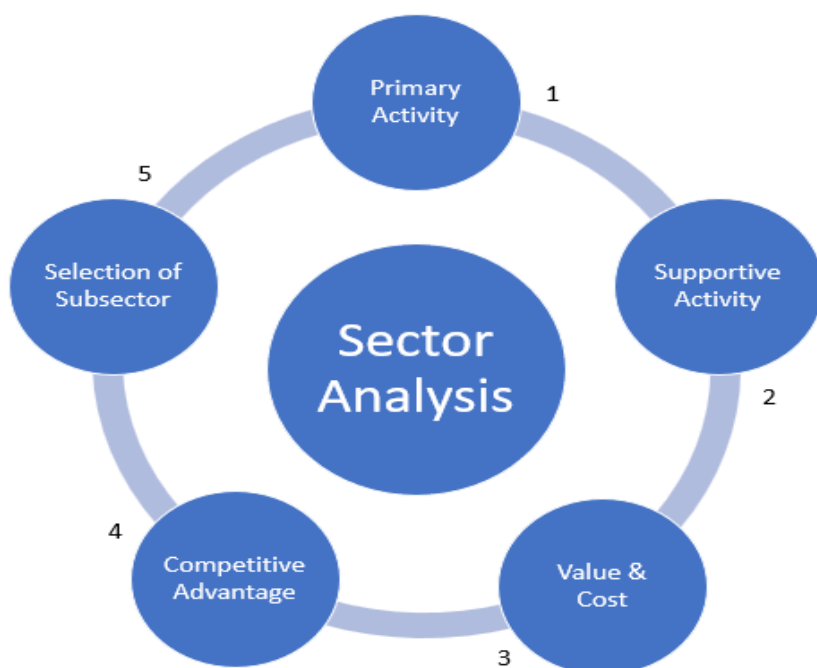
Adopting Porter's Value Chain analysis at the sector level provides an in-depth assessment of all processes along the production chain. Porter's analysis can be summarized in three simple steps, including (1) articulation of all activities along the production chain, (2) valuation and cost of all activities, and (3) identification of competitive advantage opportunities for potential growth. Applying Porter's value chain at the sectoral level will allow the identification of crucial subsectors that may be assessed for upgrading strategy. The methodology adopted in this assessment is outlined in Figure 1, where the numbers indicate the sequence of assessments undertaken.

Figure 1: Methodology of Sector Analysis Adopted in this assessment.

¹⁸ Kaplinsky, R.; Morris M., 2001. Handbook for Value Chain Research. International Development Research Center (IDRC), Brighton, United Kingdom.

¹⁹ Nang'ole EM., Mithofer D and Franzel S., 2011. Review of guidelines and manuals for value chain analysis for agriculture and forest products. ICRAF Occasional Papers No. 17. Nairobi. World Agroforestry Center.

²⁰ Rengasamy. S.; 2017. Student's Guide to Value Chain Analysis for Livelihood Intervention. Madurai Institute of Social Science. India



Focus on selected sub-sector

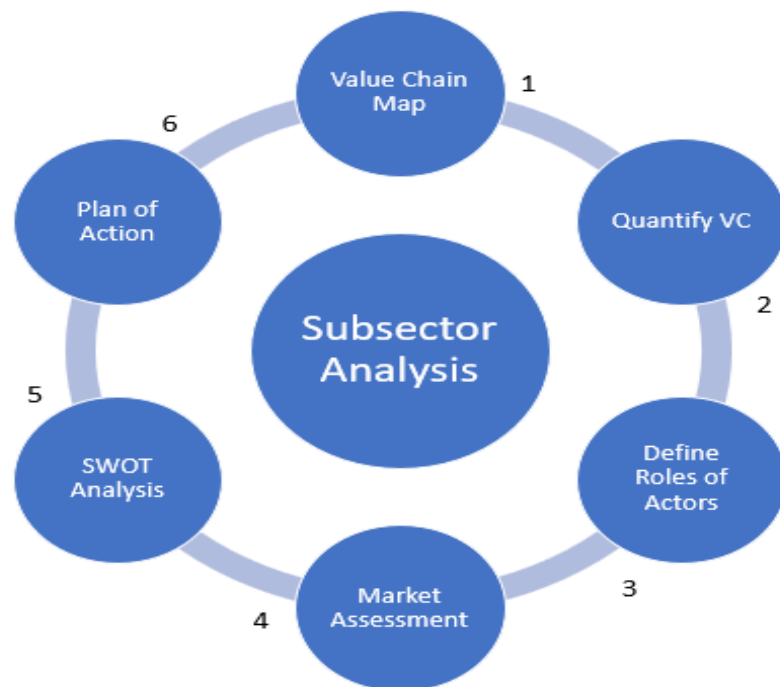
The selection of subsectors at the end of the sector analysis will be determined by the identified opportunity for growth and the potential value any intervention will bring to the sector's overall development. Once selected, detailed market information is collected through a questionnaire (Annex 4) from entry points (private players) identified in the value chain analysis. The subsector analysis adopts methodology from McGregor and Stice,²¹ as outlined in Figure 2. Information gathered in the questionnaire was transferred into the value chain framework for a sub-sector. The framework is aligned with Figure 2, as outlined in Annex 5.

Two types of subsectors are assessed: (1) dominant player and (2) new entrants in the form of NTFP MSME. The dominant player will be determined in the sector analysis. NTFPs are selected using two tools as follows:

1. In a quadrant assessment, participants are asked to place each NTFP against challenges specific to rural Fiji and the opportunity the NTFP may create to improve well-being in rural areas.
2. Rank matrices of critical criteria for the success of NTFP in Fiji, which will indicate the appropriate strategy for the NTFP assessed.

Figure 2: Methodology for Subsector analysis used in this assessment.

²¹ McGregor, A. Stice, K. 2014. Agricultural Value Chain Guide for the Pacific Islands. Making value chain analysis a useful tool in the hands of farmers, traders, and policymakers. Koko Siga Pacific. EU-ACP Technical Center for Agricultural and Rural Cooperation (CTA).



Matrices outlined in the literature (Henning et al., 2008; Tetra Tech, 2021) are also used to develop suitable criteria for selecting NTFP. The selected NTFP will be assessed using the framework outlined in Figure 2. The team developed a suite of criteria, which was presented and reviewed by Focus Group Discussion. The Focus Group consisted of Government Officials, representatives from statutory bodies, civil society, and the private sector.

The original success criteria for NTFP focused on growth opportunities, availability of human resources, accessibility to raw materials and markets, fragility, impact of climate change, and access to finance, technology, and information. The final matrix agreed (at the Focus Group Discussion) to be appropriate and relevant to the Fijian forest sector NTFP is outlined in Table 3. These criteria for success also indicate the critical strategy NTFP should 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 3: Matrix for Criteria of Success for NTFP

Thematic Area	Non-Timber Forest Product Specificity	Core Manifestation criteria
Accessibility	Accessibility (high value/low volume)	<ul style="list-style-type: none"> • Remoteness • Distance to markets • Efficiency of infrastructure • Weight/volume of products • Availability of communication infrastructure
	Availability/ access to technology (Opportunity for Value Addition)	<ul style="list-style-type: none"> • Improved access to financial services for improved technology • Ability to identify gaps and deficiencies. • Identification of appropriate technology
Niche	Growth opportunity (Unique/niche market)	<ul style="list-style-type: none"> • Presence of unique/niche products or services due to location-specific diversity (in the form of products, culture, or knowledge) • Potential for pro-poor income increase

Thematic Area	Non-Timber Forest Product Specificity	Core Manifestation criteria
	Availability of human resources (Inclusiveness and Capacity Needs)	<ul style="list-style-type: none"> Existence of backward linkages (in terms of both investment and knowledge transfer) Equitable participation of poor/disadvantaged groups as producers or laborers Strengthening women's negotiating power within markets and enterprise Gender training for women and their families to increase women's power in the family. Strengthening support networks in the community, including protection of women against violence
F. Diversity (economies of scope)	Consumer Demands	<ul style="list-style-type: none"> Linked to the mainstream market. Capacity to understand/fulfill market demand. Negotiation capacity Ability to bear market risks.
	Impact of other land (e.g., livestock, mining, fire, etc. – the need for Resource Planning)	<ul style="list-style-type: none"> Development of Tikina Based Landuse Plans Adoption of Tikina, Province and National Landuse Plan Development of Policies and regulations supporting NTFP
Fragility	Access to finance (Bankability of the enterprise)	<ul style="list-style-type: none"> Potential for economies of scope through diversified but interlinked activities Improved facilities for women in markets and measures to counter discrimination
	Fragility (sustainable resource management)	<ul style="list-style-type: none"> Vulnerability to irreversible damage Carrying capacity for sustainable supply of raw material
	Impact of Climate Change on access or raw material (climate resilience)	<ul style="list-style-type: none"> Vulnerability to the impact of climate change on resource availability Ability to resist drought, floods, and tropical cyclones. Improvements in broader social security, health, and education provision for all women, youth, and vulnerable in society.

Forest Sector Analysis

Porters Value Chain Framework

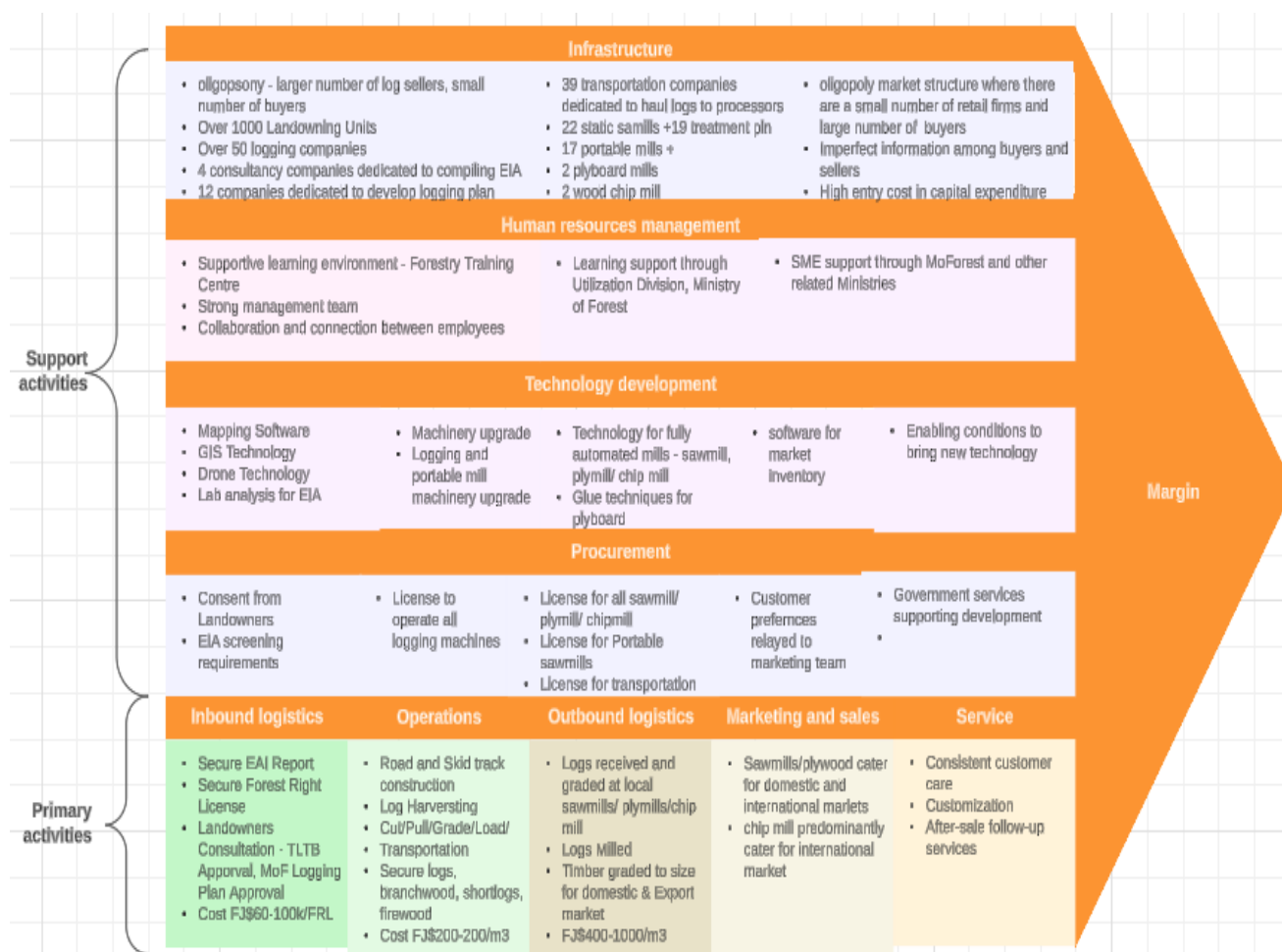
By applying Porter's Value Chain framework, we delve into the primary and supporting activities that underpin Fiji's forest industry production process. This comprehensive approach allows us to trace the journey of direct inputs to the final commodity sold in domestic and international markets. Porter's framework, widely recognized for its effectiveness in assessing private firms, helps us identify fundamental procurement mechanisms, logistics, business processes, and consumer groups in the industry. While Figure 3 provides a high-level overview of the market channel of logs sourced from native forests and plantation establishments, it is essential to note that the complexities of Fiji's forest sector are not fully captured. Nonetheless, it serves as a valuable tool in understanding the various processes of log production that facilitate commodity production.

Primary Activities

Inbound logistics

The forest sector is guided by the Constitution of the Republic of Fiji (2013)¹ and Forest Decree 1992,²² which regulates the management and utilization of forest resources sustainably while facilitating the sector's growth with the full participation of resource owners. The Forest Decree (1992) also directed the establishment of a Forestry Board to advise the Minister of Forest on matters relating to forest policies. The regulations that guide forest development include the Forest (Preservative Treatment) Regulation 1992, the Forest (Sawmill) Regulations 1968, the Forest Guard Regulations 1975,²³ and the Forest (Fire Prevention) Regulation 1972²⁴.

Figure 3: Porters Value Chain for Fiji's Forest Industry



Several acts and regulations are in place to ensure the forest industry's commitment to environmental protection. These include the Environment Management Act (EMA, 2005), the Endangered and

²² <https://www.forestry.gov.fj/docs/legis/FORESTDECREE1992.pdf>

²³ <https://www.forestry.gov.fj/docs/legis/ForestGuardRegulation.pdf>

²⁴ <https://www.fao.org/faolex/results/details/en/c/LEX-FAOC008045/>

Protected Species Act (1972), the Biosecurity Promulgation (2008), and the iTaukei Lands Trust Act 2012 (Amended). Complementing these acts are the Environment Management (EIA Process) Regulation 2007 and the Environment Management (Waste Disposal and Recycling) Regulation 2007. These comprehensive legal and regulatory frameworks underscore the industry's dedication to sustainable practices and environmental stewardship.

Laws and regulations establishing forest institutions in Fiji include the Fiji Pine Commission Act 1976, Commission Forests (Maintenance and Protection) Regulation 1987, and the Fiji Pine Decree 1990²⁵. For Mahogany plantations, the Fiji Mahogany Act (2003) and the Mahogany Industry Development Act 2010²⁶. In 2011, the Government endorsed the Mahogany Industry (Licensing and Branding) Act²⁷ to regulate the licensing and branding of Fiji Mahogany.

Other legislations that affected forest industry development include the Native Land Trust Act of 1940, the Land Conservation and Improvement Act of 1953, the Nature Reserves Act of 1956, the Native Land (Lease and Licenses) Regulations of 1984, and the Native Land (Forest) Regulation of 1984.

The above laws regulate how actors prepare and engage throughout the value chain. For instance, preparatory requirements for harvesting licenses include the Environmental Impact Assessment (EIA) approval by the Ministry of Environment. To secure harvesting licenses, operators need consensus from landowning units or *mataqali* that own the land where the logs will be extracted. The iTaukei Lands Trust Act dictates that at least 60% of landowners must agree on the harvest of native timber trees. In the case of plantation-grown timber, such consensus is secured before land leases are issued to plant trees. Plantation management, therefore, has the total prerogative to harvest plantation forest on the assumption that prior endorsement from landowning units is secured.

Operations

Native tree species are categorized into merchantable and non-merchantable timber. The latter cannot be extracted from native forest areas for commercial purposes. At the same time, merchantable species require two licenses, and the iTaukei Lands Trust Board issues a Forest Access License. It is a prerequisite to the Forest Right License the Ministry of Forestry issued. The application process for harvesting licenses is clearly articulated in the Ministry of Forestry Business Guideline 2022-2023.

The number of logging licenses issued by the Ministry of Forest has continued to decline since 2017, as depicted in Figure 4. The decline may be attributed to increasing stringent requirements under the Ministry of Environment, such as the EIA, which has been reported to take as long as three years to process.

Generally, pine production is the dominant species harvested from Fiji's forest, while mahogany is the least. The pine plantation is considered a sub-sector, with the primary producer being Fiji Pine Ltd. (FPL), supplying logs - solely to its subsidiary company Tropik Wood Industries with a sawmilling capacity of 350m³ per day, a treatment plant, two chip mills as well as the production of electricity from

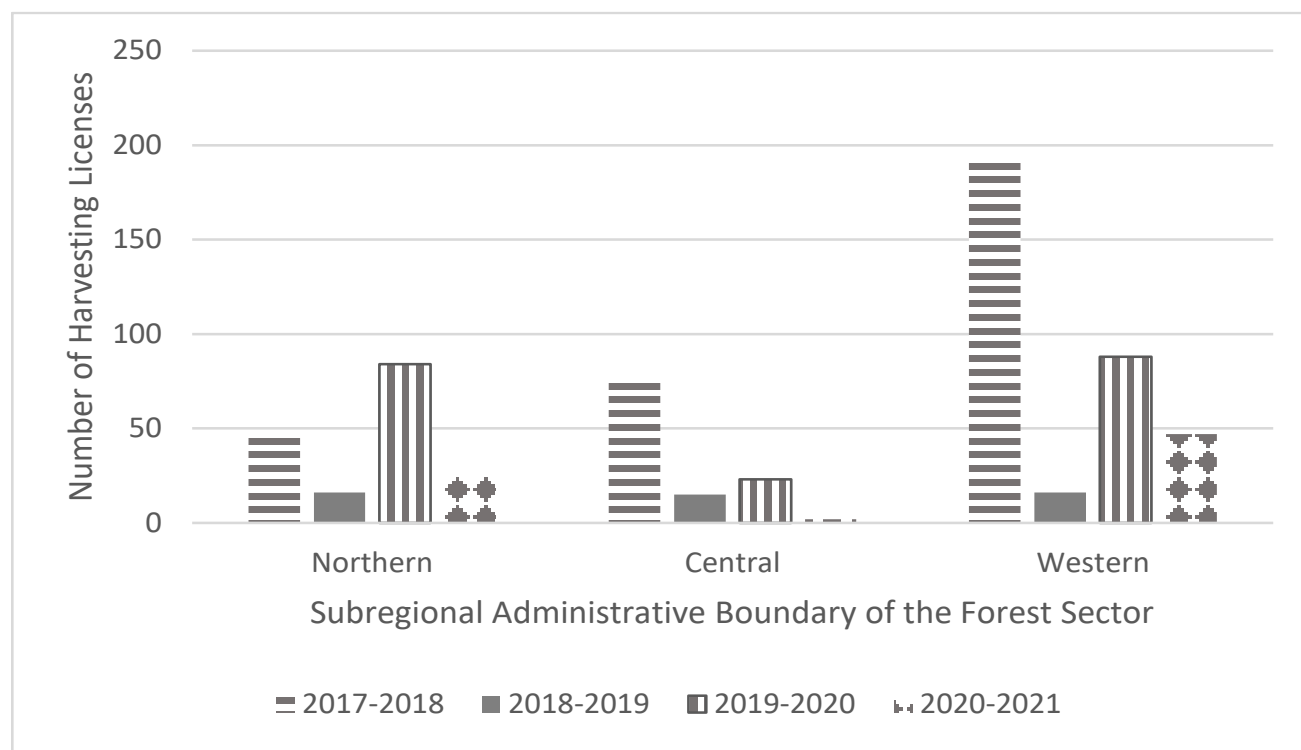
²⁵ <https://faolex.fao.org/docs/pdf/fij2913.pdf>

²⁶ <https://www.laws.gov.fj/Acts/DisplayAct/645>

²⁷ <https://www.laws.gov.fj/Acts/DisplayAct/647>

wood waste which it supplies to the national grid. On the other hand, Fiji Hardwood Corporation Ltd. manages mahogany plantations and does not have a sawmill. FHCL focuses only on log production. The sale of Mahogany logs by the company saw a transition from auctions to predetermine sales agreements in alignment with the Mahogany Licensing and Branding Act of 2011. Through this legislation, FHCL may issue licenses to mahogany log buyers. Each license holder can purchase mahogany logs from the company at pre-agreed volume and mill gate price. The annual quota set by FHCL is 80,000 m³ annually. Given the low productivity against the level of quota set, a new system was put in place in 2020 that allows Open Buyer License. The company continues strategizing to increase production levels and meet sustainable harvesting levels.

Figure 4: Trend in the number of Timber Harvesting License issued per year over four four-year period



The trend in log production for the period 2017 – 2021 indicates that pine is the dominant subsector in the forest sector (see The transportation of round logs is part of the harvesting operation and is traditionally organized and coordinated by harvesting operators. Transport arrangements are complex as trucks can be used in other activities, such as construction and infrastructure development, in conjunction with the harvesting operation (backhauling) or when harvesting operations are suspended or completed.

Figure 5)

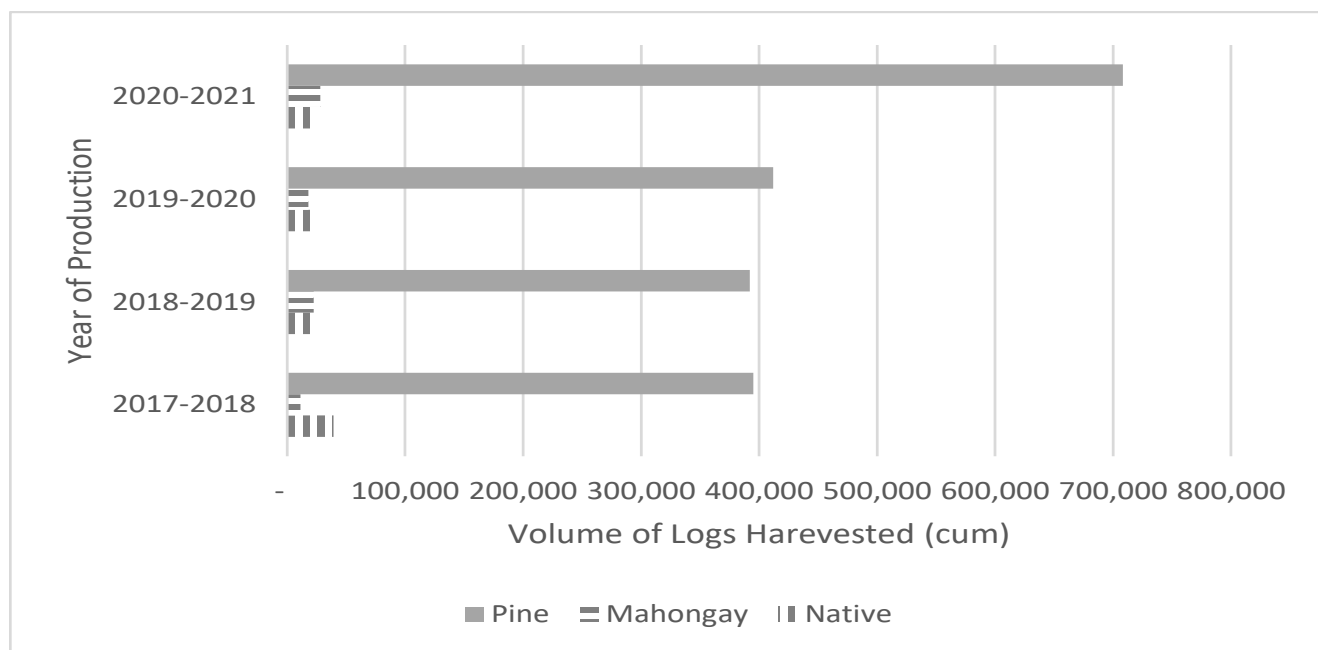
Log harvesting from all forest types begins with the development of coupe or logging plans. These plans are aligned with the Fiji National Harvesting Code of Practice (2013), which provides guidelines for all forest users (landowners, logging contractors, and forestry officers) on how to log harvesting must be undertaken to minimize adverse impacts while aligning with standard best practices in Fiji.

Logging activities for commercial purposes are authorized through a Forest Right License issued by the Ministry of Forestry. Licenses are commonly given annually, although there is an opportunity (by law) to

opt for a more extended license. Except for plantation owners, landowners of native forests often opt for annual licenses to facilitate the management of logging contractors.

The transportation of round logs is part of the harvesting operation and is traditionally organized and coordinated by harvesting operators. Transport arrangements are complex as trucks can be used in other activities, such as construction and infrastructure development, in conjunction with the harvesting operation (backhauling) or when harvesting operations are suspended or completed.

Figure 5: Trend in Log Production 2017-2021 showing log sources.



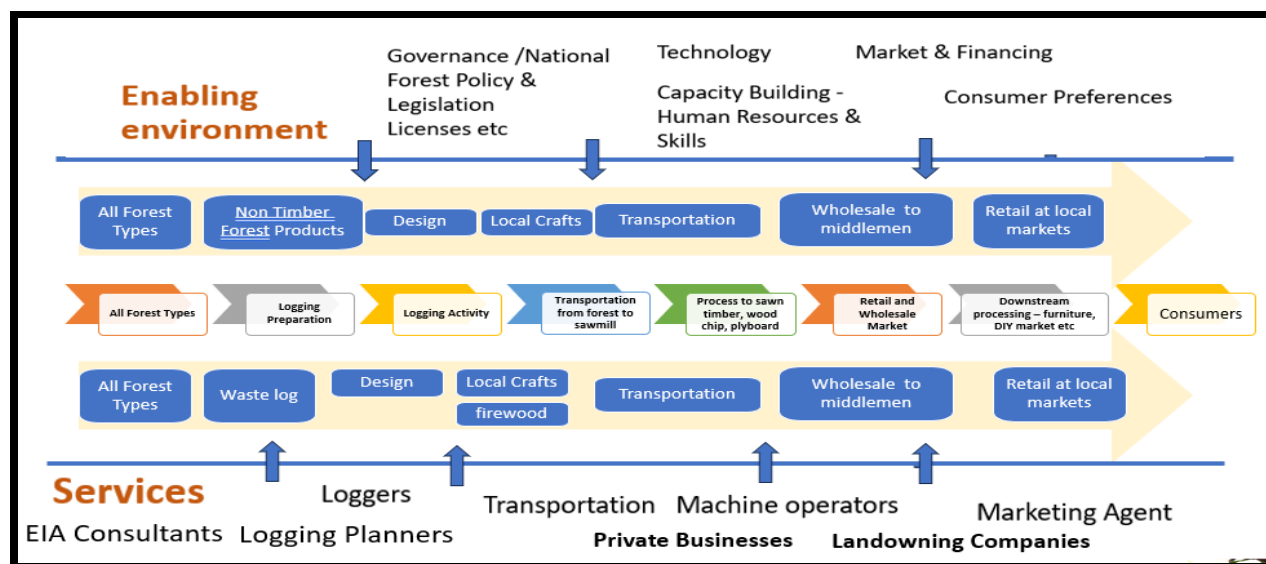
Officials from the Ministry of Forestry measure all harvested logs at the landing before loading them on 10–13-ton trucks. Each truckload of measured logs is issued a ‘pass’ that authorizes the truck driver to transport the measured logs on public roads. Each truckload of logs has a predetermined destination: delivery to designated sawmills or log yards. Figure 6 depicts a typical market map for the forest sector.

Outbound logistics

Logs are selected at the log yards for specific end products depending on the species and size. For instance, high-value native species with straight boles of particular sizes are directed to the veneer mill for plyboard. Shorter pieces that do not fit the specifications for sawn timber are produced as packaging material and are constructed into packaging boxes or pallets. Waste wood and sawdust are used to fire steam-generated electricity, as in the case of Fiji Pine, or sold to the public as firewood.

Essential criteria for entry into sawn wood production include security of supply for round logs. Sawmill owners must have the consensus of 75 percent of resource owners to ensure the ability to access indigenous lands for log extraction from native forests. Whiteman (2005) has documented parameters of a typical ‘average’ sawmill with a capacity of 5,000 cubic meters per annum, operating at 60 percent of that capacity with a 30-40 percent recovery rate. The parameters of a typical sawmill in Fiji are outlined below Table 4. Time limitations have not allowed a review to attain recent parameters.

Figure 6: Market Map of timber and wood pan products in Fiji



The average sawmill is assumed to be self-sufficient because it has secured log sources through harvesting operations, thus ensuring a regular supply of raw material. The mill is further assumed to sell 50 percent of its output to the domestic market and 50 percent to the export market. The number of sawmills operating at each administrative boundary in Fiji has continued to decline, as depicted Figure 7. The decline can be attributed to the reduction in the number of logging licenses issued and operational factors such as adverse and prolonged wet seasons and increasing costs of doing business due to additional requirements in the value chain, such as the EIA under the Ministry of Environment.

Table 4: Typical Parameters for Sawmill Operation (Whiteman, 2005)

Parameters	Quantity	Units
Capacity	5000	cum/yr
Annual log input	6000	cum/yr
Operating capacity	60	%
Recovery rate	50	%
Annual output	3000	cum/yr
Log source	Saw miller license area with an annual Forest Right License	
Commodities produced	range of timber products, grade, species	
Market	50	% export
	50	% domestic
Borrowing	20	% of capital
	80	% of saw millers' equity
Return on Capital	20	%

Family businesses traditionally run processing in the forest sector; small operators outnumber larger ones. However, many small operators have closed due to log scarcity (08/10/05) due to the introduction of

new policies, the transitional nature of development in the industry, and the push to adopt new, more efficient technology²⁸. Another major constraint may be the economies of scale for entry, which allow companies who have remained in the industry to advance with new technology and establish their position in domestic and export markets (Whiteman, 2005). The number of players entering and exiting the industry between 1986/1989, estimated by Whiteman (2005), indicates a high exit level and low level of new entrants (see Marketing & Sales

Market Activity

Generally, the current economic activity in the forest sector has been weak primarily due to weak foreign demands, adverse weather conditions, and licensing issues. The export of wood chips by Tropik Woods Industries has declined as global demand for paper subsides. Nevertheless, mahogany productivity is expected to increase with the new licensing regime and the repositioning of FHCL under the Ministry of Forestry (transitioned by Cabinet Decision from the Ministry of Public Enterprise). At the same time, the Reserve Bank of Fiji hopes to develop non-timber forest products, such as wood pellets, for export to Korea by the Nabou Biomass Plant. Despite the high potential, producing wood pallets from Fiji needs extensive Research and Development on product development.

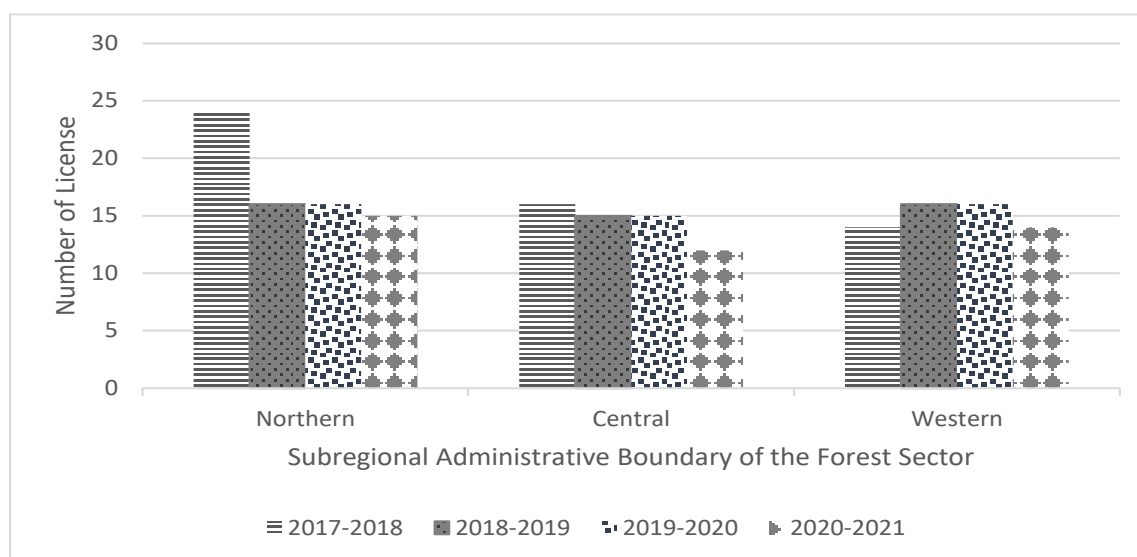
).

Table 5: Entry and Exit of Players in the Sawn Timber Processing Industry 1986-1989 –Whiteman (2005)

Size of sawmill by annual log intake	Total 1986 -1989			Annual Average		
	Entry	Exit	Total	Entry	Exit	Total
Over 10,000 cum	3	5	8	0.2	0.4	0.6
5,001 – 10,000 cum	9	7	16	0.7	0.5	1.2
1001 – 5000 cum	20	20	40	1.5	1.5	3.1
0 – 1,000 cum	49	73	122	3.8	5.6	9.4
All Sizes	81	105	186	6.2	8.1	14.3

Figure 7: Five-Year Trend in the Number of Sawmills Operating in Fiji

²⁸ Rizer, J. P. (1988). Data Requirement of Fiji's Current and Future Timber Industry. *Forest Sector Development Study Fiji*. A. Leslie. Rome, FAO.



Marketing & Sales

Market Activity

Generally, the current economic activity in the forest sector has been weak primarily due to weak foreign demands, adverse weather conditions, and licensing issues. The export of wood chips by Tropik Woods Industries has declined as global demand for paper subsides. Nevertheless, mahogany productivity is expected to increase with the new licensing regime and the repositioning of FHCL under the Ministry of Forestry (transitioned by Cabinet Decision from the Ministry of Public Enterprise). At the same time, the Reserve Bank of Fiji hopes to develop non-timber forest products, such as wood pellets, for export to Korea by the Nabou Biomass Plant. Despite the high potential, producing wood pellets from Fiji needs extensive Research and Development on product development.

The Ministry of Forestry²⁹ has expressed aspirations to support investment in non-timber forest products; however, there is very little-known data on current levels of demand or production nor an available list of players in the non-timber forest subsector. The Ministry of Forest recognizes the growth potential of non-timber forest products. It has included government investment to help communities and interested parties plant 150,000 sandalwood, 100,000 coastal species, 200,000 fuelwood species, 100,000 fruit trees, 400,000 teak, and 100,000 candlenut trees³⁰.

Market Structure

A comparative graph shows the number of harvesting and sawmill licenses issued between 2017 and 2021 Figure 8. The number of harvesting licenses issued annually is averaged at 157 for the period 2017 – 2021. Issuing licenses for minor forest products (posts, poles, and firewood) would bring the total license issued annually to around 250. The scarcity of round logs has forced the buyers to become competitive, as evident in the high percentage of economic rent received by resource owners

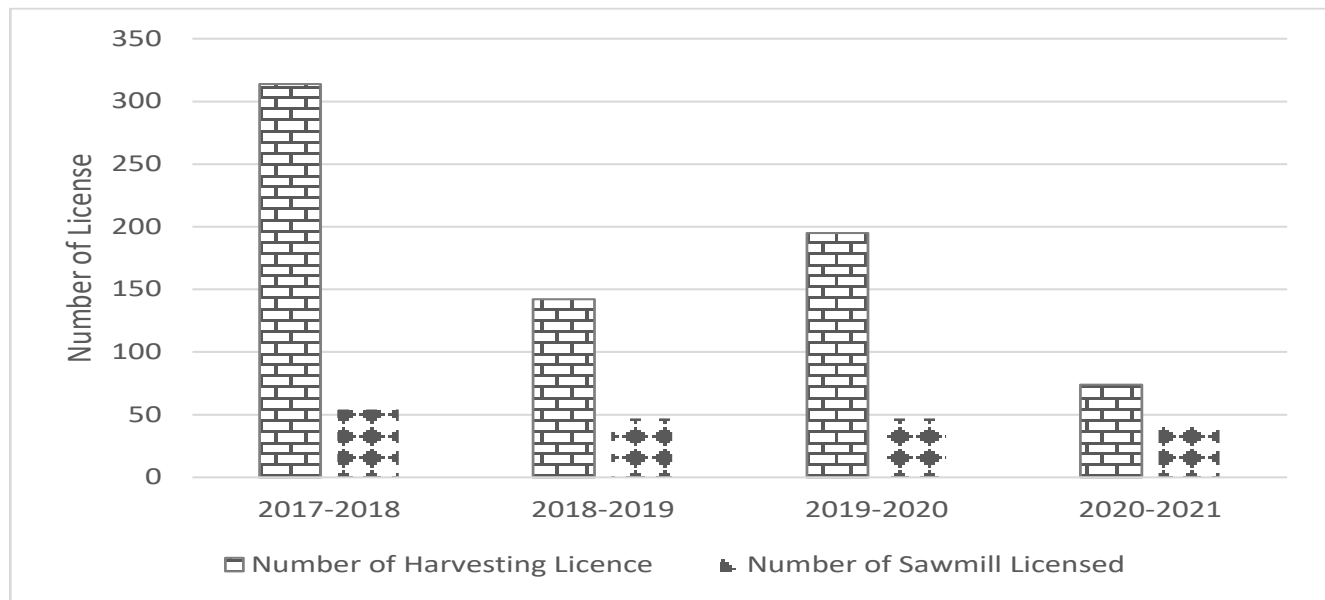
29 Fiji Government. 2021. The Ministry of Forestry Annual Report 2020-2021.

30 Fiji Government. 2021. The Ministry of Forestry Annual Operational Plan 2021-2022.

(Whiteman, 2005). In short, the market situation at primary production is one of few buyers (saw millers) and many sellers (forest owners with Harvesting License) – aligning to an oligopoly market structure.

On the other hand, considering the processing and retail end of the market, there are a few sellers (sawmillers and retailers) and many buyers (consumers). In this case, the market situation is oligopoly under assumptions of homogeneity of commodities and difficult market entry (Waqainabete, 2006)². Given that the size of the distribution channel is often measured by the number of different processes involved and the range of commodities produced, the timber industry in Fiji is tiny by world standards.

Figure 8: Trend in number of licenses in primary and secondary process 2017-2021



For plantation estates in the forest sector, FPL and FHCL are government-owned companies controlling wood flow from the source. FPL operates along the whole value chain and may be considered to operate in a monopoly market. Although FHCL is focused on log production, the absence of competitors in its market segment creates a monopoly structure.

Plantation forests contribute 96% of Fiji's log production, 91% from pine plantations, 4% from Mahogany, and 5% from native forests. Pine and mahogany logs cannot be substituted; hence, the respective plantation companies monopolize their subsectors.

The dual market structure of Fiji's forest sector is assumed to trigger complex market behaviors along the value chain that may create a perfect competitive market where there are (1) large numbers of buyers and sellers, (2) homogeneous products that are perfect substitutes; (3) there is perfect information amongst all market participants; and (4) there is free entry and exit in the market. Each of the four critical requirements for perfect competition is discussed to describe the prevailing market structure for the timber industry in Fiji.

Many buyers and sellers: At the extreme ends of the value chain for the forest sector, there are many sellers of logs (forest owners) and buyers of the final product, such as sawn timber, furniture, and other

wood-based commodities sourced from forest resources. All market producers are assumed to be profit seekers, and all buyers aim to maximize utility at the lowest possible price. Under such conditions, individual decision factors differ from market demand and supply functions. Therefore, in a market with large numbers of buyers and sellers, any deviation from the market price will cause either a loss of market share for that participant or disruption in the balance of the entire market equilibrium, resulting in a new set of demand, supply, and prices (Frank, 2003)³¹.

The forest industry in Fiji is one where the few buyers can, under competitive conditions, insert significant market power on the many sellers of primary products. Further, production forest areas are isolated and remote from processing plants; hence, diseconomy of scale and high transportation costs may disadvantage the sellers by limiting market boundaries only to mills within the vicinity of the forest areas. This then determines the number of buyers (saw millers) with whom sellers can trade – violating the first requirement of perfect competition. At the same time, buyers in other areas or zones may be desperate to secure a log supply and deviate from perfectly competitive prices in their bid to procure raw materials; hence, prices in the industry at the national level may not move together.

Homogenous commodity: At the primary production stage, logs are homogenous; however, the spatial distribution of market players, the relative value of the log, and transportation costs, coupled with different site conditions, question the definition of homogeneity.

Perfect information: Perfect information must prevail if all participants in the market are to make objective decisions on any exchange in terms of prices, form, quality, and quantity for an efficient market outcome. Buyers (saw millers) and sellers (resource owners) can make decisions in their best interest because they can trade at the maximum expected utility or refuse to trade should an alternative deal be more lucrative. This enforces Pareto efficiency by removing the possibility of rearranging the transaction to make one party better off without making others worse off (Frank, 2003; Murray & Prestemon, 2003³²). In the context of the forest industry, perfect information, even at the production level, is not possible. The situation arises where one party has more information and can use it to their advantage in adverse selection and violation of Pareto efficiency. Similarly, product information is readily available in the commodity market, and buyers have a wide range of choices to source desired procurement.

Free entry and exit: Free entry and exit are preconditions for perfect competition. Baumol (1982) extended the oligopoly and monopolistic market to show that contestable markets allow firms to enter and exit without incurring significant costs. However, irrespective of the market structure or the cost involved in entry and exit, players are assumed to be governed by Adam Smith's invisible hand, are rational decision-makers, and are driven by self-interest and present aim. In this respect, as long as participants anticipate higher expected profits than entry costs, they will enter the market. However, existing market players will try to discourage potential entrants from reducing their market share and, therefore, pitch the price higher than the average equilibrium level (Frank, 2003)³³.

³¹ Frank, R. H. (2003). *Microeconomics and behavior fifth edition*. New York, McGraw-Hill Companies Inc.

³² Murray, B. and C. Prestemon (2003). Structure and efficiency of timber markets. *Forest in Market Economy*. E. O. Sills and K. L. Abt. Netherlands, Kulwer Academic Press.

³³ Frank, R.H. 2003. *Microeconomic and behavior. Fifth addition*. New York. McGraw-Hill Companies Inc.

In Fiji's timber industry, free entry and exit mean market participants are not constrained by technology or institutional barriers (Murray and Prestemon). This is evident in the high turnover of sawmills going out of operation (see Table 4). A major contributing factor may be the scarcity of raw materials (logs) as a direct consequence of the general decline in the number of harvesting licenses issued (see Figure 3). Additional market barriers to free entry in the forest industry may include high set-up costs for plant and equipment, increased operational costs for infrastructure (harvesting road construction in the forest, etc.), and communication.

Diseconomy of scale and the very long-run nature of business in the industry are significant factors causing some participants to exit and provide natural barriers to potential entrants. The remaining participants may take such opportunities to expand their operation in the supply and processing of timber and improve operational efficiencies. This conforms to Baumol's (1982)³⁴ description of perfect contestable markets that will aspire to (1) maintain zero or negative economic profit to discourage new entries; (2) endeavor to portray the absence of any form of inefficiency in the long run; and (3) set the price of products equal to the marginal cost in the long run equilibrium.

The above discussion of the market's competitiveness violated all but one condition for perfect competition—free entry and exit. Heavy machinery used in harvesting and secondary processing in the timber industry can be resold for civil engineering or construction work. Hence, if the equipment's resale value is considered, entry and exit in the timber industry may be costless.

It has been argued that the market structure is oligopolistic for primary production and oligopoly for processing. In such markets, decisions are based on dominant game theory strategies, and it is generally difficult to evaluate performance (Kohls & Uhl, 1990)³⁵. Commonly, these markets behave like perfect competitive firms only under the conditions of a costless entry and exit where there is no associated sunk cost. Assuming that this condition applies to the timber industry, it may be concluded that the industry structure conforms to the model of contestable markets where market participants behave perfectly competitively (Baumol, 1982; Frank, 2003).

Supporting Activities

Procurement

The National Forest Policy 2007 sets a medium to long-term vision for the sector's development in which sustainable management of forest resources, poverty reduction, social development, and environmental protection are integrated. The REDD+ Policy 2011 advocates the conservation of Fiji's natural forest and biological diversity to contribute to Fiji's commitment under the Convention on Biological Diversity (CBD) and the United Nations Convention on Combating Desertification (UNCCD). The policy also suggests implementing integrated forest resource management with particular emphasis on developing NTFP.

The Sawmilling Policy, formulated in the late 1960s, was reviewed in the early 1990s. The Cabinet endorsed it in August 1995 to increase wood utilization efficiency by enforcing the use of circular saws to replace band saws, the total ban on log exports, and the use of portable sawmills. Portable sawmills

³⁴ Baumol, W. 1982. Contestable markets: an uprising in the theory of industry structure. *American Economic Review* 72:1-15.

³⁵ Kohls, L. R. and J. N. Uhl (1990). *Marketing of agricultural products*. New York, Macmillan Publishing Company.

were allowed in the early 2000s to address landowners' engagement aspirations. The policy also aimed to support increased productivity in the sector.

Related policies that guide the forest sector include the Fiji Rural and Land Use Policy (2005), Fiji Nationally Determined Contribution (NDC) Implementation Roadmap (2017-2030), and Public Private Partnership Policy 2019. Additional guidance is gleaned from the Ministry of Forestry Annual Operational Plan 2022-2023, the National Biodiversity Strategy and Action Plan, the Green Growth Framework (2017), the National Development Plan 5 & 20 years, and the National Adaptation Plan (2018). Details of the legal framework governing the forest sector management are outlined in Table 6.

Table 6: Legislative Framework that governs the forest sector management (adapted from The Ministry of Forest²²)

Legislation	Foret Act 1992
	National Research Bill
	Environment Management Act 2005
	Biosecurity Act 2008
	Native Land Trust Act 2012 (Amended)
Regulation	Endangered and Protected Species (Amended) Act 2021
	Forest Sawmill Regulation 1968
	Preservative Timber Treatment Regulation 1992
	Forest Guard Regulation 1975
	Forest Fire Prevention Regulation 1972
	Environnement Management (EIA Process) Régulations 2007
Plans	Environment Management (Waste Disposal & Recycling) Regulation 2007
	National Biodiversity Strategy Action Plan (NBSAP)
Manual	Green Growth Framework
	Fiji Forest Harvesting Code of Practice
	Sandalwood Manual
	Nursery Manual

Market players procure harvesting licenses in the long, medium, and short term. The license is issued under the iTaukei Lands Act, Environment Impact Regulation (under the Environment Management Act 2005) and the Forest Decree 1992. Long-term harvesting licenses span 30 years with specific conditions that the licensee must invest in setting up processing plants (sawmill, veneer, or any other processing facility). Medium-term licenses span 5-10 years, and short-term harvesting licenses are issued for 12 months. Each license is renewable and subject to assessments and decisions by the Conservator of Forest. Pre-paid licenses are also issued for 6 – 9 months for harvesting mangrove forests and extracting other non-timber forest products such as posts and poles. The number of harvesting licenses

issued varies annually (Whiteman, 2005). The Department of Forest has little control over it, as the first point of approval is the iTaukei Land Trust Board, followed by the Ministry of Environment (EIA). A typical harvesting operation is characterized by parameters outlined in Table 7.

The forest industry is classified (Standard Industrial Classification 1968) under the main order heading of “agriculture, forestry and fishing” (The Ministry of Forestry 2022³⁶). Recently, the Fiji Bureau of Statistics reviewed the classification of the forest industry to ensure the capture of the total contribution of the forest sector. This will ensure the correct linkage between industry growth (or decline) and national indices such as the GDP.

Table 7: Parameters of a Typical Harvesting Operation in Native Forests (Whiteman 2005)

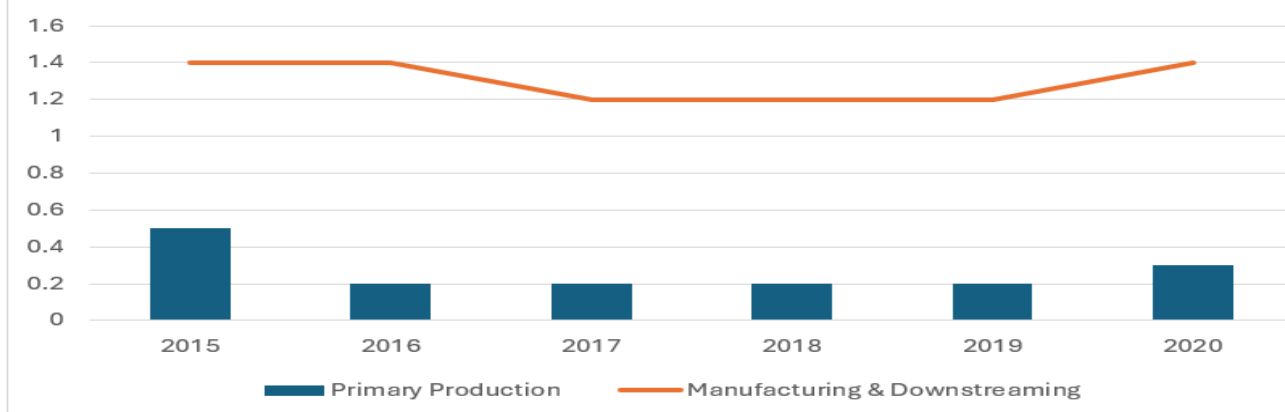
Parameters	Quantity	Units
Area harvested	200	ha/yr
Harvesting intensity	30	m ³ /ha
Annual output level	6000	m ³ /yr
Road construction	20	m/ha – include access road
Haulage distance	50	Km/way from forest to mill
Work period	8	Months/yr
Daily work hour	8	Hr/day
Number of workers per harvesting crew	6	2xChainsaw, 2x D6Bulldozer, 1x Loader, 1xtruck
Machines	4	1xChainsaw, 1x D6Bulldozer, 1x Loader, 1xtruck
Truck capacity	25	m ³ /load
The average life of the truck	7	Yrs
The average life of all other machines	18	Yrs

Primary production via forest activities, which entails log harvesting, contributed \$26.6 million (0.3%) to Fiji’s real GDP in 2020. As evident in Figure 9 this, there is a 7.7% increase when compared to the 2019 level. During COVID-19, the forestry and harvesting industry was one of only three industries that recorded growth in a challenging year when the pandemic affected the nation. Such strong resilience confirms the sector’s importance beyond raising seedlings and harvesting trees. At the same time, the primary industry within the forestry sector contributes to the growth of downstream processing, which is categorized under the manufacturing industry.

According to the Ministry of Forestry Annual Report (2022), the manufacturing industry includes sawmilling and planning of wood; the manufacture of wood products, cork, straw, and plaiting material; pulp, paper, paper board, and furniture. The combined forest-related activities within downstream manufacturing in the forestry sector recorded FJ\$153.0 million (1.4%) to the national GDP by the end of 2020. Between 2015 and 2020, the Forest Sectors’ collective contribution to Fiji’s GDP indicated a decline of 0.2% over time and averaging out at 1.4%, as indicated in Figure 9.

³⁶ The Ministry of Forestry. 2022. The Ministry of Forest Annual Report. Parliamentary Paper Np. 73 of 2022.

Figure 9: Percent of Forest Sector Contribution to Fiji's GDP



Imported timber products cater to demands that local producers cannot produce, such as cross-arms and specifications of exotic timbers for special purposes. Trends in the import of wood and wood-based products are also in decline (see ^[OBJ]) and reflect the sector's contribution to Fiji's GDP, which shows a general decline in productivity between 2016 and n 2016-2020.

Technology development

The Ministry of Forest Operational Plan 2021-2022 emphasizes seed testing and seed technology training as well as GIS Remote Sensing Technology (Fiji Government, 2021)^[OBJ]. Nursery development is an essential component of the Ministry's focus on supporting the establishment of national seed orchards, which would produce a variety of high-quality seedlings needed for the national commitment to plant 30 million trees by 2036.

The Ministry of Forest aims to support training, forest resource assessments, and the updating of maps, dashboards, and other visual data tools to effectively communicate to resource owners the need to manage forest resources sustainably. In addition, the Ministry of Forestry aims to establish a drone program to be integrated into the monitoring, evaluation, and surveys that are regularly undertaken in field divisions.

Forestry GIS and Remote Sensing are critical in managing vast forest resource areas (Ibid). Technologies associated with harvesting, log processing, and downstream manufacturing are driven by the private sector and linked to market demands. A snapshot of the forest sector at the divisional level based on 2003 data is outlined in Table 8. Unfortunately, updated data is not available. Waqainabete (2006)² indicated that the life of machines used in the harvesting operation in Fiji's Western Division is well over 15 years old. In 2003, 13,288 cubic meters were harvested from native forests in the Western Division. Although the input mill capacity among the seven (7) sawmills in the Western Division is over 8000 cubic meters per annum, only 2094 cubic meters of logs were processed into 1068 cubic meters of sawn timber (see Table 8). Production efficiencies are not high but comparable to national standards of at least 50% of logs being fed into the sawmills, which have production efficiencies averaging 22% for both native and pine processing. The level of processing efficiency may indirectly indicate the level of technology that existed in 2003. Time limitation prevents this assessment from reviewing the current situation.

Figure 10: Percentage of total value of Import attributed to Wood & Articles of Wood: 2016-2020

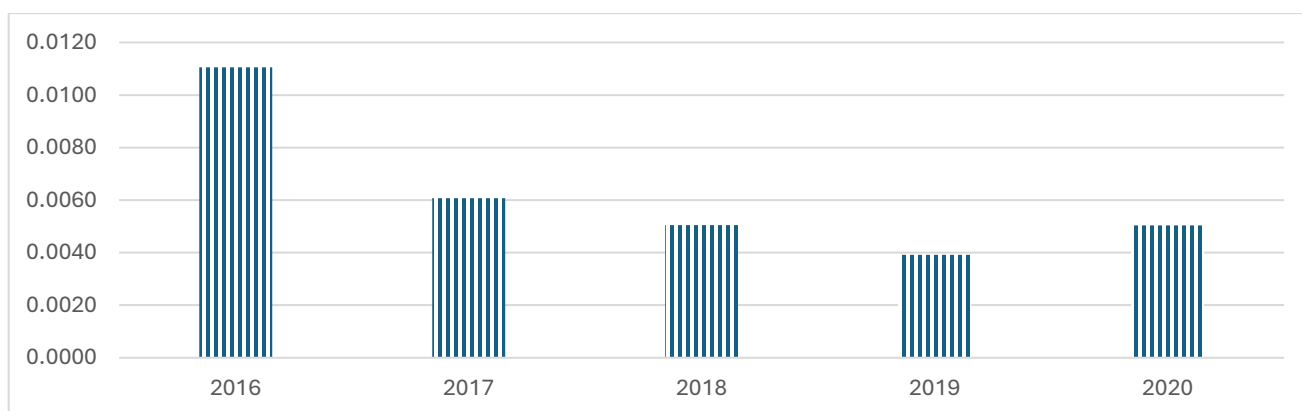


Table 8: Profile of Western Division timber industry, based on 2003 data (Waqainabete 2006)²

	Native	Pine	Units
Log Production			
Area harvested	795	1420	ha/annum
Stocking intensity	17.03	240	cum/ha
Annual output 2003	13,288	629444	cum/annum
Road construction	25	20	m/ha
Haulage distance (forest to mill)	75	50	Km
work period	8	8	months/yr
daily work hours	8	8	hrs/day
Number of workers in a logging crew	3	6	per logging crew
Number of machines available to a logging crew	4	6	per logging crew
Logging Truck capacity	25	25	cum/load
average Truck life	7	7	yrs
Avg. Life other machines	18	18	yrs
Processing			
No of sawmills processing raw material	7	1	
Average mill capacity (input)	8571	500,000	cum/annum
Average log input	2094	109,000	
Average output of sawn wood	1068	32,799	cum
Core commodity	sawn wood	Pine chips sawn wood	

Human Resources Management

The Ministry of Forestry is committed to developing and promoting effective training, communication, awareness, and extension advisory services in both primary and secondary production processes through the provision of technical skills certificates for Forest Wardens, Chainsaw Operators, Nursery managers, and others.

Training for all stakeholders involved in primary production involves chainsaw, logging planning, nursery training, and others. At the same time, the Timber Industry Training Center (TITC) provides training for processing, including saw doctor, timber grading, joinery, finish products, and other technical training.

TITC is also responsible for incubating small microenterprise ventures that use waste wood from mahogany forests.

The Ministry of Forestry's Annual reports capture the number of employees in the formal sector. Little information is available on the total number of workforces in the sector. Nevertheless, turnover in the primary sector in the area of machine operators is very high as new players use the forest sector as a pathway to other sectors, such as civil works and infrastructure.

Infrastructure

Key forest sector players include landowners, producers (logging contractors) and processors, wholesalers, retailers, and consumers. The iTaukei Lands Trust Board is the legal custodian of native lands and administers all dealings with landowners. However, the decision to harvest forests for timber rests on the landowners themselves. The role of key stakeholders in the market channel is listed ^[108] as adopted by Waqainabete (2006). These parameters are still relevant at the time of this analysis.

Table 9: Who does what in the forest industry marketing channel.

Stakeholder	Key Roles	Remarks
Resource Owners	Decide on the sale of raw material	<ul style="list-style-type: none"> Native forest owners are price takers as they do not have processing plants and mostly do not know the value of their resources. Native resource owners negotiate directly with processors. No framework for collective bargaining for resource owners Plantation owners have their processing plants and, therefore, determine the price of plantation logs
Loggers	Secure forest area to be logged	<ul style="list-style-type: none"> Can either be employed by the processor and manufacturers or a freelance where he sells patches of forest to processors with the prior consent of resource owners, taking a commission on every deal. Mostly operate in securing resources from native forests, given its fragmented ownership structure
Processors and manufactures	Deliver consumer needs and demands	<ul style="list-style-type: none"> Clear communication links must be maintained with wholesalers and retailers to maximize resource utilization. Heavily monitored and controlled by regulations of the facilitator
Retail-Wholesale	Monitors and supplies demand, store commodities for future distribution	<ul style="list-style-type: none"> Predominantly saw millers who control the throughput of sawn timber and other products. Sawmillers are export agents selling directly to international markets. Have clear communication links with the retailers to minimize storage and maximize throughput and profit. controlled to some degree by the facilitator. Market players determine the price of the final product by negotiation. Generally, do not need to invest in the sunk cost of advertisement as outlets are secure
Retail	Supplies consumer demands	<ul style="list-style-type: none"> At the local market, predominantly hardware stores or some saw millers sell directly to consumers and are sensitive to market demand and consumer preferences. Some hardware outlets heavily invest in advertisement to win market shares by drawing individual consumers.
Facilitator	Regulates the market system	<ul style="list-style-type: none"> Government Departments such as the Department of Forest, Quarantine Department, Department of Environment, Department of Labour Uphold, monitor, and guide legislation and related regulations. Non-government organizations facilitate movement towards active stakeholder consultation processes

The Fiji Pine Limited (FPL) is built on a business model that aims to maximize return to resource owners through integrated management of pine plantation management, log production, downstream processing, and marketing via wholesalers and retailers while supporting direct facilitation of landowner development through the Fiji Pine Trust (FPT). FPL is governed by a Board of Directors where the Fiji Government nominates the Chairperson. However, over 90% of voting rights rests with landowners, given the integrated structure of FPL, branding, and marketing claims that it sources raw materials from sustainably well-managed forests^[OBJ] aligned to Forest Stewardship Council Certification Standards that use 100% of the wood product from their pine forest where waste wood s used to generate electricity that is fed to the national grid. Core commodities produced by Tropik Woods Industries Ltd include wood chip (export market); treated sawn timber of a wide range of profiles and sizes that are sold as sawn timber, profile, and dressed timber, including lining, flooring, shiplap, weatherboard, cladding, ribbed and plain decking as well as square dressed timber. These commodities service both domestic and export markets. Some specific features of timber sold by the company include machine stress-graded framing timber and adopting Australian and New Zealand treatment standards.

Similarly, the Fiji Hardwood Corp Ltd. (FHCL) was established as a government mahogany plantation and now transitioned under the law to become a private company. In 2010, the Mahogany Industry Development Act (MIDA) transferred 10% shares held by Fiji Mahogany Trust (FMT) on behalf of all landowners to the Government, which now holds 100% shares. A Board of Directors governs it under the legal guidance of the Mahogany Industry Council. The Board of Directors oversees the management of the company but also the progress and effectiveness of the Fiji Mahogany Trust (FMT). FHCL employs a slightly different model as they do not own a processing plant and, therefore, focuses on the primary production of logs and the welfare of landowners through FMT. High-end mahogany logs (grade 1) are sold to license holders. Some license holders enter the high niche market, such as Taylor Guitars, aimed at the high-end global market. Other grades are sold to other downstream processors to produce assorted sizes of sawn timber, furniture, decking timber, and other commodities. These commodities target both domestic and export markets.

Like plantation-sourced timber, the downstream processors of native-sawn timber can be categorized into two broad groups - building construction and wood-based manufacturing industries. There is no published record on the volume of sawn timber demanded by each type of end-user. Table 10 Indicates the type and number of wood manufacturers in Fiji in 2004 (Waqainabete, 2006)². It is expected that some categories, such as toy makers and panel makers, may have closed due to the influx of substitute materials in the market.

Value and Cost

Price determination and discovery

Economic signals, such as a product's price, directly coordinate and determine the decisions of producers, consumers, and processing firms. Prices are driven by demand and supply functions within a purely competitive market. Price behavior differs in different market structures depending on the number of buyers and sellers, the size of the distribution channel, the degree of product differentiation, and the ease of entry and exit.

Table 10: Number of Timber manufacturers in Fiji 2004 (MFF 2005)

Types	Forestry Department Administrative Region			
	(Division)			
	Northern	Southern	Western	Total
Retailers	14	30	28	72
Construction	7	51	40	98
Furniture & Components	13	28	17	58
Curio Makers & Retailers	1	21	10	32
Boat Building	0	3	5	8
Tool Handles	1	3	0	4
Toy Makers	0	1	1	2
Panel Makers	1	2	0	3
Coconut Furniture	0	1	0	1
TOTAL	37	140	101	278

As previously discussed, in the context of Fiji's forest sector, more than 1000 landowning units are potential sellers in the market for round logs. Logs from native forests are controlled by local saw millers who service the domestic and export markets. Logs from plantation forests are dedicated to specific markets where pine logs are exclusively directed to Tropik Woods Limited. At the same time, FHCL sells mahogany logs to licensed buyers who are assumed to have their sawmills. However, recent movements have seen FHCL opening log sales to all interested buyers. Log production from all forest types over the last five years is outlined Figure 11.

Price discovery is done through private negotiation, where representatives of the harvesting or sawmill companies approach representatives of resource owners to negotiate the stumpage price of timber and other terms specific to the landowner's collective needs and aspirations. Company representatives often have prior knowledge of the value of the forests before approaching resource owners through forest inventory estimates provided by the Ministry of Forestry. Suppose resource owners are ignorant of the value of their forests (as is often the case for remote and isolated villages). In that case, asymmetric information prevails in the negotiation, resulting in the lemons principle and adverse selection or statistical discrimination (Frank 2003). Resource owners who may not appreciate the dollar value of their resources are forced to accept any value offered by the company representative, who may push for the lowest possible deal, hence driving out high prices and quality.

The exchange mechanism can be categorized into three main areas: charges for the use of the forest resources (royalty, commission, premium), charges for the services provided by the government (fees collected by the Ministry of Forestry), and general taxes paid by companies and individuals (paid to Fiji Revenue and Customs Services). Royalty is categorized into various classes according to the species and geographic location. Royalty charges are decreed through forest laws and related regulations. Fees and taxes are regulated under the iTaukei Lands Act, the Forest Decree 1992, and relevant regulations. Current prices of logs from native forests are outlined in Table 11. Native forest species enlisted under each Royalty Class are listed [66]. There are four Royalty Classes, each reflecting the different timber qualities and value of products that can be manufactured from each species.

Figure 11: Trend in Log Production from all forest types

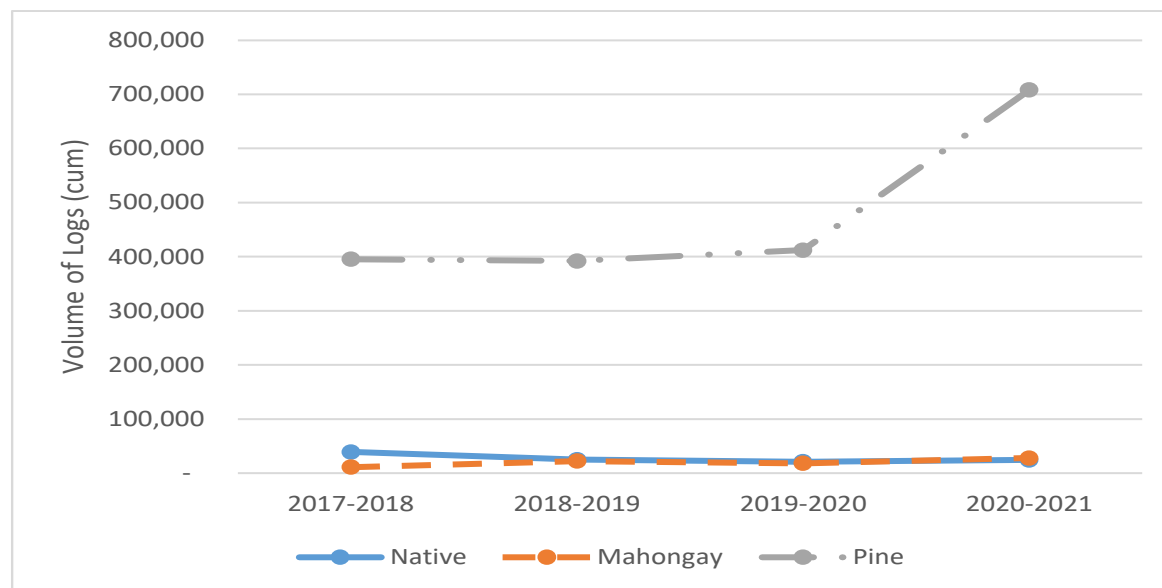


Table 11: Mill Gate Price for Native Species (2023)

Native Species /Logs	Mill Gate Price (\$)	
	Prime Logs	With defects
Royalty Class 1	400	300
Royalty Class 2	300	250
Royalty Class 3	200	160
Royalty Class 4	100	70

Mill gate prices for pine logs are recorded as follows:

- Sawlogs - \$91.30
- Pulp - \$60.00
- Post - \$55.11
- Poles - \$74.56
- Fuelwood Raintree - \$45.00

Mahogany logs are graded into five categories at the forest landing, and mill gate prices are defined in alignment with three subcategories under each grade. There are 15 grades under which mahogany logs are classified and sold to interested buyers as outlined Table 12. Fiji Hardwood Cooperation Ltd. is currently working to secure forest management certification under the Forest Stewardship Council to transition its operation into sustainable standards that embrace environmental, social, and economic best standards.

Table 12: Mill Gate Price & Grade for Mahogany³⁷

Grade	Quality	LOG PRICE VEP	LOG PRICE VIP -15%	License Fees	Reforestation Fees	Total (VIP Log Price @ 15% + Fees)
G1	G1A	400.00	460.00	56	19	535.00
	G1B	380.00	437.00			512.00
	G1C	250.00	287.50			362.50
G2	G2A	390.00	448.50	53	17	518.50
	G2B	345.00	396.75			466.75
	G2C	235.00	270.25			340.25
G3	G3A	365.00	419.75	45	15	479.75
	G3B	300.00	345.00			405.00
	G3C	200.00	230.00			290.00
G4	G4A	260.00	299.00	30	10	339.00
	G4B	190.28	218.82			258.82
	G4C	150.00	172.50			212.50
G5	G5A	180.00	207.00	23	7	237.00
	G5B	160.00	184.00			214.00
	G5C	140.00	161.00			191.00

At the national level, a log value comparison indicates that the most valuable logs are sourced from mahogany plantations, followed by native species and pine. Although Pine logs have the most negligible value, the volume of pine produced annually far exceeds native and mahogany forest production. A summary of log values expressed above is outlined in Table 13.

The market price for sawn timber and other wood-based end-products is not regulated, and price discovery in the market is assumed to be based on demand and production cost with profit maximization. Further, it is assumed that market players are well informed on product specifications and characteristics.

Except for mahogany, there is little differentiation between domestic and export prices for native and pine-sawn timber. For instance, Royalty Class 1 species – *Dakua Salusalu* (*Retrophyllum vitiense*) is sold at the domestic market for \$2,500 (Select Grade) while its price on the export market for the same grade is \$2,400. The range of prices for sawn timber products is outlined in Table 14, details of which are listed in Annex 3.

³⁷ Hammond. D. Hardwood Programmes in Fiji, Solomon Island, and Papua New Guinea. Forest Plantation Working Paper. Forest Resources Development Services. Forestry Department. Working Paper FP/21. FAO. Rome.

Table 13: Comparative Value of Logs at Mill Gate

\$/cum	Highest Price Range	Lowest Price Range
Native Species	250.00	195.00
Pine	91.30	55.10
Mahogany	535.00	191.00

Table 14: Comparative Value of Sawn timber

\$/cum	Highest Price Range	Lowest Price Range
Domestic Market	5,000.00	800.00
Veneer	2,800.00	900.00
Export Market	5,000.00	900.00

Consumers in the domestic market are not particular about quality and tastes. The price of the product drives the decision. This can be attributed to the low level of income and the fact that timber, conforming to Engel's law, is a normal good whose demand increases with an increase in income. Suppose local consumers have no access to sufficient information to make informed decisions. In that case, the situation in the domestic market approximates that of adverse selection where the production of low-quality products drives out high-quality timber commodities.

Preference, taste, and quality are more important in the export market.

Firms, therefore, take advantage of this market situation and respond by differentiating production lines for domestic and export markets. Prices are also differentiated between the two markets as producers aim to maximize economic profit through reducing consumer surplus.

At the national level, the contribution of forest activities to GDP shows a promising trend of a gradual increase over three years (2018-2020) (see Table 15).

Associated Costs

Cost of Primary Production

Waqainabete (2006)² estimated the average cost of log production for the Western Division at 35 FJD per cubic meter, while the average capital cost is estimated at 26 FJD per cubic meter. Royalties and fees are estimated at 69 FJD per cubic meter. The average total assembly cost for log production is estimated at 130 FJD per cubic meter. Whiteman (2005) estimated the assembly cost to be 137.98 FJD per cubic meter.

Whiteman (2005) considered the transport cost and incorporated the variable cost of raw material, distance, and fuel. This is estimated at 17.00 FJD per cubic meter. At the same time, the transportation cost for product delivery is estimated at 15 FJD per cubic meter (Waqainabete, 2006)².

Table 15: Trend in Contribution of Forest Activities to GDP (The Ministry of Forestry 2020-2021 Annual Report)

Industry by economic activity	2018r		2019r		2020p	
	FJD [Millions]	% Contribution to Real GDP	FJD [Millions]	% Contribution to Real GDP	FJD [Millions]	% Contribution to Real GDP
Forestry and logging industry	26.1	0.2	24.7	0.2	26.6	0.3
Manufacturing industry						
Sawmilling and planing of wood	68.6	0.6	68.7	0.6	60.0	0.7
Manufacture of products of wood, cork, straw and plaiting material	18.3	0.2	18.4	0.2	22.1	0.2
Manufacture of pulp, paper and paperboard	2.3	0.0	2.4	0.0	2.3	0.0
Manufacture of corrugated paper and paperboard and containers of paper and paperboard	12.9	0.1	11.9	0.1	11.6	0.1
Manufacture of other articles of paper and paperboard	23.9	0.2	21.2	0.2	24.0	0.3
Manufacture of Furniture	6.6	0.1	6.8	0.1	6.4	0.1
Total	158.7	1.4	154.1	1.4	153.0	1.7

Source: Fiji Bureau of Statistics, 2022

Notes: r - revised; p - provisional

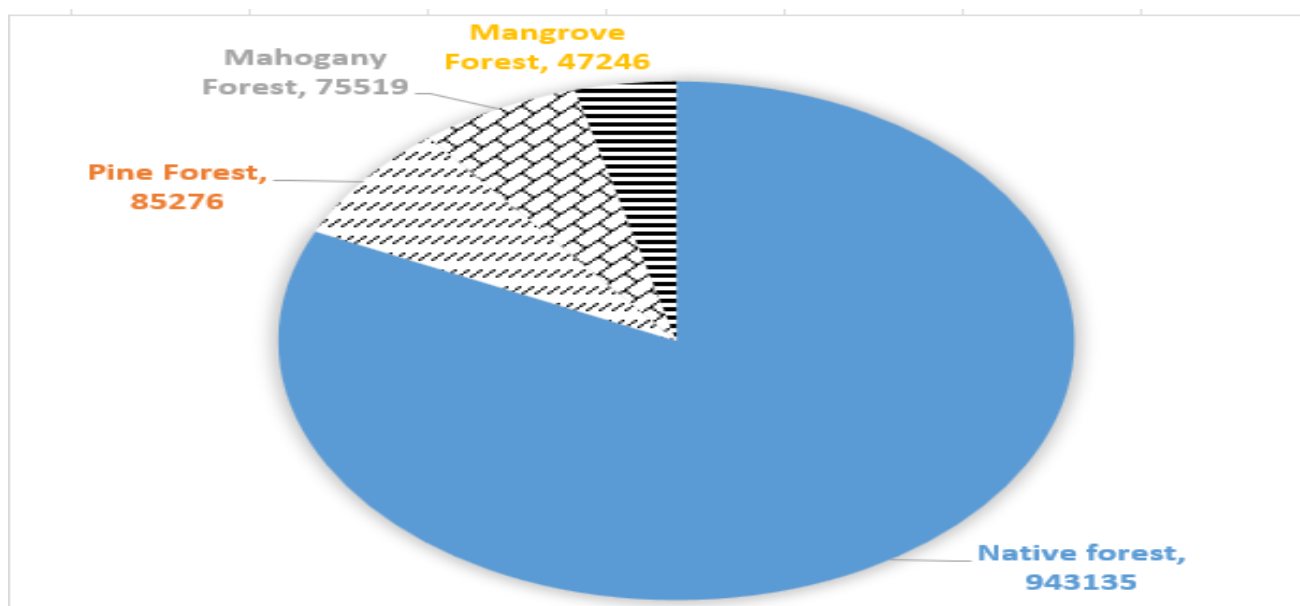
Cost of Processing (sawmill to consumers)

In terms of processing, Waqainabete (2006)² used raw data from sawmills in the Western Division and estimated the average total cost for the Western Division milling process at 483 FJD per cubic meter consisting of 214 FJD per cubic meters for capital cost and 269 FJD per cubic meters for operating cost. The operating cost consists of 195 FJD per cubic meter for variable costs and 74 FD per cubic meter for fixed costs. In comparison, Whiteman (2005) estimated the total average processing cost for the typical sawmill in Fiji to be 599.79 FJD per cubic meter.

Competitive Advantage and Opportunities

Fiji's forest covers 60% of its landmass, equivalent to 1.15 million hectares of four main forest types: native forest, pine and mahogany plantations, and mangrove stands. The extent of forest cover for each of these forest types is outlined [Table 10.1](#). Native forest has the most extensive coverage, while mangrove has the least. At the same time, between the two-plantation forests forest, pine covers more area than mahogany.

Figure 12: Area of Fiji's principal forest types (ha)



As previously discussed, log production at the primary level is dominated by pine logs (91%), followed by native (5%) and mahogany (4%). Analysis of the average annual production over five years (2017-2021) indicates that pine is at a critical harvesting trajectory over the limits of sustainable yields. On the other hand, native and mahogany production shows deficiency with room for significant improvement (see Table 16).

Table 16: 5-YR Production Against Sustainable Harvest Levels

	Estimated Sustainable Yield (cum/yr)	5 YR Average Production (cum/yr)	% Sustainable Yield
Native	100,000	27,487	27%
Mahogany	120,000	10,991	17%
Pine	400,000	476,938	119%

Competitive advantages generate excellent value for a company and its shareholders. Generally, companies strive to secure a sustainable competitive advantage to ensure their competitors cannot neutralize such an advantage. In the interest of this analysis, we ask what the competitive advantage of Fiji's forest sector is where products could be produced more efficiently with the most significant opportunities. At the same time, which products or services currently produced in Fiji are different from our competitors' offerings and are seen as superior?

Exports of pine wood chips from pine plantations slumped in 2019 and slightly recovered in 2020, but not pre-COVID conditions (see [OBJ]). The decline in demand for pine wood chips may be attributed to global trade restrictions due to COVID-19. However, as global consumers transition to a paperless society, demand for wood chips from Japan/China will decline.

Table 17: Export of Wood Products (2018-2019) FJ\$ Million Source- The Ministry of Forestry Annual Report 2020-2021

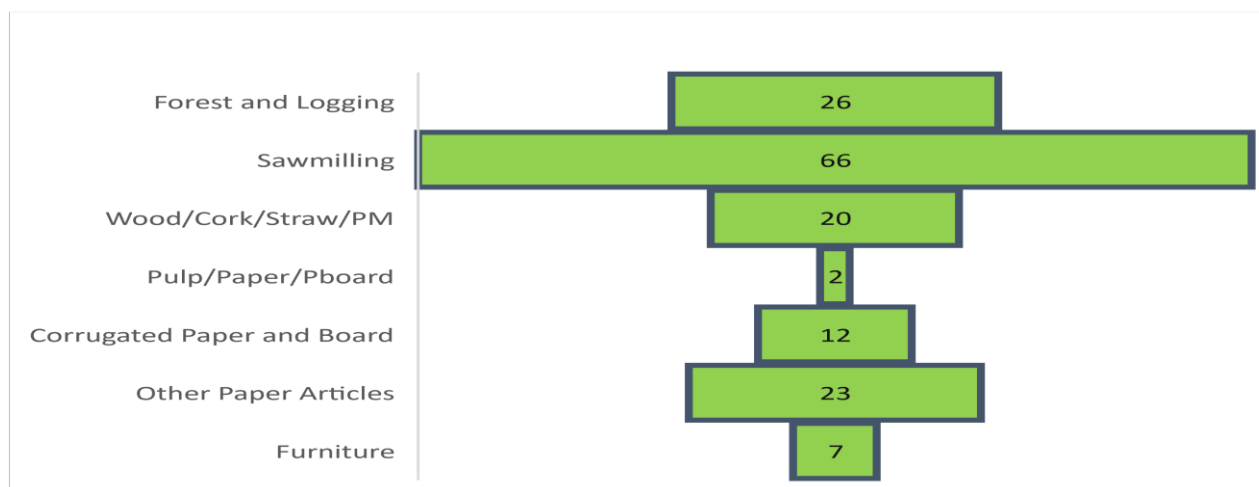
Product	2018	2019p	2020p
Wood and articles of wood	94.6	59.0	76.6
Of Which – Woodchips pr particles	78.5	37.6	55.4
Mahogany	6.9	10.6	9.2
Total Export	1,175.0	1,167.1	1,146.4

P: Provisional

Despite the decline in wood chip export, pine log production continues to increase as Tropik Woods Industries Limited moves towards fully utilizing and improving the efficiency of its recently upgraded sawmill. Claiming to have a state-of-the-art integrated sawmill in Fiji, FPL and its subsidiary Tropik Woods Industries Ltd. continue to monopolize the pine subsector with a range of commodities from profile timber (lining, cladding, flooring, etc.), stress-graded construction material, wood chips as well as treated post/poles. In addition, with 100% Forest Stewardship Certification and a “Made in Fiji” label, the company is successfully penetrating export markets in the Pacific Island region, Australia, New Zealand, and beyond. Competitive advantage for the pine subsector includes the 100% FSC label it carries and the recent upgrade of its production facility in Drasa, Lautoka. At the same time, a core competitive advantage for FPL is the commodity range that is unique to the company, including treated timber profiles where there is high demand for weatherboard cladding.

Fiji is home to the world's most extensive mahogany plantations. Harvesting of Fiji's mahogany plantations began in 2003. As indicated above (Table 16), the trend in mahogany log production is exploited at levels well below sustainable limits. However, it is contributing significantly to Fiji's foreign earning power (Table 17). Close consideration of the contribution of forest activities to Fiji's GDP indicates that the highest value in the production chain from logs to end products lies in the “sawmilling” process (see Figure 13). Noting the short period FHCL has been in business, perhaps it is time to invest heavily in sawmilling to capitalize on integrating downstream processes, as in the case of the pine subsector. The Ministry of Forestry fully supports the development of Forest Stewardship Council Certification for Fiji mahogany to secure a niche export market for high-end mahogany products. Under the current production levels discussed above, competitive advantage for the mahogany subsector would focus on securing 100% Forest Stewardship Council Certification for all mahogany plantations.

Figure 13: Average Value of Forest Activities 2018-2020 (FJ\$ million)



Source: (The Ministry of Forestry 2020-2021 Annual Report)

The Ministry of Forestry Operational Plan 2021-2022 listed the utilization of wood waste/residues from harvesting and timber processing facilities as one of the key outcomes to supporting commercial and business development. Using 100% forest products is an important goal to ensure total efficiency and zero waste of natural resources/raw materials. As the mahogany subsector continues to increase its productive efficiency, the opportunity to utilize 100% of such valuable resources is considered seriously.

The performance of native forest log production has declined for the above reasons. The Ministry of Forest aims to slowly phase out harvesting from native forests by focusing on managing and harvesting planted forests. The Ministry of Forestry is committed to launching a plantation policy to encourage private sector investment in plantation establishment. Conducive and enabling conditions for such arrangements are being set up under the REDD+ land leasing/rent process. The Ministry of Forestry also hopes that reducing harvesting pressure on native forests will support assisted natural rejuvenation of forest ecosystems, thus increasing carbon removals.

Weaving all the information and discussions above into the Value Chain framework, adding known costs, average prices of commodities, and the value of each forest activity as a reflection of its contribution to Fiji's GDP, it is noted that although the level of investment to enter harvesting activity is lower than sawmilling, the maximum value and profit is associated with sawmill activity. Barriers to entry in the Fiji forest sector are economies of scale needing high capital investment. At the same time, the sector will need assistance from the government to secure market access, which is driven by research and development in designing new product lines.

In alignment with Gereffi (1999) (see Table 2), the value chain of Fiji's forest sector predominantly needs designing and marketing to drive demand down to primary production. Without a vibrant market for the end product, there is limited demand for raw materials and a continual decline in the primary sector. Given the many players, dual market structure, and a wide range of commodities in the value chain, each company would consider economies of scope rather than economies of scale to cut costs and maximize returns. Forest products are non-durable, with the leading network links being trade-based, where ownership of firms in Fiji's forest sector is locally owned (family-owned) businesses. The forest sector value chain is, therefore, a buyer-driven commodity chain.

The business model presented by Fiji Pine Ltd. for managing pine forest plantations that are linked to downstream processes and integrate other products, such as the sale of energy to the national grid, is a model that other plantation owners may need to consider carefully to build a competitive advantage in the sector.

With a continuous decline in native log production, the opportunity exists to consider developing non-wood timber products sourced from native forests or cultivated from degraded landscapes. NTFPs are commonly gathered from natural forests, while some may be produced with varying degrees of cultivation and domestication (Wilkinson & Elevitch, 2000)³⁸. The Ministry of Forestry Business Guide 2022-2023³⁹ highlights NTFP as one of the seven (7) investment opportunities in the forest sector.

Recent interventions through REDD+ and the Emission Reduction Program present opportunities for Fiji to restore degraded landscapes and generate new revenue streams through emission reduction carbon credits. Fiji has identified a potential network of terrestrial protected areas under the GEF PAS 4 Forest

³⁸ Wilkinson, K.M.; and C.R. Elevitch. 2000. Nontimber Forest Products for Pacific Islands: An introductory guide for producers. Agroforestry Guides for Pacific Islands #3. Permanent Agriculture Resources. Holualoa, Hawaii, USA. Website: <http://www.agroforestry.net>

³⁹ Fiji Government. 2022. The Ministry of Forestry Business Guide.

and Protected Area Management. These key biodiversity forest areas are well-positioned to explore the development of biodiversity credits that can supplement ER credits.

In the interest of this assessment, we will use the term “nontimber forest product,” which means resources of significant value to human society that ***arise from the forest yet are not based explicitly on the wood*** that is produced to **secure economic well-being of rural tribal communities** living in and around forest areas (see Box 1). NTFPs are assumed to entail micro, minor, or medium-scale trade producing domestic or export commodities. Further, it is assumed that NTFPs have no or limited access to capital, but meeting environmental, social, and economic household needs is beneficial.

Case Study – Fiji Mahogany

Mahogany subsector

The following section presents a case study for the mahogany subsector collated out of a focused questionnaire with FHCL CEO. Refer to [box] it for details of the interaction that form the basis of this assessment.

As previously noted, Fiji is host to the largest mahogany plantation in the world, with an area of 41,325ha stocked mahogany forest (MOF, 2022)⁴⁰. Harvesting of mahogany logs began in 2003, and FHCL issued mahogany purchase licenses to interested bidders, resulting in an average production of 19,991 over the last four years. FHCL does not operate a sawmill. Its operation is limited to primary log production.

In 2010, the Fiji Government introduced reforms under the Mahogany Industry Development Act 2010 (MIDA), which enabled a framework for restructuring the Mahogany Industry to facilitate and enhance further development for:

- i. the interest of the iTaukei landowners;
- ii. facilitating an enabling environment for current mahogany industries;
- iii. aligning the Company with the Government’s overall reforms.

By 2015, the Companies Act of 2015 provided additional supportive legislation to support the total reform of the mahogany industry. The Government also formed the Mahogany Industry Council (MIC) to oversee the function and roles of the Fiji Mahogany Trust (FMT), which looks after landowner affairs. FHCL Board of Directors also oversees the operation of FHCL. The six key objectives of MIDA 2010 are for the Mahogany Industry to be:

1. **Sustainable:** operated sustainably for the long term, including a comprehensive reforestation program.
2. **Value Adding:** the desirability of value-adding of Fijian Mahogany for the country to realize its full potential;
3. **A fair return to the landowners:** whereby landowners are paid returns for the use of their land and active engagement and empowering landowners to also participate in business ventures;
4. **Interest of the Fijian people:** the mahogany industry to generate increased employment activities and encourage skills that could create opportunities to promote mahogany utilization and value-adding locally and internationally;

⁴⁰ <https://www.forestry.gov.fj/pressdetail.php?id=144>

5. **Quality Assurance:** Maintaining a high-quality mahogany product that could compete in the niche international market;
6. **Branding:** developing a recognized brand for Fijian mahogany timber and associated products.

At the end of 2023, the Board of FHCL secured support from the Fiji Government to endorse the perusal of forest management certification under the Forest Stewardship Council. The FHLC Board aspires to support Fiji Mahogany's market access to ensure the industry can fully realize a niche market in Australia/New Zealand and the UK. The Board further aspires to support investment in downstream processing and believes securing market access through certification is paramount at this stage. At the same time, under the Convention on International Trade of Endangered Species (CITES), it is a requirement that Fiji Mahogany be certified to compete in a volatile market threatened by substitutes such as African mahogany sourced from African countries.

Value chain map

Critical actors in Fiji's mahogany subsector include the MIC, which, by law, oversees the functions of the FHCL Board of Directors and the FHCL management team. Collectively, these organizations control the flow of mahogany from the forest. FHCL sets the annual cutting quota and issues five (5) year logging licenses to companies that will purchase pre-agreed grade and volumes of mahogany logs. There are 15 grades of mahogany logs.

FHCL started with a log auction where high bidders got access to the logs.

The annual quota approved by the MIC is set at 40,000 cum; however, the sustainable annual production level is 150,000 cum per year, with the opportunity to increase to 200,000 cum per year.

The logs are felled by FHCL and transported to the log sale yard, sorted into grades. There are five grades and three subgrades under each. Subgrades are differentiated by the degree of rot and defect manifested in the logs. Log buyers (including the licensed companies) place their orders at FHCL; each is supplied with the required grade and volume. Buyers without a license are labeled "open market buyers." Licensed and Open Market buyers demand Grade 1 -2 logs. Lower-grade logs are sold to furniture makers. Firewood is directed to domestic households and industries that use firewood to generate energy.

Licensed and open-market mahogany log buyers produce sawn timber for domestic and export markets. Companies that procure Grade 1-2 produce high-end sawn timber for the export market. Others supply specific markets, such as high-end guitar producers in the USA. Grade 3 generally produces sawn timber for the domestic market, while furniture makers procure Grade 4-5 for export and domestic markets. Residual logs (waste logs) produce furniture for domestic markets. Logs not sold in any of the above categories are sold as firewood. Generally, Grades 1-3 comprise 40% of the logs, while furniture and firewood comprise 10% each. Residual logs consist of 5% of harvested mahogany logs. FHCL currently encourages zero waste in wood flow and aims to enter a niche market when they complete the Forest Stewardship Council Certification Process. The value chain of mahogany logs is outlined in Figure 14.

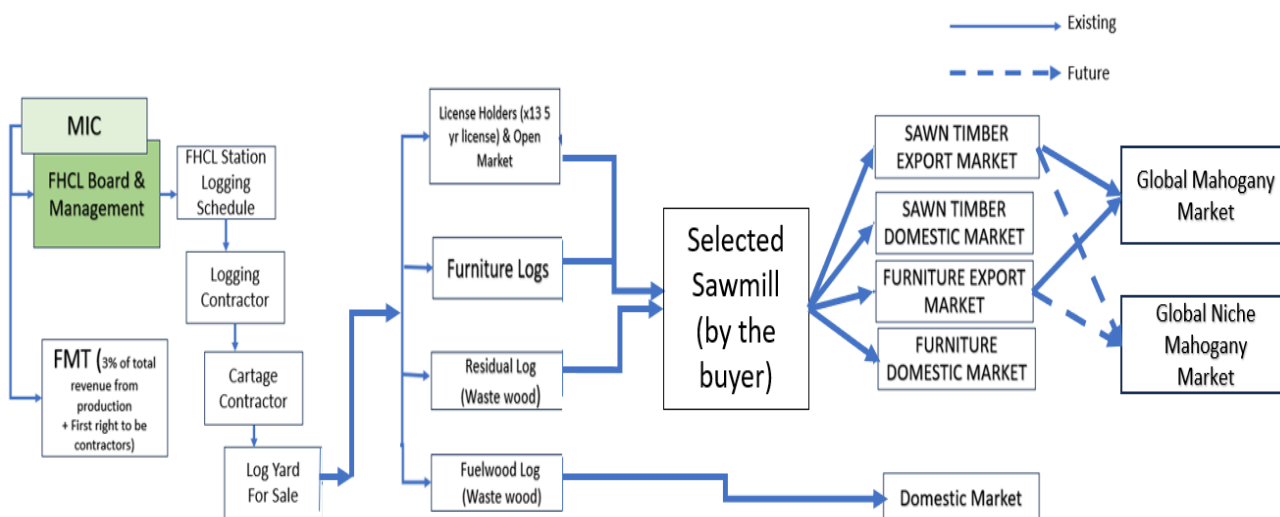
Quantification of the Value Chain

The FHCL Board of Directors consists of 6 members who oversee the core management team. With 14 stations across Fiji, on Viti Levu and Vanua Levu, 72 technical staff are involved in managing mahogany plantations and harvesting mature stands.

To safeguard the interests of mahogany landowners, the FMT consists of representatives of the 14 Mahogany Stations across the country. FMT receives \$3.45 per cum from all logs harvested by FHCL. FMT also has the first right of refusal for forest contract work such as logging and haulage.

FHCL pays land lease rental to iTaukei Lands Trust Board (TLTB) and distributes the funds directly to each mataqali or landowning unit twice a year.

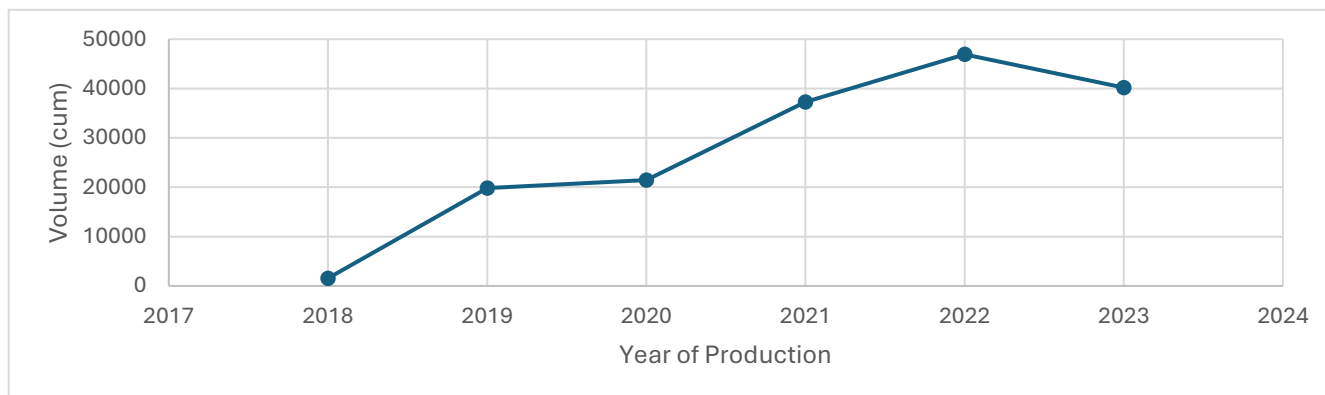
Figure 14: Value Chain for Fiji Mahogany Logs



FHCL prepares coupe planning for all logging areas and coordinates the logging crew to harvest mahogany logs. At the time of this report, five logging crews are working across two stations, and one cartage company is servicing the transportation of logs from the forest to the “sales log yard.” At the sales log yard, the logs are sorted according to the 15 log grades, ready for sale,

Once sold, FHCL is responsible for transporting logs to the license holder sawmills, as log prices are set at the mill gate. The same applies to all buyers of mahogany from FHCL. Log volume sold by FHCL has consistently increased since 2018. Production parameters of all key players are outlined below Table 18.

Figure 15: Production Trend for Fiji Hardwood 2018-2023



Source: FHCL

Table 18: Production Parameters for Key Players in the FHCL Value Chain

Monthly production level	Volume in demand/ Month (cum)	Domestic Demand	Export Demand	Production Level	Cost	Pricing	Risks
Mahogany Station Harvesting Schedule	8000*	70% production	30% production	4,000	**\$1m	See Table 12	weather
Logging Contractors	8000	70% production	30% production	4,000	\$1.6m	\$400/cum	weather
Cartage Contractors	8000	70% production	30% production	4,000	\$7000	\$45/day @ 2 trip 13ton/ trip/day	weather
Sale Log Yard Management	8000	70% production	30% production	4,000	***\$1.25m	As per grade	Buyers fail to buy due to a drop in international demand

*Assume ten working months/yr

**@\$0.25m/station x 4station

***40%Grade1&2, 20% Grade 3, 10% Grade 4&5, 5%Residual @\$60cum

The performance of mahogany log buyers is inconsistent. Of the 13 license holders, 38 percent purchased logs consistently for five years between 2019 and 2023. An estimated 15 percent purchased logs consistently for four years—mostly missing purchases in 2023. Despite having a purchased license, an overwhelming 46 percent purchased logs for only two years or none. Failure to procure logs may be associated with a lack of market access. However, open market buyers are consistent over the assessment period (see Table 19).

Role and Contribution of All Actors

The Mahogany Industry Development Act (MIDA) 2010 dictates the formation of a Mahogany Industry Council to be chaired by the Prime Minister. The Council's primary function is to oversee and supervise the maintenance and development of the mahogany industry in Fiji – particularly the FHCL and the Fiji Mahogany Trust. There are five members of the MIC: the Prime Minister, the Attorney General, the Minister responsible for Forests, the Chair of the Fiji Mahogany Trust, and one person appointed by the

Chairperson. Although MIC is mandated to oversee FHCL and FMT, it only met once since 2010. FHCL Board of Directors has found it challenging to respond to market signals to make effective business decisions when needed. For instance, the 5-year license for high-value log buyers for 2017 – 2022 expired without renewal. FHCL is selling logs to all interested companies on open market purchasing. Recently, the Fiji government decided through a cabinet decision that the chairmanship of the MIC should be transferred from the prime minister to the minister responsible for forests.

Table 19: Performance of mahogany log buyers 2019 – 2023 (Source FHCL)

License Holders	2019	2020	2021	2022	2023
Dayal Sawmillers Ltd. ¹	4,109.69	6,131.83	13,222.66	14,504.73	17,079.52
Fiji Mahogany Trust	768.53			62.193	
Future Forest (Fiji) Ltd.	76.26	105.33	26.74	26.74	
Mega Maderas (Fiji) Ltd. ²	4,293.87	3,900.97	7403.90	7934.96	
Nur Ahmed & Company Ltd.	842.89	408.04		34.855	
Rup Investment Ltd.	450.49	182.32	317.77	816.836	883.85
Southern Forest Products	351.59	555.49		452.212	
Subrail Furniture Ltd.	571.62	1,100.93	1,178.09	661.94	2,127.71
Vitiana Timbers (Fiji) Ltd.	859.74	2,486.54	1,055.36	1,169.99	837.46
KKK Logging & Sawmiller Co. Ltd.					
Nukurua Mahogany Trust Holding Co. Ltd.					
Scud Timber (Fiji) Ltd.					
Tropik Wood Industries Ltd.					
Open License Buyers	3,208.44	6,364.45	14,872.96	25,664.46	12,157.97
Total	15,533.12	21,235.90	38,077.48	45,604.82	33,086.51

FHCL management runs the day-to-day operation of the mahogany estates under a lease arrangement with the iTaukei Lands Trust Board. There are 14 mahogany stations across Viti Levu and Vanua Levu, with an estimated total of 75,223 ha, of which 41,325 ha are stocked with mahogany, 10850ha are stocked with mixed hardwood species, and 23,048ha are native forests.

Under the direction of MIC, FHCL negotiates and secures mahogany log buyers by issuing them licenses to buy them. These licenses have pre-agreed log grades and volumes allocated to each holder on a 5-year basis with annual quota allocation. It is assumed that the mahogany license holder has sawmills to process the logs for domestic and export-sawn timber markets. To date, licensed buyers in the mahogany market have predominantly exported sawn timber, with some exporting furniture and joinery. The mahogany market saw a slight decline in 2019 as it faced competition from a potential substitute - the African Mahogany in the global market. The FHCL management is committed to securing Forest Stewardship Council Certification by the end of Dec 2024 to curb such competition in the future.

The contractors control all logging equipment and liaise directly with FHCL to coordinate monthly production. Logging production schedules are, therefore, aligned with the requirement of the FHCL management team. The logging crew hauls logs to landings in the forest using D3, D6, or similar machines to stockpile produce for extraction to the sale log yards. The logging contractors are paid a flat rate of \$47.29 per cum.

Logging contractors may also be cartage contractors who deliver mahogany logs from the forest to the sale log yard. Once buyers place their orders, FHCL schedules harvesting and cartage of logs to the sale yard for delivery to the buyer's chosen sawmill. At peak periods, FHCL may hire additional cartage

companies to facilitate efficient log haulage from the forest to end users. Cartage is at an average cost of \$23 per cum.

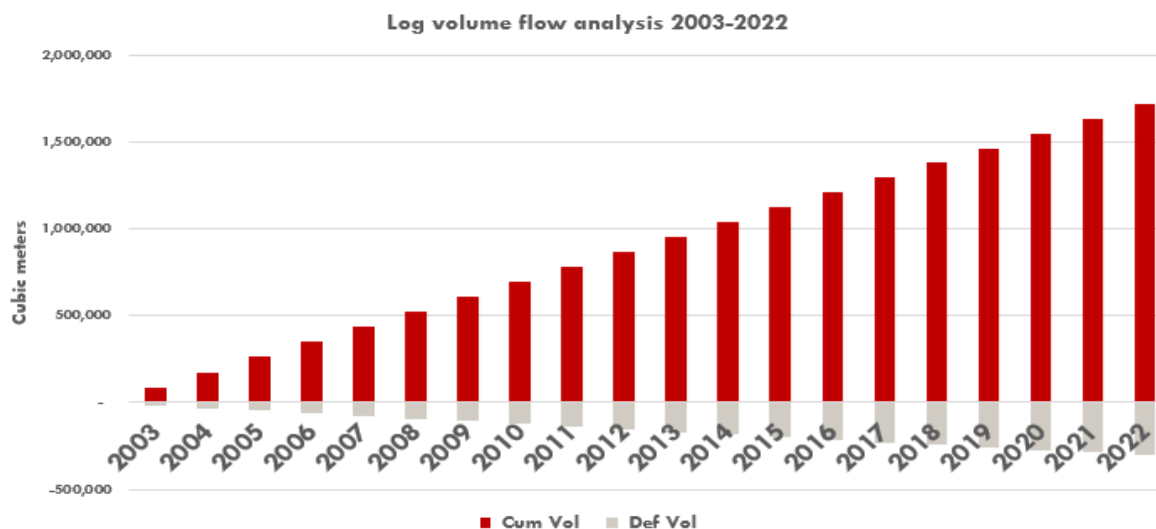
Market Assessment

The mahogany estate under FHCL consists of trees ranging between 16–69-year-old with an estimated 6.2 million cubic meters of *Swietenia macrophylla*, commonly known as Fiji mahogany. Plantation of Fiji mahogany suffers infestation by three kinds of butt- or stem-rot. The common one, termed "marginated butt-rot" is not easy to recognize. The other two - Armillaria and Fomes are also embedded deep in the bole of the tree. The occurrence of the rot is prevalent in old-aged forest as evident in the 1992 mahogany forest inventory (see Figure 16). The data indicates that the percentage of rot increases with old age of the plantation meaning that pressure is on FHCL to harvest old growth mahogany. This therefore presents the opportunity to increase harvest to 200,000 cum per year immediately.

FHCL is operating in a monopoly market in selling its mahogany logs. Regarding product lines, 40% of the harvest logs fall under Grade 1&2. At the same time, 10% of logs are graded 3-4 while an additional 10% is residual logs. The fall-down at 5% are firewood.

To the consumer, it is very important to secure logs that have minimal defect hence there is highest demand for Grade 1 logs. FHCL uses selective logging techniques in its harvesting regime, prioritizing the extraction of old logs. This challenges FHCL's ability to market and sell all harvested logs as the degree of rot cannot be predetermined. Strategically, FHCL continues to explore ways to prioritize the harvest of old growth forests to maximize returns on the quality of the logs while at the same time discovering ways and to means to increase the demand for low grade logs.

Figure 16: Sustainable Harvestable Volume 1992: Valuation and yield forecasting
[(1994) 20,000m³/yr; (1998) 100,000m³/yr; (2018) 200,000m³/yr]



Source: FHCL – personal communication CEO S Drani 27 Feb 2024

Prices for mahogany logs have been set since 2017 and attempts by FHCL to change it according to supply/demand has been difficult in the absence of MIC convening. The prices of mahogany logs consist of three components: (1) vat inclusive price of the log - which is the price FHCL makes from the log sales; (2) license fees (paid to the Fiji Government) under MIC as per MIDA 2010 requirements; and (3) reforestation fees which FHCL absorbs to support replanting or restocking of harvested areas. A summary of the average price of mahogany logs under each grade is outlined in Table 20 (details are listed in Table 12).

Table 20: Average Log cost of each Mahogany Log Grade

Log Grades	VIP Log price (A)	License Fee (B)	Reforestation Fee (C)	Collected By FHCL (A+C)	Paid to Fiji Government (MIC) (B)
Grade 1	395	56	19	414	56
Grade 2	371.83	53	17	388.83	53
Grade 3	331.58	45	15	346.58	45
Grade 4	230.1	30	10	240.1	30
Grade 5	184	23	7	191	23

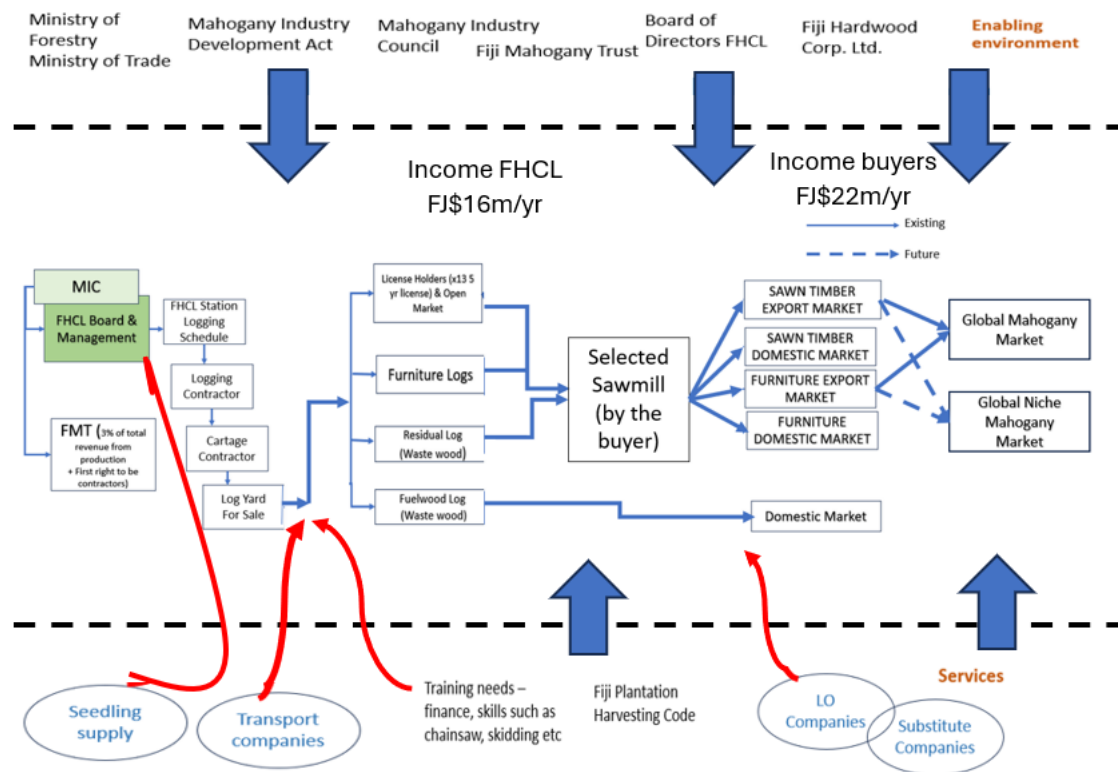
Consumers are also keen to ensure that FHCL follow harvesting standards outlined in the Plantation Code of Harvesting Practice.

The market map for FHCL is outlined in Figure 17.

Sawmillers of the buyers' choice process logs purchased from FHCL. FHCL prioritized licensed buyers who were assumed to have sawmills to process the logs for domestic and export sawn timber markets. Given that the license issued by FHCL expired in 2022, it has since supported non license (open market) buyers to procure mahogany logs. Some buyers do not own sawmills and would subcontract a sawmill to process the logs they procure from FHCL. The log buyers secure export and domestic markets for sawn timber, furniture, and other downstream commodities. Residual logs or waste-wood are also processed into furniture for domestic markets while firewood is sold to industries producing bioenergy or catering to domestic household needs.

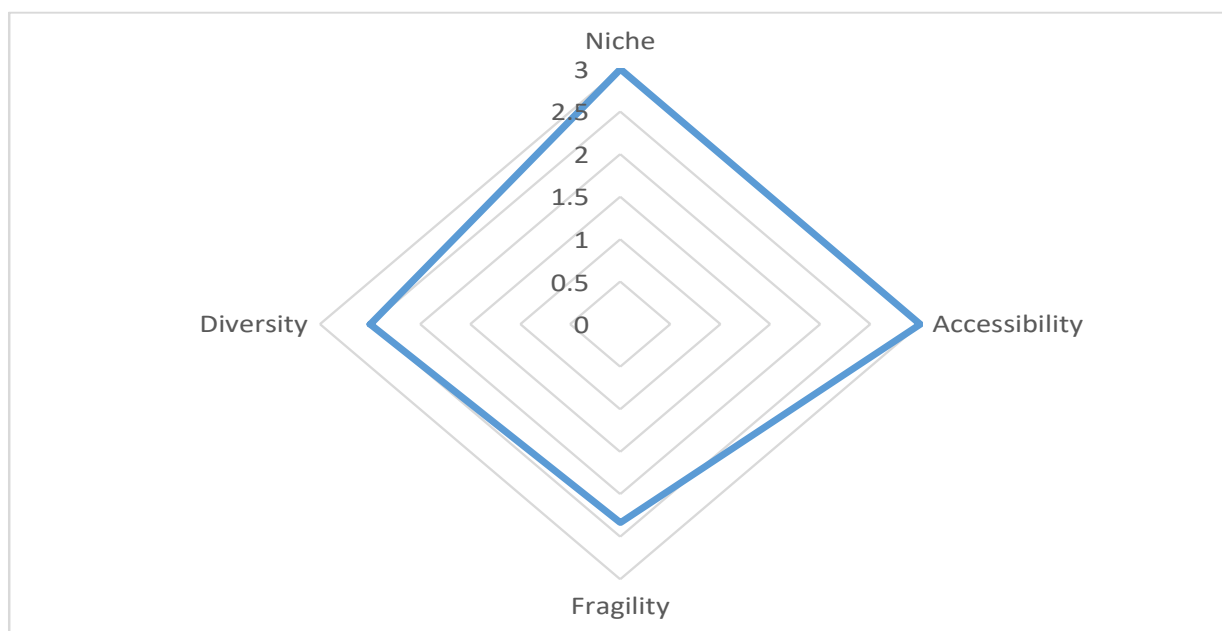
FHCL's financial performance improved substantially from 2021, when revenue grew by 234%. At the end of August 2023, FHCL paid off an FJ\$8.79m loan, so it is now operating free of debt. Permanent and regular buyers are given credit terms of 1-3 months, while other buyers operate via a cash on delivery policy.

Figure 17: Market map for Fiji mahogany



Critical success factor for FHCL market access would prioritize the development of a niche market, followed by ensuring accessibility to market, technology and information to diversify product mix while focusing on ensuring fragility to irreversible change in the long run (see Figure 18).

Figure 18: Market Strategy based on critical success factor for Mahogany.



SWOT analysis of the Value Chain.

The report assesses strengths, opportunities, weaknesses, and threats along the chain [OBJ]. The main actors are FHCL, log buyers, logging and haulage contractors, and sawmill operators that process mahogany logs. Support actors are identified as FMT.

Given the inconsistent procurement of mahogany logs, FHCL may need to reassess its licensing procedure and explore increasing log prices for grades that are in high demand. Log buyers have been exporting mahogany on their efforts. They may benefit from coordinated assistance from Fiji Government through bilateral trade agreements in countries that value mahogany such as the United Kingdom. To align with National Forest Policy, the Ministry of Forest may reconsider returning 10% shares to FMT to incentivize full engagement of landowning units in the long-term development of the mahogany subsector.

Table 21: SWOT analysis for Fiji Mahogany

Actors <i>[Main actor (MA) Support Actor (SA)]</i>	Strength and Opportunities	Weakness and Threats	Action Needed
FHCL (MA)	FHCL has full control of log supply activities. Outsourcing work streams to LOU and others More demand for high grade logs Open opportunities to LOU to engage in downstream processing using residual logs	Inability to control downstream commodity development. LOU slow uptake to become engaged in the market process. Inability to sell low grade logs given private sector demand for high quality logs	Reassess licensing procedures and access opportunity to increase price of logs. FHCL enter downstream processing to utilize all log grades. Improve governance of FMT
Log buyers (MA) License and Open Market Buyers	Current network with existing markets	Inconsistent demand which affects cash flow for FHCL Inconsistent demand also results in low demands and inability to meet sustainable harvest quota	Fiji Government to assist market access for private sector. Need skill training for design. Training on downstream market assessment to understand demands.
Logging Contractor (MA)	Ability to plan with FHCL on dry and wet weather coupes. Alignment to Plantation Code of Logging Practice	Long rainy seasons Lack of upskilling for highly volatile labor market.	Need urgent assistance from The Ministry of Forest on Chainsaw and machine training for Mahogany logging crew
Haulage Contractor (MA)	Consistent log supply and workload	LTA requirement to regulate weight of logs on trucks on public roads	
Fiji Mahogany Trust (SA)	Support LOU development	Reduced shares in FHCL under MIDA 2010	Cabinet Decision to return 10% shared to FMT.

Actors [Main actor (MA) Support Actor (SA)]	Strength and Opportunities	Weakness and Threats	Action Needed
		Slow and low aspirations to fully engage with development of mahogany industry.	Training for FMT members on business planning and management Awareness to FMT on business opportunities where they can be involved
Sawmiller (MA)	Existing facilities to saw logs into required specs. Encourage and engage all sawmills in the value chain to be part of the certification process.	To ensure entry into global mahogany niche market, plantation management and downstream processing must all be certified under FSC, challenge may arise in coordinating compliance across all sawmills involved in mahogany log processing	FHCL to articulate clear compliance requirements for sawmills as downstream processors.

LOU – landowning units (mataqali)

Propose a plan to improve the value chain.

In view of the above discussions and the SWOT outlined in

Table 21, the immediate and long-term plans for FHCL and the development of the Fiji Mahogany subsector are proposed as follows.

Short-term plan

Immediate action that aims to directly impact the value chain are listed as follows.

1. With the change in chairmanship of MIC, it is important to start on a clean slate by changing the law through repealing MIDA 2010 and developing substitute legislation that will ensure alignment with the Forest Decree 1992 and the National Forest Policy. These are Government decisions; hence, FHCL will need to work closely with the Ministry of Forest to secure Cabinet support for all the above changes.
2. The SWOT analysis notes that FMT is not fully engaged with the many opportunities presented by FHCL to develop and secure the full engagement of landowning units (LOU). Given the transfer of 10% shares for FMT to the Fiji Government, such that FHCL became 100% government-owned under MIDA 2010, the reverse of this stance may incentivize FMT and LOU to be more cooperative and engage fully with the development of the mahogany industry in Fiji.
3. FHCL is currently targeting log production of 80,000 cum per year from 2024 upon approval of the Ministry of Forestry. As evident in Figure 15, sustainable harvest level for 2018 is as high as 200,000 cum per year. The current low production levels can be reversed and FHCL is committed to facilitate increase in production level from 80,000 cum per year in 2024 to 200,000 cum per year from 2025 for three years after which the annual production will fall back to 150,000 cum per year by 2028. The main intention of increasing productivity is to utilize old growth mahogany rapidly.

4. To support the increase in log harvest volume, FHCL will need skilled and certified forest workers. Therefore, it is important to secure support from the Ministry of Forest to dedicate focused training on chainsaw and logging machine operators to the mahogany subsector.
5. Continue engagement and work on adopting FSC for forest management, with clear timelines to complete the same by December 2024. A strategy to secure a niche market (in the future) is reflected in FHCL's current commitment to FSC-certified forest management. FHCL is aware that FSC will need to involve all players in the value chain, including sawmill processing.

Long term plan

1. In the long term, FHCL aims to adopt the high-quality export-driven strategy aligned with the Forest Sector Study by FAO in 1988^[10]. The study recommended institutional restructuring to create demand for a high-quality export-driven market based on meaningful participation of landowners in the industry.
2. FHCL notes the successful model of Fiji Pine Limited with a subsidiary company being Tropik Woods Industries and other subsidiaries supplying electricity to the national grid. FHCL will need Fiji Government approval (MIC) to endorse adopting its institutional restructure to align similar subsidiary companies. Subsidiary companies under FHCL may include a sawmilling company, a marketing company, shipment logistics, a furniture company and so on in alignment with National Forest Policy (2007) Section 5.4.1. For this purpose, FHCL aims to fulfill (1) under short term plan as a catalyst to development opportunities in the mahogany subsector.
3. Once certified, FHCL is committed to secure Fiji Government support to secure niche markets through bilateral agreement with UK governments to absorb certified mahogany products from sawn timber to a wide range of commodity lines.
4. As a follow-on effect from (1-4 above) FHCL aims to enter downstream processing to ensure the use of all log grades harvested from the forest. With recent changes in the chairperson of MIC, FHCL hopes to secure support from the Ministry of Forestry to approve diversification of the current business operation of FHCL (mandated by law) to include downstream processing. It is anticipated that FHCL will require an investment of FJ\$2m to fulfil this aspiration. The opportunity presented by global market is high given the global demands for mahogany. and Fiji through FHCL stands to develop a billion-dollar market if zero waste of mahogany logs is advocated across all value chain actors.

Subsector Analysis of MSME in Fiji's Forest and Sustainable Landscape Sector

The Fiji Government prefers to use the term - Micro, Small and Medium Enterprise (MSME) which is defined as follows:

- Micro – FJ\$0 to FJ\$50,000;
- Small – FJ\$50,000 to FJ\$300,000;
- Medium – FJ\$300,000 to FJ\$1,250,000.

Fiji is the second largest economy in the Pacific islands. Micro, small and medium-sized enterprises (MSME) accounts for 97% of establishments in rural business sector, 18% of gross domestic product, and 36% of employment⁴¹. In 2023, MSME registered under “furniture” includes 86 companies of which women own 16 with an average turnover of \$721,019 per establishment. At that same time, 91% of women are engaged in handicraft in the informal sector where raw material is sourced from forest resources (ibid).

The Ministry of Forestry Business Guide (2022-2023) outlines seven investment opportunities in the forest sector ranging from Forest Harvesting; Sawmill; Treatment Plant; Timber Processing; Forest Parks; Value Addition and Non-Wood Timber Forest Product. The Business Guide also guides financial assistance schemes available through various Government Agencies as listed in Table 22.

Table 22: Financial Assistance Scheme available to support SMSE in the Forest Sector

Name of Assistance	Agency	Objective
Forest Subsidy Grant	Ministry of Forestry	Support the establishment of small forestry-related businesses to improve the production and quality of existing small forestry-related businesses through the procurement of tools, equipment, and machinery that add value.
National Export Strategy	Ministry of Commerce, Tourism, Trade and Transport	Support businesses that are ready to export and those that have been in operation for at least 2 years.
Integrated Human Resources Development Programme (HRDP)	Ministry of Commerce, Tourism, Trade and Transport	Aim at reducing poverty on a one-third cash funding of total project cost focusing on manufacturing machines for value adding, construction of warehouse and storage facilities, product development.
Northern Development Programme (NDP)	Ministry of Commerce, Tourism, Trade and Transport	Provision of equity assistance through grants to business to improve the livelihood of communities and individuals in the Northern Division in the areas of Forestry, Fisheries and Argo-Business and Manufacturing.
Micro, Small and Medium Enterprise Credit Guarantee Scheme	Reserve Bank of Fiji	Aimed to develop the local business industry by encouraging private sector lending through MSME.

⁴¹ ADB. 2023. Women Owned MSME in Fiji. <https://www.adb.org/sites/default/files/publication/900981/women-owned-msmes-fiji-opportunities-challenges.pdf>

Non-Timber Forest Products in Fiji

The consulting team developed a non-exhaustive list of non-timber forest products and presented it to the Focus Group Discussion Workshop on 6 Feb 2024. The Focus Group added to the list as outlined in [66]. The list is non-exhaustive, as new commodities may arise over time. Six broad categories were identified, including handicraft, medicine, food, perfume and oil, restoration, and landscape-agroforestry.

Criteria and Indicators for Selection of MSME for Market Analysis

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 potential to generate new source of income for rural forest dweller and provides a safety net or insurance in unfortunate circumstances. Production of NTFP may also be linked to religious beliefs of rural communities as well as to provide financial security. For these reasons, the team developed a matrix that will rationalize selection of the entry points to deeper assessment and understanding of specific value and market assessment of NTFP in Fiji.

Noting that many non-timber forest products (

Figure 19) of which some 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 value chain is important as rural products and services are affected by specificities such as poor accessibility, marginality, fragility, and diversity (Hoermann et.al. 2010)⁴².

Figure 19: Non-exhaustive list of Non-Timber Forest Product in Fiji

⁴² Hoermann, B., Choudhary D., Choudhury D., Kollmair M.; 2010. Integrated Value Chain Development as a Tool for Poverty Alleviation in Rural Mountain Areas. An analytical and strategic Framework. International Centre for Integrated Mountain Development, Kathmandu. June 2010.

Handicraft <ul style="list-style-type: none"> • <i>Soga</i> • <i>Dyes</i> • <i>Reed</i> • <i>Bamboo</i> • <i>Masi</i> • <i>Voivoi</i> • <i>Wame</i> • <i>Makadre</i> • <i>Wooden carving & artifacts (from waste wood)</i> 	Medicine <ul style="list-style-type: none"> • Charcoal • <i>Kura</i> • <i>Assorted medicinal trees - Fijian medicine (Juice Fiji)</i> • <i>Yaqona/waka</i> <p><i>Cagolaya</i> <i>Warusi</i> Mushroom</p> <p>Lemon Grass</p>
Food <ul style="list-style-type: none"> • <i>Honey</i> • <i>Ota</i> • <i>Waka / Yaqona</i> • <i>Coconut</i> • <i>Vanilla</i> • <i>Assorted Fruits</i> <p>Turmeric Cocoa Tivoli Coffee Ivi/Dawa/Fruits</p> <p>Bamboo Shoot Mushroom Lemon Grass</p>	Perfume and Oil <ul style="list-style-type: none"> • <i>Yasi</i> • <i>Makosoi</i> • <i>Moringa</i> • <i>Lauci</i> • <i>Dilo</i> • <i>Other assorted less know species</i> • <i>Lemon Grass</i>
Restoration <ul style="list-style-type: none"> • <i>Tree seeds</i> • <i>Tree seedlings</i> • <i>Vetiver Grass</i> <p>Bamboo</p>	Landscape-Agroforestry <ul style="list-style-type: none"> • Firewood • Coco-wood • Nursery (tree/shrubs) • woodchips <p>Horticulture Ecotourism</p>

For this assessment, additional specificities relevant to Fiji include availability of skills and human resources; impact of climate change; access to finance and technology as well as impact of other landuse to 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 success of NTFP enterprise in Fiji; how we can measure this; how we can integrate the impact of climate change and ensure inclusive approach.

Criteria for success for NTFP in Fiji's forest sector were categorized into thematic focus (see **Error! Reference source not found.**). The final criteria for success of NTFP in Fiji is outlined in Table 3 (see Section on Methodology).

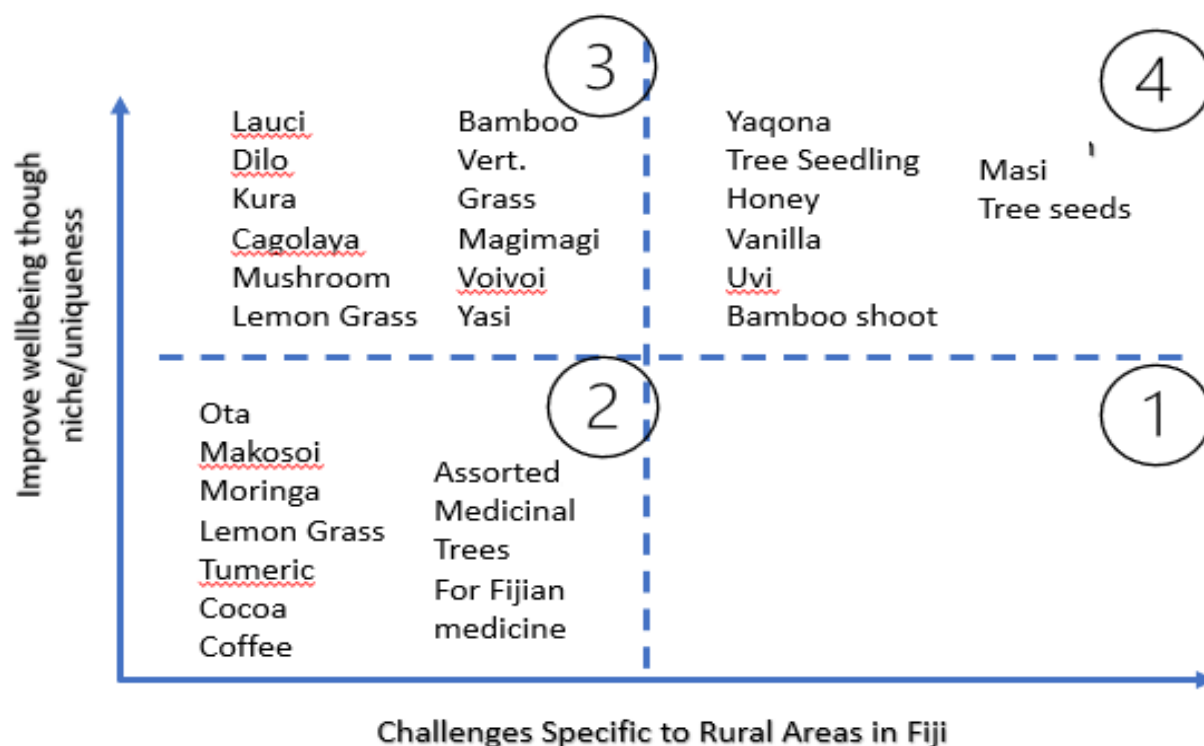
Ranking of NTFP focusing on Challenges and Opportunities

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 20**). 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 Lauci, 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 Yaqona, Tree Seedlings, Honey, Vanilla, Uvi, Bamboo Shoots, Masi and 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. Markets 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 idea selection, where challenges are low and opportunities are high, falls in Quadrant 3.

Figure 20: Using Quadrant to Rank entry point for NTFP



Ranking NTFP using critical 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

Table 23.

Table 23: Criteria for success and strategy for NTFP

Category	Criteria of success for NTFP SME	Strategy for NTFP development
Accessibility	Availability/ access to technology	Technology for Value Addition

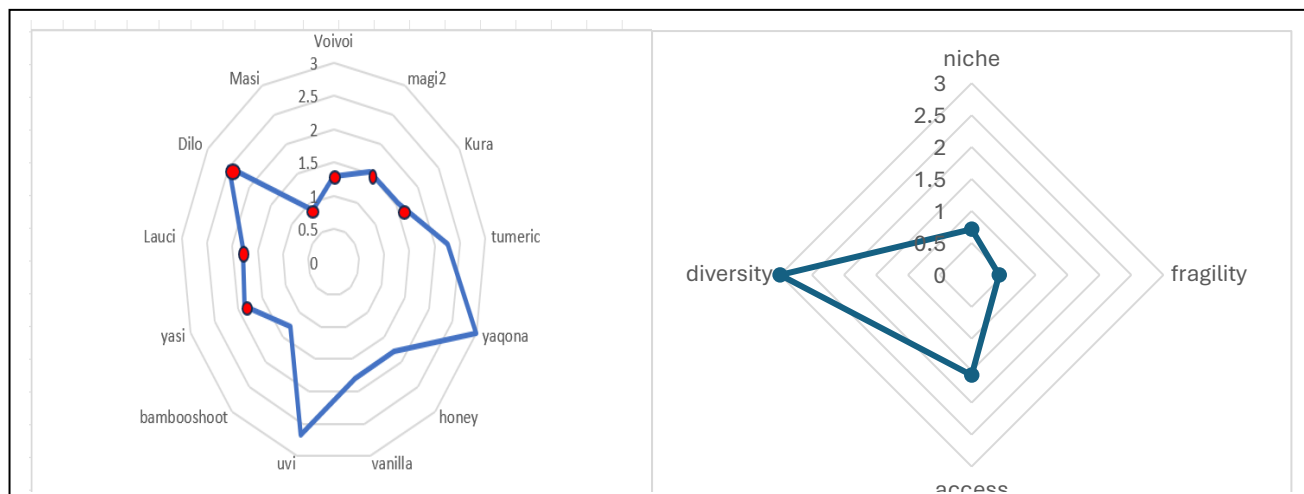
	Access to market	Niche market - High value/low volume
	Access to information	Improve communication technology
Diversity	Impact of other land-uses (e.g. livestock, mining, fire, etc.)	Resource Planning
	Consumer demands	Market Information
Niche	Growth opportunity	Skills & Capacity Building
	Availability of human resources	Rural Capacity Needs
	Access to finance	Bankability of the enterprise
	Impact of Climate Change on access of raw material	Adaption Plan to become climate resilience

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 21) and indicates Yaqona, Uvi, Dilo, Yasi and Lauci 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 completed⁴³. This leaves **Dilo, Lauci** 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 21). 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, Lauci and Yasi.

Figure 21: Priority NTFP and Indicative Strategy

⁴³ PHAMA. 2020. Kava Value Chain Analysis. The Ministry of Agriculture. Fiji



Case Study - Mahogany MSME cottage industry

Mahogany residual logs

Case study for the mahogany residual wood subsector is presented using data collated out of focused questionnaire with four small enterprises currently under incubation at The Ministry of Forestry FPTT Division. Refer to Appendix 5 for detail interaction as recorded in the questionnaire.

As outlined above, according to FHCL, the composition of logs in the sales log yard categorized as residual logs is estimated at 5% of log stocks at any time. At the current annual production level of 40,000cum, this is equivalent to 2,000cum per annum of residual logs in the log sales yard sold at \$60 per cum with a value of FJ\$120,000.00 per annum.

Tauraga (2016)⁴⁴ assessed residual logs in native forest and found that 0.4cum is left behind as waste logs for every cubic meter of native tree harvested. In the case of mahogany, straight boles produce premium sawn timber estimated to consist 70% of a standing tree, however, only 40% of this is used as 30% are defected with rot. These are considered waste wood or residual wood in the forests. Shorts/ branch logs can be converted to short length sawn timber. Although undocumented, this is confirmed by FHCL to consist of 20% of a standing tree. Smaller branches that cannot be converted into useable timber are considered fuelwood consisting of 10% of the volume of a standing tree.

As managers of the largest mahogany plantation in the world, FHCL is aware of the above challenge and committed to explore opportunities to secure zero-waste for its mahogany estate. Hywel (1973)⁴⁵

⁴⁴ Tauraga, J.; 2016. Logging Residue: An assessment of primary waste from selected native species in Fiji. Thesis submitted for the degree of Masters in Environmental Management, University of Gyana.

⁴⁵ Hywel Robers. 1973. When Ambrosia beetles attach mahogany trees in Fiji. FAO <https://www.fao.org/3/I0049e/I0049e06.htm>

found that rapid population growth of ambrosia beetle and the extensive mortality due to root decay are associated with bush debris from tropical cyclone and debris of native timber that were felled to make way for young mahogany seedlings. FHCL management is fully aware of these challenges and the potential impact of waste wood left on mahogany forest floor. To mitigate this, FHCL uses selective logging to extract old growth trees as a priority.

In alignment with the National Forest Policy, the Ministry of Forestry envisions that cottage industry using residual logs is a huge opportunity that should be supported whereby landowning units are encouraged to engage. The success of the first cohort under incubation will determine future influx of interest from the 200 landowning units under the 14 Mahogany Stations across Fiji.

As is the global trend, Fiji's main cause of forest degradation includes agriculture extension, logging, traditional use, introduced species and natural disasters (CI 2000)⁴⁶. Romero et al. (2023)⁴⁷ estimated the potential contribution of improved forest management pathways for natural climate solutions in the tropics at 537 PgCO₂e. Strategies suggested to support this pathway include:

1. Use reduced impact logging (RIL) practices;
2. Improved wood utilization from felled trees;
3. Reduce harvesting frequency or lower logging intensity;
4. Apply silviculture treatments;
5. Plant trees on accessible degraded areas.

Pathways 1-3 above will reduce carbon emissions, while 3-5 will increase carbon removals.

This case study assesses the creation of value addition to residual wood from mahogany harvesting operations and aligned to pathway 2 above hence this intervention contributes towards reducing carbon emission. At the same time, clearing residual wood from forest floor will increase natural regeneration and/or ease of restocking logged over forest, the pathway under discussion will also contribute to increased carbon removals.

Value chain map

Key actors in Fiji's mahogany residual wood subsector include the Mahogany Industry Council (MIC), Fiji Hardwood Corporation (FHCL), Board of Directors and the FHCL management team. These organizations control the flow of mahogany from the forest and determine the level of residual wood.

Individual landowning units have taken the opportunity to register businesses and engage in cottage industry by purchasing waste wood from FHCL logging operations. These buyers are categorized under "Open Market Buyers" by FHCL.

⁴⁶ Conservation International, 2020. Report: Analysis of drivers of deforestation and forest degradation; barriers for forest conservation, sustainable management of forests, and enhanced carbon stock; and strategic response options. The Ministry of Forestry. REDD+. Indufor. Conservation International – Grant #: TF 019204

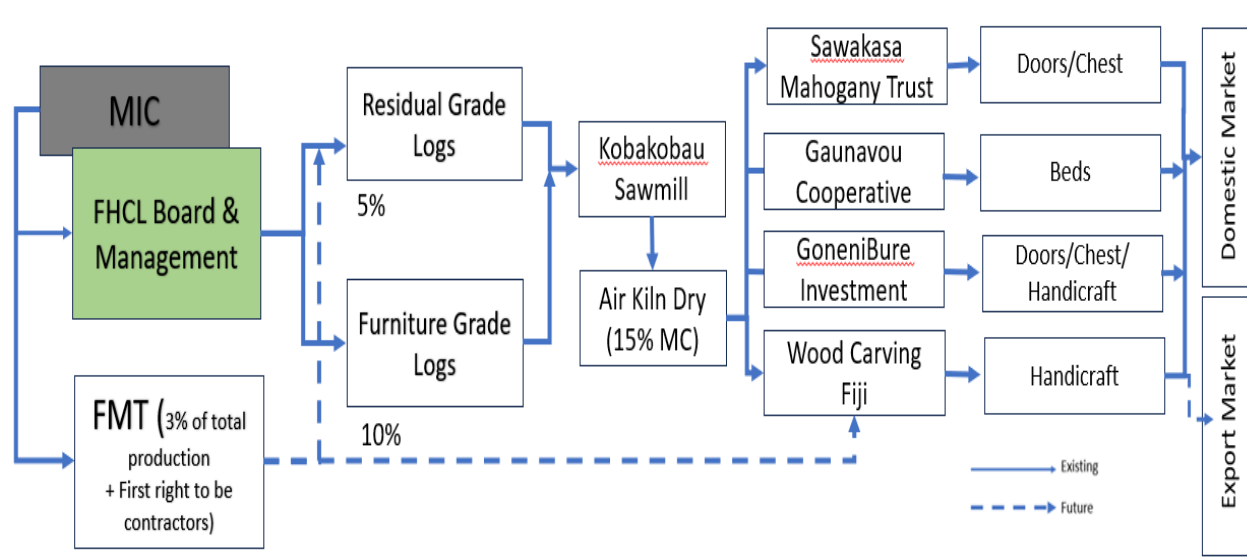
⁴⁷ Romero, C., Stickler, C., Putz, F.E., 2023. Opportunities to reduce tropical forest degradation and mitigate climate change. US Forest Services. USAID.

Mahogany landowning companies include *Gone ni Bure Investment Cooperative*, *Sawakasa Mahogany Trust* and *Gaunavou Cooperative*. These companies are in the “incubation stages with close mentoring from the Ministry of Forestry. Product lines include wooden beds, & doors chest box, carving and other joinery such as coffin boxes, lamp shade etc. Between the three companies, beds and doors comprise 60% of their production, chest-box 10%, carving 15% and other joinery 15%. The Ministry of Forestry continues to provide quality control and financial management oversight. Value chain of the residual wood cottage industry is outlined in

Figure 22.

The Ministry of Forestry mentors newly developed cottage industry enterprises for the five years after which each enterprise is expected to operate independently. Entry pathway is one year of training engagement at the Timber Industry Training Center (TITC) at the Ministry of Forestry Processing Trade and raining Division at Nasinu, Suva. Students are encouraged to register their companies as sole trader or Cooperative before being included in the Ministry’s incubation program. There are five cottage companies (see Table 24) under incubation at the time of this assessment where one is at kick-off stage and under training with one of the older companies.

Figure 22: Value Chain for Fiji Mahogany Logs



The domestic market consists of local furniture chains such as Courts Fiji Ltd. Subrails Furniture, Government Ministries, Methodist Church of Fiji, Fiji Schools, Hotels, Facebook-interested buyers, and Walk-in Customers at the joinery shop. Generally, retailers absorb 70% of the production, walk-in customers take 20%, and 10% are sold to other categories listed above.

Table 24: Key Residual Wood Value Chain and Core Commodities Actors produced.

Name of Enterprise	Core Commodity	Male	Female	Total Number of Staff
--------------------	----------------	------	--------	-----------------------

Sawakasa Mahogany Trust	Doors/Chest	7	2	9
Gaunavou Cooperative Ltd.	Beds/Dinning table	0	3	3
GoneniBure Investment	Doors/Chest/Handicraft	5	2	7
Wood Carving Fiji	Handicraft	3	0	3
Seaqaqa Cottage industry	Training under GoneniBure	1	0	1
Kobakobau Investment	Sawmill	4	0	4

Approximately 25% of the workers in the small enterprise listed [OBJ] are women. Several critical issues identified through the gender inclusiveness discussion ([OBJ]) are barriers to women's participation in the NTFP trade. The traditional Fijian community structure is a patriarchal society, rural society, and decisions are made through a top-down approach.

Cultural and social barriers exist within the traditional community setting in Fiji, such as the traditional demarcation of roles and responsibilities, changes in community structure due to migration, and community construct (attitude and mindset). Another barrier identified is religious beliefs and denominations in communities that may impede women's participation.

To encourage women's participation, several pathways were identified, such as engaging the Soqosoqo Vakamarama, training on gender equality, and delegation of responsibilities within a community setting. Other entryways include identifying traditional NTFP handicrafts and utilizing traditional structures, such as the “solesolevaki” approach, to engage women.

Quantification of the Value Chain

Each entity's production level differs according to market demand. The detailed annual production level for each enterprise is listed [OBJ]. The Ministry of Forest FPTT has yet to provide costings and postings, an essential factor to consider when undertaking value chain analysis.

Table 25: Production level for each leading actor in the mahogany residual wood sub-sector

Monthly production level	Volume demand/ Month (pcs)	in Domestic Demand	Production Level (annual)	Pricing	Risks
Sawakasa Mahogany Trust	3 Mahogany Doors	Walk-in customers	29	FJ\$480	weather
	1 Coffin Box Large	Walk-in customers	2	FJ\$500	
	1 Coffin Box Small	Walk-in customers	1	FJ\$900	
	1 Chest Box	Walk-in customers	1	FJ\$450	
Gaunavou Cooperative Ltd.	4 Queen Size Bed	Courts Fiji Ltd.	40	FJ\$872.65/ pcs	
	2 King Size Bed	Courts Fiji Ltd.	20	FJ\$989.3/ pcs	
	2 Double Bed	Courts Fiji Ltd.	20	FJ\$775.86/ pcs	
GoneniBure Investment	1xMahogany Doors	Walk in	9	FJ\$450	
	1xCoffin Box Large	Walk in	8	FJ\$550	
	1xCoffin Box Small	Walk in	1	FJ\$900	
	15x Church Bench	Walk in	189	FJ\$600	
	1xShield	Walk in	1	\$135	
	2x 21 st birthday key	Walk in	32	FJ\$80/ pcs	

Wood Carving Fiji	1 x Takona (wooden bowl)	Walk in	1	FJ\$150	Buyers fail to buy due to a drop in international demand
	1x Drua Canoe/	Walk in	2	FJ\$250	
	1x Silver Fern	Walk in	1	FJ\$500	
	1x Tanoa	Walk in	100	FJ\$12	
	15 x Shield	Walk in	1	FJ\$3	
	1x Trophy	Walk in	1	Average FJ\$180	
	1x Lathe Post	Walk in	1	FJ\$180	
	1xCoffin Box	Walk in	1	FJ\$550	

*Assume ten working months/yr

**@\$0.25m/station x 4station

***40%Grade1&2, 20% Grade 3, 10% Grade 4&5, 5%Residual @\$60cum

(source: The Ministry of Forestry, Forest Processing Timber and Training Division)

Role and Contribution of All Actors

FHCL is the only supplier of raw materials. It sells residual logs at \$60 per cum. Furniture Grade 5 logs are also available for purchase should the players in the residual subsector wish to purchase quality furniture logs at average mill gate price.

The Ministry of Forestry—Forestry Processing Timber and Training (FPTT) is important in coordination and training. FPTT provides product design and marketing and coordinates production line plans at each entity. FPTT further secured capital project funds of FJ\$150,000 to facilitate the procurement of raw materials and initiate incubation for the entities listed Table 24. FPTT also facilitates skills training in joinery and finishing.

Kobakobau undertakes all the milling for the four joinery enterprises. The milling process is followed up with kiln drying near the Ministry of Forestry FPTT facilities. At 15% moisture content, the sawn timber is ready to be processed into furniture and an assortment of handicrafts as outlined Table 25. Each enterprise is responsible for processing the various commodities. Orders from retail buyers have continued to grow, particularly for beds, doors, and other furniture.

Under the incubation framework, FPTT also monitors and controls the quality of all products. These are essential aspects that ensure high quality and customer satisfaction. The entrepreneurs involved in the residual wood market have noted in the interview that the Ministry of Forestry is doing an excellent intervention in skills training. However, they also would like exposure to business management and financial training.

Competition is minimized as each entity focuses on a different commodity.

Market Assessment

Currently, the Ministry of Forestry FPTT negotiates product specs and prices. There will come a time when the management team of each entity will be required to undertake this role. Current market communication is through word of mouth and social media. Domestic customers in the form of local retailers are committed and supportive of the initiative such that the quantity of orders continues to increase with retailers. Therefore, The MSME group focuses on confirmed orders from retail outlets.

The MSME is aware of the FSC Certification that FHCL aims to secure. They are also aware of other related market entry requirements; however, this does not affect their current operation. With the assistance of The Ministry of Forestry FPTT and FHCL, the enterprises involved in this sub-sector align their operations to Fiji's labor laws and other operating requirements.

All enterprises were first inspired to enter the market due to the availability of raw materials and coaching and mentoring from the Ministry of Forestry FPTT. The entry point is training at the Timber Industry Training Center (TITC) at FPTT. TITC offers training on joinery from design to finishing, timber grading, sawmill operation, and all aspects of skills development associated with timber utilization and trade.

Revenue earned by each enterprise indicates that by definition of Fiji's micro, small, and medium enterprises, the four key players in the mahogany residual wood subsector are considered small enterprises (see Table 26).

Table 26: Revenue for mahogany residual wood enterprises – 2023 (Source the Ministry of Forestry FPTT)

Enterprise	Sales (2023)
Sawakasa Mahogany Trust	\$16,270.00
Gaunavou Cooperative Ltd.	\$124,685.00
GoneniBure Investment	\$124,686.00
Wood Carving Fiji	\$9,350.00

Regarding technology uptake, the current machines used by all enterprises are sufficient to kick off business startups. However, once demand increases and the market expands beyond the current reach, each enterprise is aware that it may need to upgrade machines and improve production efficiency. Each enterprise needs certified machine operators and relies on FPTT for training.

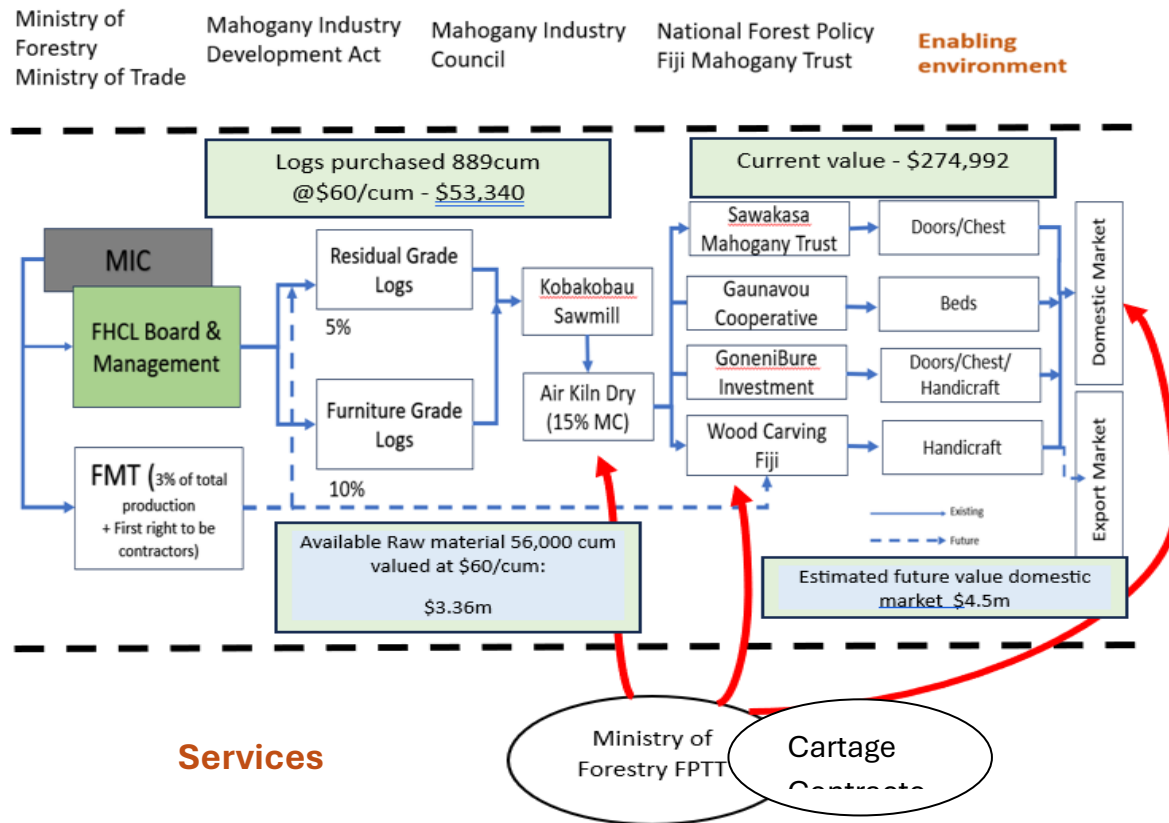
Participants along the value chain strongly believe that there is room for other landowning units to participate in this subsector. Further investment of up to \$400,000 to procure efficient machines may bring the product to world standards. At the same time, there is a general aspiration to bring designers and planners from UK markets to help improve the appeal and marketability of potential new furniture lines. The enterprises recognize lead competitors, including Mahogany Industry Ltd. (exporter of mahogany furniture) and Subrails (domestic retail outlet producing their furniture). The current purchase agreement with Vision (Courts Fiji Ltd), Fiji's most significant furniture outlet, keeps all MSMEs busy.

The MSME assessed is assumed to purchase an estimated volume of 889 cum of residual logs at \$60/cum. Although FHCL claims they also procured furniture grade logs, the team could not secure an estimated volume. According to reports from The Ministry of Forestry FPTT, the collective revenue accrued by all four enterprises totaled \$274,992 at the end of 2023 (Table 26). The financial return is very lucrative, assuming each MSME was given \$10,000 to start up.

In terms of potential available resources, given that FHCL has been slow in utilizing residual logs, it is assumed that a collective volume of logs on the forest floor is estimated at 56,000 cum at a rate of 2,800 cum per year over the last 20 years. The current mill gate price presents a lost opportunity of \$3.3m. At the same time, given current commodity prices, the potential unrealized market value for the domestic furniture market is estimated at \$4.5m.

The market map for FHCL is outlined below Figure 23.

Figure 23: Market map for Mahogany Residual Wood



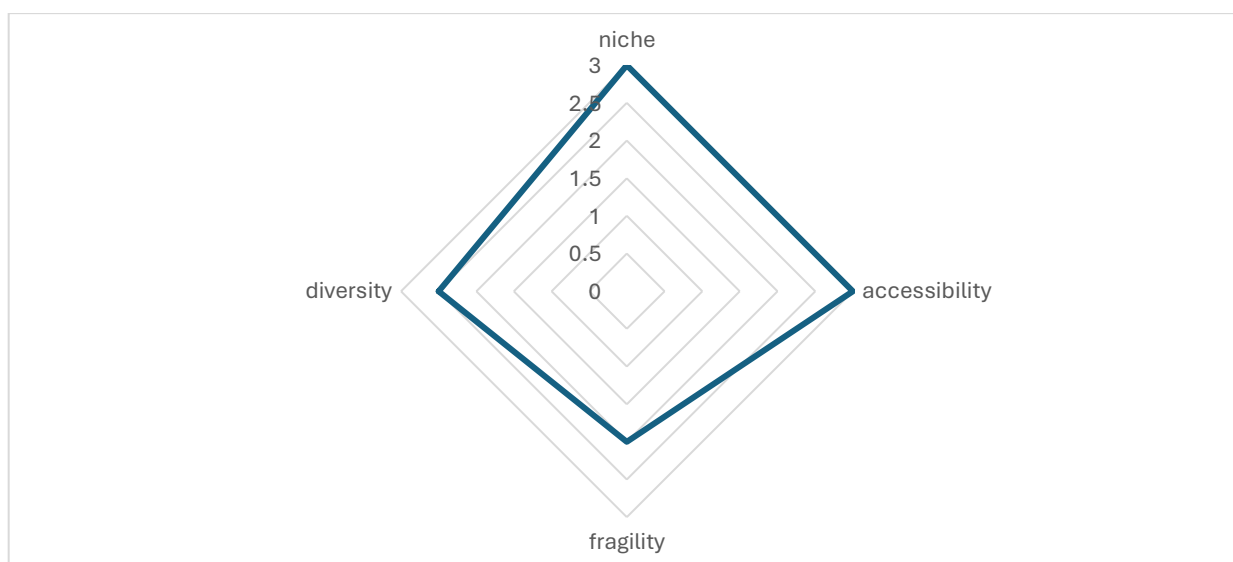
Participants were asked to rank the most critical strategy the subsector should focus on to consolidate critical success factors for enterprises involved in the mahogany residual value chain. Results indicate that residual wood enterprises should focus on developing a niche market specific to the market segment they service (see SWOT analysis of the Value Chain.

).

The critical success factors for mahogany MSME are niche and accessibility.

Under niche product, we consider growth opportunities for rural pro-poor landowners and note that there is a vast potential to support an increase in income for rural communities whose land is leased by plantation forests if such communities are interested and willing to engage as is the case of the MSME assessed. Inclusiveness and capacity needs present the opportunity to involve women in marketing and enterprise management to strengthen networking among all players in the MSME. Coupled with unique high-value mahogany wood/timber, there is potential and opportunity to carve out meaningful engagement among pro-poor rural mahogany landowners.

Figure 24: Critical success strategy for mahogany residual wood



Regarding accessibility, the respondents recognize the need to be closer to the source of raw material yet need 3-phase power and other essential utilities to support the production process. Transportation of raw materials is more expensive than end-product transportation; hence, accessibility to raw materials is essential. At that same time, the respondents note the need to have access to financial services to secure improved and appropriate technology to produce high-quality commodities that meet consumer demands.

SWOT analysis of the Value Chain.

An assessment of the chain's strengths, opportunities, weaknesses, and threats is outlined Table 27.

Table 27: SWOT analysis for Mahogany Residual wood

Actor	Strength and Opportunities	Weakness and Threats	Action Needed
FHCL (MA)	Want zero waste from mahogany plantation harvesting operation	High level of residual logs Ambrosia beetle population increases with available residual logs	Review cost structure for residual logs to ensure accessibility
Small Enterprises that procure residual wood (MA)	Opportunity to form an Association	Financial management not included in Tech skill training	Introduce financial and management training
The Ministry of Forestry FPTT (SA)	The government provides a \$10,000 start-up per year. Expand to other interested landowning units.	Condition - After one year of incubation, find your factory site. The problem lies in the availability of 3phase power. Lack of capital	Build a Trade Center that provides 3-phase power and water. Rent out to MSMEs involved in the residual wood sub-sector.

Actor	Strength and Opportunities	Weakness and Threats	Action Needed
Retailers and Domestic Customers (MA)	Opportunity to expand market reach.	The ability of the enterprise to secure markets and meet demands.	FPTT is involved and guides MSME
Fiji Mahogany Trust (SA with potential to be MA)	All enterprises assessed are members of FMT. Opportunity for FMT to be involved in the business setup and incubation of landowner start-up entities	Lack of incentive for FMT to be involved	Reverse 10% share transferred to Govt via MISA 2010 Strengthen FMT to play the current role of FPTT.

Propose a plan to improve the value chain.

Given the above discussions and the SWOT outlined Table 27, immediate and long-term plans for the mahogany residual wood subsector are developed for consideration. Immediate action that aims to have a direct impact throughout the value chain and generate a long-term spin-off is critical and acts as a catalyst for spin-off benefits for the mahogany industry at large.

Short-term plan

1. Representatives of the enterprises seeking redress of mill gate price with FHCL. In particular, to request a review of mill gate cost structure for residual logs and consider reduction for a short period (5 years) to encourage landowning units to engage, extract, and utilize residual logs to kick start MSME. This will increase the removal of harvest residual Logs from the forest floor, increase ease of restocking, and facilitate effective startup for many interested landowning units.
2. The Ministry of Forestry FPTT should consider introducing financial and management training to existing entities and including these in the primary training curriculum.
3. The Ministry of Forestry FPTT will negotiate a loan package with financial institutions in Fiji to support other landowning units that may want to enter and coordinate product development to enhance collaboration and reduce direct market competition among potential market players.
4. Rethink the landowner engagement modality to ensure all interested parties are engaged. This may mean developing and coordinating entities that produce product components - focusing on component markets. Given that there are 14 mahogany Stations and over 200 landowning units, each station may focus on a single commodity where different landowning entities within a station produce one component of the product along the assembly line so that all interested landowners are engaged and benefits are shared equally. For instance, in the case of tables, one entity produces table legs, another – tabletops, and another assembles the table as a finished product. This also presents the opportunity to use the traditional collaborative modality of work locally known as “*solesolevaki*.”

Long term plan

1. Given the growth opportunities evident through the cohort of MSMEs under the current incubation with FPTT, all small enterprises interviewed recognized the importance of ensuring the fulfillment of current demands. With support and assistance from The Ministry of Forestry, the enterprises are committed to securing market shares by ensuring high-quality and timely production of all commodity lines. In the long term, quality control must become an inherent training component delivered by TITC to ensure this aspect of product development is integrated into future MSMEs.
2. Given the opportunity to involve FMT with development and safeguard of landowner interests, as well as the extent of assistance needed by more than 200 landowning units across the 14 mahogany stations in Fiji, it is suggested that the Ministry of Forestry FPTT liaise with FMT and secure interest from FMT to play the role of facilitator of the incubation of new landowning enterprises, including business training, quality control, securing markets and finance for landowning units interested to engage.
3. The Ministry of Forestry FPTT to secure Government investment to build a center that provides 3-phase power and water to rent out to MSMEs involved in the residual wood subsector. Such a facility will ensure coordinated efforts among MSMEs, reduce competition, and allow and build a vibrant community of producers where access to technology, information, training, and shared learnings are readily available. It is further recommended that three such facilities be set up – one in the Suva/Nausori corridor, one in the Lautoka/Nadi corridor, and one in the Seaqaqa, Vanua Levu.

Conclusion

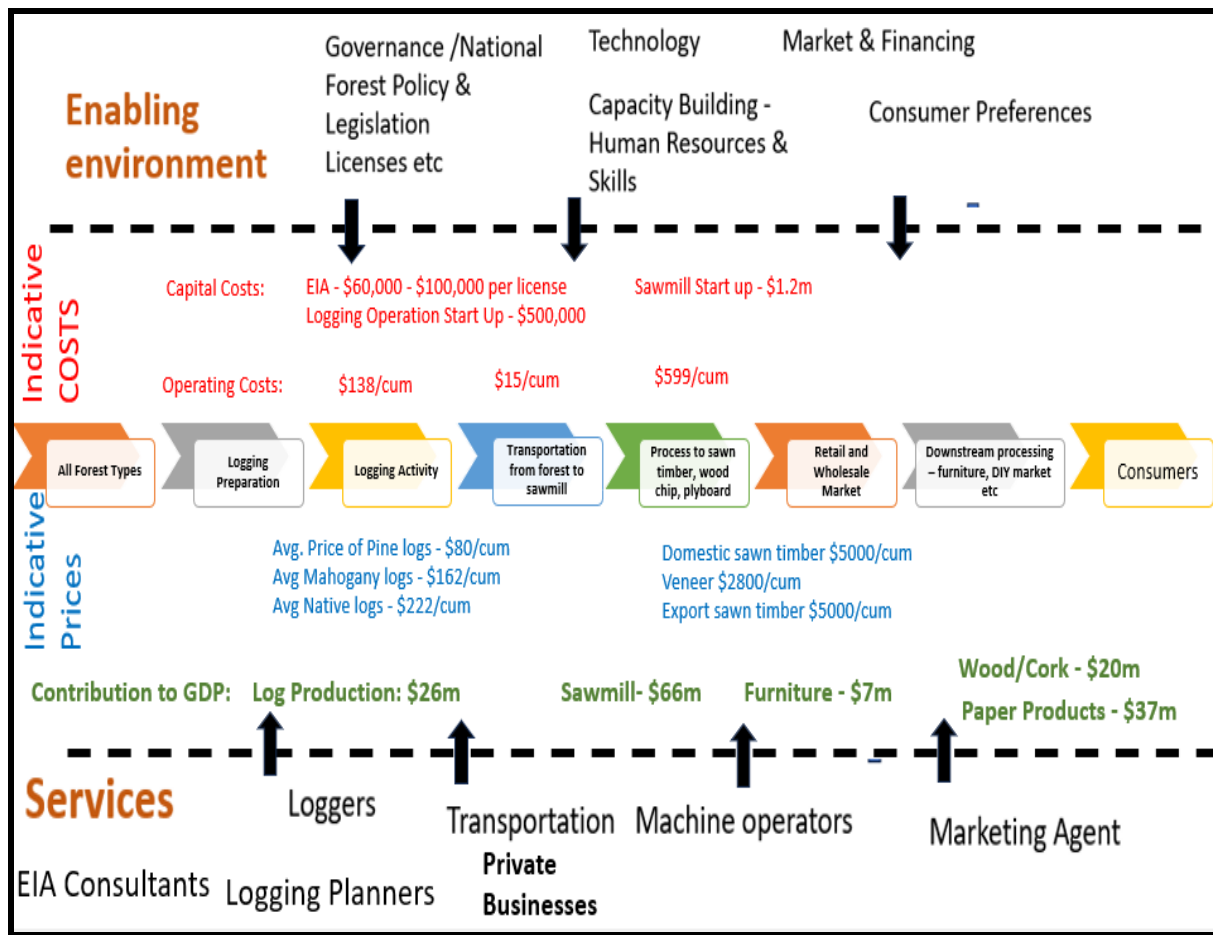
Markets in the native forest sector value chain in Fiji have distinct market structures between primary and secondary production, where the primary market structure is considered oligopsony. In contrast, the secondary processing markets conform to oligopoly (Waqainabete, 2006)². Plantation log flow is dominated by two distinct market segments monopolizing two timber market segments. The players in the forest sector value chain thus operate in contestable markets where they use strategies (games theory) to maximize profits. It is assumed that entry and exit are costless, particularly in the logging activity where equipment can be resold and used in another sector such as infrastructure (building and road constructions). Trends also indicate that the number of sawmills and harvesting licenses issued annually has declined since 2017.

Analysis of the production level from different forest habitats shows that pine production is produced over sustainable limits yet is the most significant contributor to the forest sectors' GDP, followed by mahogany. However, log production for mahogany is lower than that of native forests.

Value along the chain indicates that sawmill activity contributes most to Fiji's GDP (see

Figure 25). Coupled with the above assessment, mahogany appears to have the highest timber value; upgrading of mahogany production is therefore projected to boost the sector's economic performance. The Fiji Government and Fiji Hardwood Corporation Ltd. are pursuing forest management certification under the Forest Stewardship Council. Successful completion of such certification will further boost the international marketability of Fiji Mahogany.

Figure 25: Value Chain market map for the Forest Sector in Fiji



With the overall decline in production from native forests, the opportunity to focus on NTFP is real. Many potential NTFP commodities have been identified, but with very little available information on production levels, market demand, and consumer preferences, the Fiji Government is committed to supporting the research and development of NTFP.

The market for non-timber forest products in Fiji is at its infancy stage, with no apparent commodity at the lead. Although Sandalwood has been the most widely discussed opportunity, Fiji still sells raw materials such as roots and has yet to progress to more refined products such as oil extraction. Notably, the Ministry of Forestry is committed to investing in the Research and Development of non-timber forest products to diversify the forestry sector's economic performance and develop alternative commodities through non-timber forest products for livelihood and poverty alleviation among the rural populace.

Despite the selection made by the Focus Group Discussion (FGD), the consultancy team wants to avoid misrepresenting potential NTFP. Hence, after further consultation among the consultancy team and other external interests such as the Fiji Foresters Professional Association, the final list of NTFP that will be part of the next phase of assessment as outlined Figure 26, where at least two commodities from each NTFP group are selected to ensure fair representation of all possible NTFP that can be developed from the forest sector.

Table 28 Lists the selected NTFP (yellow highlight Figure 26) in their respective category.

Figure 26: Final NTFP commodities to be assessed in detail

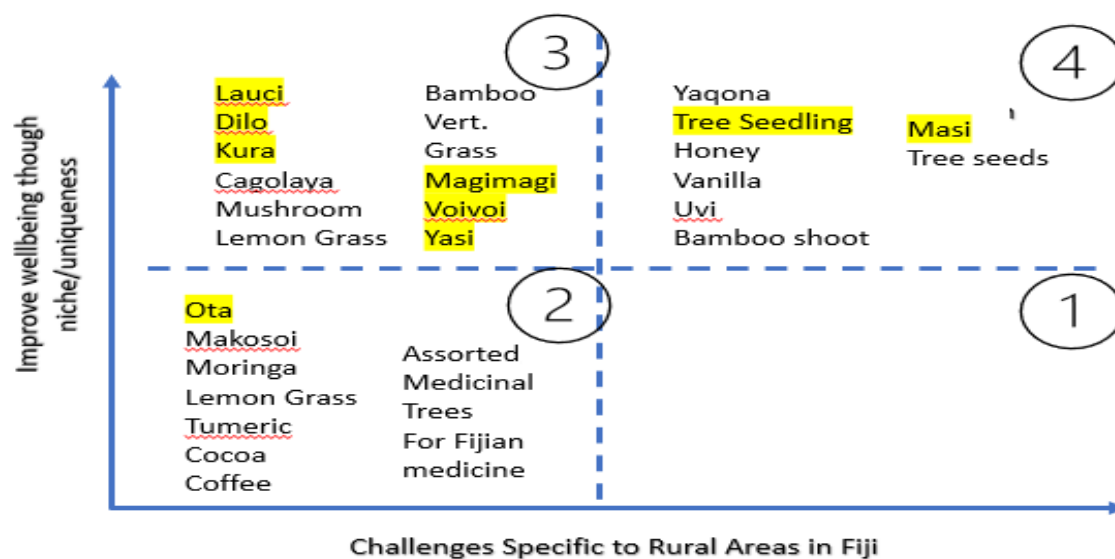


Table 28: The final list of NTFPs was selected for further consideration.

TYPE of NTFP	NTFP	Current Practitioners	TYPE of NTFP	NTFP	Current Practitioners
Handicraft	Magimagi	Drani & Susana, Cicia	Perfume and Oil	Lauca	Abhay Chaudhary
	Masi	Moce		Dilo	Drani & Susana
	Voivoi				Mereseini Dimeke
Restoration	Tree Seedlings	Rakiraki – Tubui	Land / Agroforestry	Yasi	Sandalwood Officer (Farmer/Exporter – Sanjay)
Medicine	Kura	Waisea Vakalevu - Northland Pure Noni	Food	Ota	Market
		Peter Chang/ Seetoo			

Organisation & Representatives Consulted

Organization	Name	Designation
The Ministry of Forestry	Sanjana Lal	Conservator of Forest
	Taniela Whippy	Director FPTT
	Alivereti Naikatini	Director Silviculture Research
	Kesa Tabua	Silviculture Research
Fiji Hardwood Corp. Ltd.	Semi Drani	CEO
Gone ni Bure Investment Cooperative	Ropate Green	TITC
Sawakasa Mahogany Trust	Ropate Green	TITC
Gaunavou Cooperative	Ropate Green	TITC
29 Participants at the Focus Group Discussion/ workshop are listed in the workshop report		

Annex 1: WORKSHOP REPORT

Separate file [here](#)

Annex 2 – Royalty classification for native species

Species List			
Royalty Class 1	Royalty Class 2	Royalty Class 3	Royalty Class 4
Amunu Buabua Dakua Makadre Dakua Salusalu Kuasi Rosawa Vesi Yaka	Bauvudi Dabi Damanu Dilo Kauceuti Kaudamu Kaunicina Kauvula Mavota NAwanawa Sagali Raintree	Doi Dogo Laubu Qumu Rosarosa Sacau Sasauira Tivi Vaivainiveikau Yasuyasi	All native species not included in Classes 1-3 Exception of Yasi Dina (Santalum Yasi to which special conditions apply)

Annex 3: 2023 market prices for selected grades (Source The Ministry of Forestry)

	species	untreated	Fiji Prime	Select	Standard	ungraded
Domestic	Dakua s	1200	0	2500	1700	800 - 1000
	Dakua m	0	0	2300 - 2700	1800 - 2000	800 - 1000
	Raintree	0	0	0	1000	750 - 800
	Kaudamu	900 - 1200	0	1600	1300	900 - 1200
	Kauvula	900 - 1200	0	1600	1300	900 - 1200
	Damanu	800 - 1100	0	1700	1400	800 - 1100
	yasiyasi	900 - 1200	0	2800	1900	900 - 1200
	vesi	2000	0	3500 - 5000	3000	2000
	sacau	900 - 1200	0	2800	1900	900 - 1200
	bauvudi	900 - 1200	0	1300	1200	700 - 1000
	rosawa	800 - 1200	0	2000	1800	800 - 1200
	kaunicina	900 - 1200	0	1600	1300	900 - 1200
Venner	aumunu	1500	0	2800	1900	1200 - 1500
	pine	1200				
	mahogany	1500	0	2500	2000	900 - 1000
	Damanu	1200	0	1700	1500	900 - 1200
Export	pine	0	0	0	1500	0
	Mahogany	0	0	4500	1300	1200
	Dakua Makad	0	0	0	5000	0
	Raintree	0	0	1200	0	900
	yaka	0	0	2300	0	0
	Dakua salusa	0	0	2400	0	0

Source: The Ministry of Forestry, Forestry Processing Timber and Timber Division, Nasinu

Annex 4 Template for Questionnaire

Value Chain Analysis for the Forest Sector with particular emphasis on Non-Timber Forest Products

Contact Information

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.
- 5.

Policy/Regulation

6. What government policies/regulations benefit your business (registrations, inspections, subsidies, incentives, etc.)?
7. 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

8. Is your industry/trade sector represented by national or local business associations? If so, please name them.
9. Are you a member? If not, why?
10. What are the primary functions and benefits of these associations?
11. 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 Using a scale of 0 to +3 to rank opportunity and 0 to -3 to rank level of constraint:
Niche	Growth opportunity (Unique/niche market)	<ul style="list-style-type: none"> • Presence of unique/niche products or services due to location specific diversity (in the form of products, culture, or knowledge) • Potential for pro-poor income increase • Existence of backward linkages (in terms of both investment and knowledge transfer) 	
	Availability of human resources (Inclusiveness and Capacity Needs)	<ul style="list-style-type: none"> • Equitable participation of poor/disadvantaged groups as producers or labourers • Strengthening women's negotiating power within markets and enterprise • Gender training for women and their families to increase women's power in the family. • Strengthening support networks in the community including protection of women against violence 	
Accessibility	Accessibility to market (high value/low volume)	<ul style="list-style-type: none"> • Remoteness • Distance to markets • Efficiency of infrastructure • Weight/volume of products • Availability of communication infrastructure 	
	Availability/ access to technology (Opportunity for Value Addition)	<ul style="list-style-type: none"> • Improved access to financial services for improved technology • Ability to identify gaps and deficiencies. • Identification of appropriate technology 	
Fragility	Fragility (sustainable resource management)	<ul style="list-style-type: none"> • Vulnerability to irreversible damage • Carrying capacity for sustainable supply of raw material 	
	Impact of Climate Change on access or raw material (climate resilience)	<ul style="list-style-type: none"> • Vulnerability to impact of climate change on resource availability • Ability to resist drought, floods, and tropical cyclones • Improvements in wider social security, health and education provision for all women, youth and vulnerable in society. 	
	Access to finance (Bankability of the enterprise)	<ul style="list-style-type: none"> • Potential for economies of scope through diversified but interlinked activities • Improved facilities for women in markets and measures to counter discrimination 	
Diversity (economies of scope)	Impact of other landuse (e.g. livestock, mining, fire,	<ul style="list-style-type: none"> • Capacity to understand/ fulfil market demand. • Negotiation capacity 	

	etc.)(Resource Planning)	<ul style="list-style-type: none"> • Ability to bear with market risks. 	
	Access to information	<ul style="list-style-type: none"> • Linked to mainstream market • Improve collation and dissemination of market information, product demands, weather forecast, latest technology and other important information. • Improve collaboration with policy makers to develop consumer guidelines for expected standards and after sales services. 	

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?

Annex 5 Template for Case Study Value Chain Assessment

Template for Value Chain Assessment – Case Study of Timber & NTFP

Introduction

Write a short introduction about the commodity, what is the annual demand and what is the actual production level? And any other information about the product that was gleaned from the interview.

Value chain map

What to do:

- a) *List all the actors involved in getting the product from the farm to the consumer.*
- b) *Arrange the actors into main actors and supporting actors – note that main actors are those that buy and sell the product as it moves along the chain, supporting actors are those that provide services to support*
- c) *Arrange the actors according to how the product moves along the chain from start to finish. This will result in a diagram that depict your value chain*

Quantification of the Value Chain

What to do:

- a) *Populating the map with facts and figures.*
 - i. *How many people are involved at each step?*
 - ii. *What is the cost of the activity?*
 - iii. *How much volume of the product is in demand? Monthly?*
 - iv. *Can we determine the domestic and export demand?*
 - v. *What is the level of production that can be met? – is the demand fulfilled?*
 - vi. *What is the transportation distance, pricing, margins or wastage?*
 - vii. *What are the risks?*
- b) *You may go back to the value chain and populate the above data into the chain?*

Role and Contribution of all actors

What to do:

- a) *identifying what each stakeholder/actor contributes to the final product and the returns they receive.*
- b) *Start with the actors listed in (1) above and fill this table:*

Actor	What the actor contributes to the final product	The cost of the actor's contribution	The reward that the actor receives	Actor Risk
Main actor (MA) Support Actor (SA)				

Market Assessment

What to do:

- a) *List down what the consumers care about? Score from 1-10 what the consumers think of the product according to your discussion during interviews. Refer to Annex 1.*
- b) *Is it a domestic or export market?*
- c) *How many players in the market?*

SWOT analysis of the Value Chain.

What to do: : Assess strengths and weaknesses along the chain and identifying ways to take advantage of strengths and minimise weaknesses

a) *Develop a SWOT table*

a. *Go back to the actors and do SWOT on each*

Actor	Strength and Opportunities	Weakness and Threats	Action Needed
Main actor (MA) Support Actor (SA)			

Propose a plan to improve the value chain.

What to do:

a) *Take findings from 5 above and develop a plan to improve the value chain*

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

b. *Long term plans – this will have future impact*

ANNEX 1: Market Assessment

Performance of value chain in meeting demands – use this table to assess market demand

Category	Consumer Concerns	Ranking 1-10
Accessibility	Is the product of high quality and affordable? Is the product accessible and available? Is the product affordable?	
Diversity	Is a product information available?	
Niche	Is the product reliable? Is the product unique?	
Fragility	Was the product sourced sustainably? Is the product environment friendly?	

Annex 6 Fiji Mahogany (Filled) Questionnaire

Value Chain Analysis for Forest Sector with special emphasis on Non-Timber Forest Products

Contact Information

Interviewer /Amena Tuisawau/Taione Lave/Susana Tuisese
Date of interview / 29/2/24
Firm Name / Fiji Hardwood Corporation Limited (FHCL)
Principal product or service; Mahogany Plantation / Mahogany logs
No. of employees / 72
Owner (or contact) / Fiji Government
Legal status / Legal entity: Public company
Address /
Telephone /
Email/

Market Access, Trends, and Governance

1. What do you see as your main needs/opportunities in accessing markets?	Market is regulated by MIDA (Mahogany Industry Development) Act that is restricting its growth. MIDA must be repealed to allow FHCL full access to log 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?	FHCL is a monopoly as only main log seller in Fiji. License Holder – 40% Open license – 60%
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?	Binded by legal log supply agreement 100% determined by FHCL
4. How do you promote and market your products/services?	Customers come directly to buy logs.

5. How strong is the market for your products/services right now? Next year? What trends do you see?	Demand for logs stands at 40,000m3 in 2022. Wood flow can reach up to 200,000m3 tremendous potential
6. Are some customer groups better than others in terms of sales and revenue growth? Which ones?	Buyers for the high grade 1 and grade 2 where demand is.
7. Do you ever collaborate with other firms on promotion and/or marketing?	It's a government company and a monopoly.
8. Who are your major competitors?	A few Mahogany overplanted from FHCL estate returned to landowners but not significant.
9. Do you have a means of communicating information about your firm to others?	Customers are updated regularly on emails, social media.
10. Is there a Government organization that you are working with or regulating your market?	Company regulated by MIDA
(Attach any brochures, list of products, etc.)	

Standards and Certifications

1. What standards or certification requirements do your products need to conform to?	FSC certification OHS, ISO
2. Who sets these standards and requirements?	International standards Fiji Standards OHS,EIA
3. Who helps you to conform to these standards and requirements?	FSC Certification auditor - SCS The Ministry of Forest, Labour
4. Do you have any problems in this regard?	Important to get international recognition.

Technology / Product Development

1. What are your major needs/ opportunities in product design and manufacturing (or service delivery)?	As log buyer logging equipment needs improving using modern up to date equipment. FHCL is anticipating acquiring sawmill and reprocessing soon.
2. What other products do you produce/sell? What percentage does each product represent in terms of your gross revenue?	Current only logs Near future will be sawn timber and processed timber.
3. What have you done recently to improve your products or services?	Strengthened log grading to increase average price.
4. Is your current equipment or machinery an impediment to growth? Explain. If so, what kind of equipment or machinery could improve your business?	As log seller current equipment is sufficient to harvest current harvest level.
What is an estimated cost of this improvement?	Estimated cost of improvement will be around \$2M
5. Is the current level of your workers training/skills holding back growth? If so, what additional training do they need?	Current level is ok Harvest monitoring needs more attention. Preparation to FSC certification

Management/Organization

1. With respect to the management of your production, are you registered as a company? Please elaborate.	It's a legal government company.
--	----------------------------------

2. In the area of organization and management, what are your major needs/opportunities?	Adapting to FSC certification
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)?	Harvesting and cartage work is contracted out. New planting and establishment also contracted to landowners. FHCL involved mostly in management, supervisions.
4. What functions do you subcontract/outsource?	Logging and cartage is contracted/subcontract out to landowners.
5. Do you sometimes collaborate with other firms to produce and deliver customer orders?	FHCL is a monopoly
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.)?	FHCL is working to setup its own sawmill and reprocessing in the next 2 years.
7. What management skills would you like to strengthen in order to grow your business?	Align to FSC certification Align to sawmill and reprocessing skills and management.

Input Supply

1. What are your major needs/opportunities in the areas of input cost, quality, and availability?	none
2. Who are your most important suppliers and what do you buy from each?	none
3. How many suppliers do you rely on? How many regular suppliers and irregular/informal suppliers	none
4. Are there problems in obtaining some important inputs? Explain.	None
5. Have you ever purchased inputs jointly with other business? Explain.	No

Finance

1. Where do you go when you need money for your business?	FHCL is self funding with surplus in reserve.
2. Do you get credit from input suppliers? What are the terms?	Yes 1 month credit/debit account
3. Do you get production financing from your buyers? What are the terms?	Permanent/Regular customers are given credit terms of 1 to 3 months. Other customers are cash buyers.
4. Do you have need for additional financing at the moment? If so, what would it be used for?	No
5. What sources (formal or informal) have you approached for loans, and what have been the key problems, if any?	No
6. Have you had training on Business Plan Development and Financial Literacy?	Yes.
7. Other (repayment rates in the sector, risk management insurance, etc.)	None

COST BENEFIT

1. Identify the production process from start to finish.	Forest Logging Bush landing Logs graded and stacked Log cartage to main concentration yard in station Log cartage to customers mill gate.
2. Determine the cost of raw materials including transportation from the forest/source to your plant.	Log Price Mill gate Attached
3. Estimate the cost of each process.	<input type="checkbox"/>

4. Estimate the price of outputs or commodity produced at each step.	
--	--

Policy/Regulation

1. What government policies/regulations benefit your business (registrations, inspections, subsidies, incentives, etc.)?	Mahogany act
2. What government policies/regulations are obstacles to growing your business?	MIDA

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.)?	FHCL is in the process of acquiring a sawmill and reprocessing equipment. <input type="checkbox"/>
2. What is industry doing about these problems	To increase log production 40,000 m3 to 100,000m3 to 150,000m3 log buyers cannot buy all volume so FHCL need to invest in sawmill to process the volumes not sold to log buyers.

Business Membership Organizations

1. Is your industry/trade sector represented by national or local business associations? If so, please name them.	Even though there are number of forest/timber association now in existence, FHCL hasn't committed to join
2. Are you a member? If not, why?	No
3. What are the primary functions and benefits of these associations?	
4. What additional services should they provide?	

Critical Success Factors

	NTFP Specificity	Core Manifestation criteria	Consider each variable and potential impact on profit 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)	<p>Presence of unique/niche products or services due to location specific diversity (in the form of products, culture, or knowledge)</p> <p>Potential for pro-poor income increase</p> <p>Existence of backward linkages (in terms of both investment and knowledge transfer)</p>	+3
	Availability of human resources (Inclusiveness and Capacity Needs)	<p>Equitable participation of poor/disadvantaged groups as producers or labourers</p> <p>Strengthening women's negotiating power within markets and enterprise</p> <p>Gender training for women and their families to increase women's power in the family.</p> <p>Strengthening support networks in the community including protection of women against violence</p>	+3
Accessibility	Accessibility to market (high	<p>Remoteness</p> <p>Distance to markets</p>	+3

		Efficiency of infrastructure	
	value/low volume)	Weight/volume of products Availability of communication infrastructure	
	Availability/ access to technology (Opportunity for Value Addition)	Improved access to financial services for improved technology Ability to identify gaps and deficiencies. Identification of appropriate technology	+3
Fragility	Fragility (sustainable resource management)	Vulnerability to irreversible damage Carrying capacity for sustainable supply of raw material	+3
	Impact of Climate Change on access or raw material (climate resilience)	Vulnerability to impact of climate change on resource availability Ability to resist drought, floods, and tropical cyclones Improvements in wider social security, health and education provision for all women, youth and vulnerable in society.	+3
	Access to finance (Bankability of the enterprise)	Potential for economies of scope through diversified but interlinked activities Improved facilities for women in markets and measures to counter discrimination	+1
Diversity (economies of scope)	Impact of other landuse (e.g. livestock, mining, fire, etc.)(Resource Planning)	Capacity to understand/ fulfil market demand. Negotiation capacity Ability to bear with market risks.	+2

	Access to information	<p>Linked to mainstream market</p> <p>Improve collation and dissemination of market information, product demands, weather forecast, latest technology and other important information.</p> <p>Improve collaboration with policy makers to develop consumer guidelines for expected standards and after sales services.</p>	+3
--	-----------------------	--	----

Final Open-Ended Questions

What are the major incentives you have for investing in / promoting change in the value chain?	<p>Availability of raw materials</p> <p>Availability of local markets</p> <p>Landowner participation</p> <p>FSC certification</p>
What risks or constraints do you face in making these investments?	Major risk mainly inclement weather

What do you think are the strengths of your industry locally and/or internationally? *	<p>The availability of raw material</p> <p>FSC certification</p> <p>Uniqueness in genuine Fiji Mahogany</p>
What are the main weaknesses of your industry?	Inability for the industry to utilize annual harvest volume as log rot becoming prominent.
What do you think is the greatest challenge facing your industry today?	Current infrastructure not capable to reach annual harvest volumes
Can you name some business owners in your industry who are leaders –for example, in terms of technology, product design, quality, or marketing?	<p>Tropik Wood Industries</p> <p>Vitiana Sawmill</p>
How did you get into your business?	Government policy

Annex 7: Mahogany Residual Wood (filled) Questionnaire

Value Chain Analysis for Forest Sector with special emphasis on Non-Timber Forest Products

Contact Information

Interviewer /Amena Tuisawau/Taione Lave
Date of interview / 15/2/24
Firm Name / Gone ni Bure Investment Cooperative Sawakasa Mahogany Trust Gaunavou Cooperative
Principal product or service/ Sawakasa Mahogany Trust – Doors/Chest Gaunavou Cooperative – Bed of various Sizes Gone ni Bure Investment Cooperative – Doors/Chest/Handicraft Wood Carving Fiji- Handicraft Kobakobau Sawmill. Sawmill
No. of employees / 27
Owner (or contact) / Sawakasa Mahogany Trust – Doors/Chest Gaunavou Cooperative – Bed of various Sizes Gone ni Bure Investment Cooperative – Doors/Chest/Handicraft Wood Carving Fiji- Handicraft Kobakobau Sawmill. Sawmill
Legal status / Legal entity
Address / Timber Industry Training Centre, Forest Product Trade & Training Division, The Ministry of Forest - Nasinu
Telephone /
Email/ shanetsuka@gmail.com

Market Access, Trends, and Governance

What do you see as your main needs/opportunities in accessing markets?	Raw material readily available Local markets acceptance of product
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?	Retailers – 70% Walk in customers – 20% Others -10%
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?	Products specs and prices are negotiated by Forestry directly with main buyers as in retailers
How do you promote and market your products/services?	Awareness /promotion through social media. Word by mouth.

How strong is the market for your products/services right now? Next year? What trends do you see?	Committed customers Focus on capturing local markets.
Are some customer groups better than others in terms of sales and revenue growth? Which ones?	Still infant stages so concentrate on 1 fixed order. Courts capable of issuing more orders.
Do you ever collaborate with other firms on promotion and/or marketing?	Marketing is done by buyer. Later on, we will promote our own products when cashflow can afford it.
Who are your major competitors?	No competition
Do you have a means of communicating information about your firm to others?	Social media The Ministry Forest awareness
Is there a Government organization that you are working with or regulating your market?	The Ministry of Forest
<i>(Attach any brochures, list of products, etc.)</i>	

Standards and Certifications

What standards or certification requirements do your products need to conform to?	FSC certification OHS, ISO
Who sets these standards and requirements?	International standards Fiji Standards OHS
Who helps you to conform to these standards and requirements?	FHCL The Ministry of Forest, Labour
Do you have any problems in this regard?	Important to get international recognition.

Technology / Product Development

What are your major needs/ opportunities in product design and manufacturing (or service delivery)?	To use bigger modern machines and equipment for better quality. Training both new technology and refresher Certified machines operators
---	---

What other products do you produce/sell? What percentage does each product represent in terms of your gross revenue?	Beds and doors 60% Chest box 10% Carvings 15% Other joinery 15%
What have you done recently to improve your products or services?	Continues QC from Forestry Department
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?	Serious investment by landowners. Close to raw material The whole joinery and planning machines needs an upgrade to 3 phase. Budget of \$400,000 per company would bring the product to world standards.
Is the current level of your workers training/skills holding back growth? If so, what additional training do they need?	Additional is a must even bring in overseas experts to train high end product production.

Management/Organization

With respect to the management of your production, are you registered as a company? Please elaborate.	All legal entities
In the area of organization and management, what are your major needs/opportunities?	These companies are in the incubation stage needs management review and some hands on training by all stakeholders. Lots of field visits and overseas field trip.
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)?	Competency based training.
What functions do you subcontract/outsource?	None Later on as company grow products will be more detailed and need subcontract. Hopefully amongst cooperative within.
Do you sometimes collaborate with other firms to produce and deliver customer orders?	No
Which aspects of your business do you intend to change in the next 2 years (machinery, equipment, computers, new products, marketing strategy,	All companies expected to manage their own but with The Ministry of Forest oversight.

quality control, management system, worker skills, etc.)?)	It will be a new dimensions commercially when stand alone so all that is listed on the question applied.
What management skills would you like to strengthen in order to grow your business?	Financial management Operation and logistics expertise.

Input Supply

What are your major needs/opportunities in the areas of input cost, quality, and availability?	Raw material guarantee. Ensure right QC for material will save costs.
Who are your <i>most important suppliers</i> and what do you buy from each?	FHCL owns Mahogany waste.
How many suppliers do you rely on? How many regular suppliers and irregular/informal suppliers	FHCL
Are there problems in obtaining some important inputs? Explain.	FHCL need to sell/free waste to landowner companies and legally secure supply. Costing of various supply points Access to funding
Have you ever purchased inputs jointly with other business? Explain.	None

Finance

Where do you go when you need money for your business?	Apart from government funding and subsidies cooperative floated shares.
Do you get credit from input suppliers? What are the terms?	None
Do you get production financing from your buyers? What are the terms?	None
Do you have need for additional financing at the moment? If so, what would it be used for?	Yes need funds to purchase more raw materials and furniture production processes.
What sources (formal or informal) have you approached for loans, and what have been the key problems, if any?	None so far depending on government subsidies.
Have you had training on Business Plan Development and Financial Literacy?	No
Other (repayment rates in the sector, risk management insurance, etc.)	No

COST BENEFIT

Identify the production process from start to finish.	
---	--

	Collect raw materials from forest Portable sawmill to process into sawn timber Air dry/Kiln Dry 15% Furniture components and processes. Furniture ready to be sold
Determine the cost of raw materials including transportation from the forest/source to your plant.	Raw materials at \$60/m3. Should negotiate to be free. Transport around \$30/m3
Estimate the cost of each process.	Not yet determined
Estimate the price of outputs or commodity produced at each step.	Not yet determined

Policy/Regulation

What government policies/regulations benefit your business (registrations, inspections, subsidies, incentives, etc.)?	Government subsidies at \$10,000 per year.
What government policies/regulations are obstacles to growing your business?	MIDA Wood waste Cooperatives are receptive to form an association to look after their interest.

Infrastructure

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.)?	After 1 year incubation landowner companies are expected to. Find factory site 3 phase power is needed Contracts Factory setup and designs
What is industry doing about these problems	At this stage its run on government subsidies

Business Membership Organizations

Is your industry/trade sector represented by national or local business associations? If so, please name them.	Landowners are represented by FMT. They prefer an association more focus on the business welfare etc.
Are you a member? If not, why?	FMT yes
What are the primary functions and benefits of these associations?	Still under discussions
What additional services should they provide?	Not clearly mapped out the FMT

Critical Success Factors

	Non Timber Forest Product Specificity	Core Manifestation criteria	Consider each variable and potential impact on profit Using a scale of 0 to +3 to rank opportunity and 0 to -3 to rank level of constraint:
Niche	Growth opportunity (Unique/niche market)	Presence of unique/niche products or services due to location specific diversity (in the form of products, culture, or knowledge) Potential for pro-poor income increase Existence of backward linkages (in terms of both investment and knowledge transfer)	+3
	Availability of human resources (Inclusiveness and Capacity Needs)	Equitable participation of poor/disadvantaged groups as producers or labourers Strengthening women's negotiating power within markets and enterprise Gender training for women and their families to increase women's power in the family. Strengthening support networks in the community including protection of women against violence	+3
Accessibility	Accessibility to market (high value/low volume)	Remoteness Distance to markets Efficiency of infrastructure Weight/volume of products Availability of communication infrastructure	+3
	Availability/ access to technology (Opportunity for Value Addition)	Improved access to financial services for improved technology Ability to identify gaps and deficiencies. Identification of appropriate technology	+3
Fragility	Fragility (sustainable resource management)	Vulnerability to irreversible damage Carrying capacity for sustainable supply of raw material	+3
	Impact of Climate Change on access or raw material (climate resilience)	Vulnerability to impact of climate change on resource availability Ability to resist drought, floods, and tropical cyclones Improvements in wider social security, health and education provision for all women, youth and vulnerable in society.	+1

	Access to finance (Bankability of the enterprise)	Potential for economies of scope through diversified but interlinked activities Improved facilities for women in markets and measures to counter discrimination	+2
Diversity (economies of scope)	Impact of other landuse (e.g. livestock, mining, fire, etc.)(Resource Planning)	Capacity to understand/ fulfil market demand. Negotiation capacity Ability to bear with market risks.	+2
	Access to information	Linked to mainstream market Improve collation and dissemination of market information, product demands, weather forecast, latest technology and other important information. Improve collaboration with policy makers to develop consumer guidelines for expected standards and after sales services.	+3

Final Open-Ended Questions

What are the major incentives you have for investing in / promoting change in the value chain?	Availability of raw materials Availability of local markets Landowner participation
What risks or constraints do you face in making these investments?	Finance capital Human capital
What do you think are the strengths of your industry locally and/or internationally? *	The availability of raw material Capacity building
What are the main weaknesses of your industry?	Establishment phase need proper infrastructure and equipment.
What do you think is the greatest challenge facing your industry today?	Incubation to become independent.
Can you name some business owners in your industry who are leaders –for example, in terms of technology, product design, quality, or marketing?	Mahogany Industries Pintos Subrails
How did you get into your business?	Awareness Government policy