Macadamia Value Chain Development Opportunities in Boun Neua District, Phongsaly Province, LAO P.D.R.

GREEN Project

Comité de Coopération avec le Laos
CCL

FINAL REPORT

Macadamia Value Chain Development Opportunities in Boun Neua District, Phongsaly Province, LAO P.D.R.

GREEN - Strengthening the economic and environmental resilience of rural communities in Bounneua & Phongsaly districts, Phongsaly province, Lao PDR

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Brot für die Welt

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List of Acronyms

CCL: Comité de Coopération avec le Laos
COSKA: Cooperation for Development and Support to Local Knowledge Association
DAFO: District Agriculture and Environment Office, Boun Neua
DICO: District Investment and Commerce Office, Boun Neua
EU: European Union
e-COI: electronic Certificate of Inspection
FDA: Food and Drug Administration
FGD: Focus group discussions
FLO: Fairtrade Labelling Organizations International
FLO-CERT: Fairtrade Labelling Organizations Certifier.
GMOs: Genetically modified organisms
GREEN: *Generating Inclusive Economic and Environmental Resilience*
IFCM: International Fairtrade Certification Mark
ILO: International Labour Organization
LWU: Lao Women's Association, Boun Neua
OFPA: Organic Foods Production Act of 1990
OSP: Organic System Plan
PAFO: Provincial Agriculture and Environment Office, Phongsaly
PICO: Provincial Investment and Commerce Office, Phongsaly
UNECE: United Nations Economic Commission for Europe
USD: United States Dollar
USDA: United States Department of Agriculture
USDA AMS: United States Department of Agriculture Agricultural Marketing Service
USDA NOP: United States Department of Agriculture (USDA) National Organic Program
WMO: World Macadamia Organisation
XYMTDC: Xishuangbanna Yunkun Macadamia Technology Development Co., Ltd.
YPISRTC: Yunnan Province Institute of Scientific Research for Tropical Crops

Executive Summary

Overview and Objectives of the Macadamia Value Chain Study in Boun Neua, Phongsaly

This study provides a comprehensive analysis of **macadamia cultivation, processing, marketing, and consumption** in **Laos, Xishuangbanna (China), and selected international markets**, with a focus on **developing value chain opportunities in Boun Neua District, Phongsaly Province**. Conducted under the **GREEN Project (2023–2026)** and implemented by **CCL** through November and December 2025, the study assesses the **entire macadamia value chain**, identifies **key market opportunities** and **priority export destinations**, evaluates **buyer expectations**, and outlines the **technical, organizational, and market support needed for local producers to compete effectively**.

Context: Phongsaly is a remote and economically vulnerable province, where **livelihoods are constrained by limited infrastructure, weak market integration, and dependence on cross-border contract farming**. While regional trade has created income opportunities, it has also **exposed farmers to market volatility and environmental risks**.

Opportunity: Supported by national policies promoting macadamia as a **high-value perennial crop**, Phongsaly possesses significant potential to develop a **sustainable macadamia sector**. Successful development of this sector could **enhance farmer incomes, improve land use practices, and strengthen integration into regional and global markets**, contributing to long-term economic resilience and environmental sustainability.

European Macadamia Market Overview and Opportunities

The **European macadamia market** presents significant growth potential for high-quality producers, particularly for emerging suppliers like Laos. Key characteristics and market requirements include:

Market Demand and Trends

- Strong growth driven by **premium, healthy, and versatile nut products**.
- Consumers favor **dried or roasted and salted kernels** as ready-to-eat snacks.
- Expanding opportunities in **flavored and value-added products** across:
    - Confectionery, bakery, and desserts
    - Breakfast items
    - Nut butters and vegan applications

Supply Landscape

- Europe is highly **import-dependent**, sourcing mainly from **Australia, South Africa, and Kenya**.

- Existing suppliers benefit from **preferential tariffs and established trade networks**, making quality, consistency, and differentiation critical for new entrants.

Regulatory and Quality Requirements

- Strict compliance with **EU food safety, traceability, and quality regulations**, including recognized grading standards and certifications such as **ISO 22000** and **BRC**.
- **Post-harvest handling**, moisture control, and protective packaging are essential to maintain kernel quality during long-distance shipping.
- Increasing focus on **sustainability**, including responsible production practices, transparent supply chains, and documented compliance systems.

Value Addition Opportunities

- **Roasting, flavoring, and branding** offer significant margins within European retail markets.

Certification and Market Access

- **Organic certification** (EU Regulation 2018/848) requires accredited certification, inspections, traceability, and compliance with strict production rules.
- **Electronic Certificate of Inspection (e-COI)** must accompany imports via the EU **TRACES system**.
- **Fairtrade certification** promotes equitable trade, minimum pricing, labor rights, and community development premiums.
- For emerging producers, combining **high-quality production with Organic and Fairtrade certification** can:
  - Strengthen market access
  - Enhance premium positioning
  - Improve long-term competitiveness in Europe

United States Macadamia Market Overview and Opportunities

The **United States** represents a **large and growing premium market** for macadamia nuts, offering substantial opportunities for international producers, including emerging suppliers such as Laos.

Market Size and Demand

- Estimated market value: **USD 150–400 million in 2024**.
- Strong consumer demand driven by:
  - Wellness trends and plant-based diets
  - Gourmet and premium positioning
  - Product innovation across **retail snacks, bakery, confectionery, food service, and specialty ingredients**
- Limited domestic production concentrated in **Hawaii**, leading to heavy reliance on imports.

Product Preferences

- **Primary formats**: shelled kernels (whole, halves, pieces).

- **Roasted and salted snacks** dominate retail.
- Raw kernels are widely used in **baking and health-oriented applications**.
- Consumers are increasingly willing to pay **premium prices** for quality, origin, and sustainably sourced nuts.

Market Access and Entry Requirements

- **Regulatory compliance**: FDA food safety, labeling, and quality standards.
- Effective **logistics and post-harvest handling** critical due to **moisture and temperature sensitivity**.
- Importers and distributors are central for **access to premium retail and ingredient channels**.
- **Sustainability, traceability, and ethical sourcing** are increasingly valued.

Certification Requirements

- **Organic certification**: mandatory for products marketed as organic.
  - Regulated by the **USDA National Organic Program (NOP)**.
  - Requires accredited certification, **Organic System Plans**, inspections, traceability, and full compliance with production and labeling rules.
  - Applies to both domestic and imported nuts.
- **Fair Trade certification**: voluntary, privately managed, and less standardized than in the EU.
  - Offers opportunities for premium pricing when combined with credible Organic certification.

Opportunities and Market Positioning

- Combining **Organic certification** with EU-style **Fairtrade principles** offers:
  - Stronger access to **premium market segments**
  - Improved price stability and long-term sustainability
  - Differentiation based on **origin, ethical sourcing, and value-added production**

Key Challenges for Exporters

- Highly **competitive market** with strong established brands.
- Price competition and **consumer familiarity gaps** compared to other nuts.
- Consistent **quality, branding, and differentiation** essential to succeed.

China Macadamia Market Overview and Opportunities

Market Size and Growth Drivers

China is one of the **world's largest and fastest-growing macadamia markets**.

- Key growth drivers include:
  - Rising incomes and expanding middle-class consumption
  - Increased snack consumption and **premium gifting traditions**
  - Health awareness and interest in premium, plant-based, and functional foods
  - Rapid expansion of **e-commerce platforms**, enabling year-round access and convenience

Domestic Production and Supply

- Domestic macadamia production is concentrated in **Yunnan Province**.
- Production remains **fragmented, limited in scale, and variable in quality**, making imports essential.
- Primary import sources: **Australia and South Africa**.

Product Formats and Trends

- **In-shell macadamias** dominate, especially for gifting purposes.
- **Kernel snacks** are growing due to year-round consumption trends.
- Emerging formats include:
  - Nut powders and macadamia milk
  - Ingredients in **bakery, confectionery, ice cream, and plant-based products**
- Product innovation is supported by premium positioning and health-oriented consumer preferences.

Market Entry and Regulatory Requirements

- Compliance required with:
  - China's **food safety, labeling, and traceability regulations**
  - Registration with the **General Administration of Customs**
- Success factors include:
  - Partnerships with **local importers and distributors**
  - Participation in **trade fairs** to build visibility
  - Adaptation to **local taste preferences** and gifting culture

Challenges for Exporters

- High tariffs and **complex customs procedures**
- Strong domestic price competition
- Limited consumer awareness outside gifting occasions
- Necessity of maintaining **consistent quality, origin branding, and sustainability credentials**

Opportunities and Market Positioning

- Effective differentiation can be achieved through:
  - Premium branding and provenance storytelling
  - Reliable supply chains and consistent product quality
  - Sustainability and ethical sourcing certifications
- With proper regulatory compliance, strategic marketing, and strong local partnerships, **China offers significant long-term growth opportunities** for macadamia exporters.

Macadamia Production, Market and Consumption Overview in Xishuangbanna, China

Regional Context

Xishuangbanna, in southern Yunnan Province, is a key macadamia-producing area alongside **Lincang, Baoshan, Dehong, and Pu'er**. Production has expanded partly as a **diversification from declining rubber cultivation**, providing alternative income for farmers. The sector combines **state-owned enterprises, private companies, and smallholder farmers**.

Key Producers

- **Xishuangbanna Yunkun Macadamia Technology Development Co., Ltd. (XYMTDC)**

Established 2008; manages ~10,000 mu (≈ 666.67 hectares) of plantations.

  - Sources nuts from own farms and local farmers.
  - Focus on scale and farmer inclusion, providing saplings and technical support.
  - Relies on chemical fertilizers; generally lower-quality, non-organic production.
- **Greenfield Agriculture and Forestry Group**
  - Founded 2013; manages ~10,000 mu (≈ 666.67 hectares) and produces ~30,000 tons annually.
  - China's largest private macadamia producer; offers **certified organic, premium macadamias**.
  - Invested in improved varieties, advanced processing, and food safety certifications.
  - Markets products domestically and for export, including Korea, under the **Yulin Yunguo** brand.

Smallholder Production

- Typically plant several hundred trees; yields up to **20 kg per tree**.
- Supported by government demonstration projects and cross-border knowledge exchange.
- Most sell unprocessed nuts to middlemen, **limiting farmgate prices and value capture**.

Processing and Marketing

- Yunkun: non-organic, lower-priced in-shell nuts for mass markets.
- Greenfield: advanced grading, vacuum-sealed storage, premium branding, distributed via **e-commerce, urban retail, and exports**.
- Regional retailers (e.g., **Zhen Wei Yuan** in Jinghong) sell both brands, including gift boxes.

Consumption Trends

- Demand driven by **health-conscious urban consumers** and premium snack preferences.
- High-income consumers: prefer **organic, whole in-shell nuts**.
- Middle- and lower-income consumers: favor flavored or processed products.
- Macadamias play an important role in **gift-giving culture** and are increasingly used in **processed foods and oils**.
- Farm-level sun-dried nuts vary in quality, highlighting the **gap between smallholder production and branded premium products**.

Macadamia Production, Market and Consumption Overview in Laos

Sector Overview and Cultivation
Macadamia cultivation in Laos is at an **early developmental stage**, despite growing recognition of its **economic potential**. The sector faces key challenges:

- Limited technical expertise among farmers
- Weak processing infrastructure
- Heavy reliance on **foreign intermediaries**, suppressing farmgate prices

Foreign-Led and Subsidized Initiatives

- **Vietnamese investments** in Champasak and Phongsaly introduced macadamia via land concessions, demonstration plots, and technical training.
- **Australian-funded projects** in Paksong established the oldest and most productive trees.
- Cultivation remains **small-scale**, often intercropped with coffee; farmers mainly sell **unprocessed in-shell nuts** to Vietnamese buyers.

Emerging Lao Entrepreneurship

- **Tanjai Agricultural Import–Export Co. Ltd. (Luang Prabang)** introduced macadamia in 2023.
- Activities include sapling distribution, farmer training, and planned kernel exports to Singapore, Thailand, and Vietnam.
- Highlights **growing local confidence** but also the need for **regulatory support** and high start-up investment.

Smallholder Adoption and Cross-Border Networks

- Adoption in **Boun Neua District** is driven by cross-border **Tai Lue and Akha networks** and Chinese entrepreneurs.
- Case studies (e.g., **Mr. Ai Oun Keao, Ban Nyor**) show:
  - Yields up to 20 kg per tree
  - Major bottlenecks: manual post-harvest handling, lack of processing equipment, uncertain market access, dependence on traders
- Farmers emphasize the need for:
  - Guaranteed buyers
  - Technical training and quality saplings
  - Price stability before expanding production

Processing Constraints

- **No industrial-scale processing** exists in northern Laos.
- Most nuts are **sun-dried in small quantities**, risking spoilage and limiting quality.
- Recommended actions:
  - Establish **centralized de-husking, drying, and cracking facilities** in Boun Neua or Ban Nyor
  - Leverage small-scale local initiatives (e.g., **Tiddin Shop, Vientiane**) to demonstrate potential

Marketing Structure

- Laos relies heavily on **imports from Vietnam, Thailand, and China**.

- **Vientiane**: macadamias sold in supermarkets and specialty stores; minimal local supply; retailers interested if **quality and packaging standards** are met.
- **Luang Prabang**: limited, seasonal sales targeting tourists and affluent consumers.
- **Northern provinces** (Boun Neua, Oudomxay): informal sales of loose or minimally packaged nuts, often linked to cross-border trade.

Consumption Trends

- Consumption is **gradually expanding**, driven by:
  - Health-conscious consumers
  - Expatriates and returning migrants
  - Border communities influenced by Chinese markets
- Preferences:
  - Urban consumers: natural dried nuts
  - Younger buyers: flavored products
  - Northern areas: casual snack, but cracking difficulties and inconsistent quality remain challenges

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Recommendations

This section outlines a **phased strategy** to support the sustainable development of the macadamia value chain in Boun Neua District, Phongsaly Province. Recommendations address **cultivation, processing, storage, packaging, marketing, governance, and certification**, with the objectives of increasing local value addition, stabilizing farmgate prices, reducing dependency on foreign intermediaries, and enabling gradual integration into regional and international markets.

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1. Cultivation

1.1 Technical Training

- Implement structured training covering soil preparation, planting, pruning, fertilization, pest management, harvesting, and post-harvest handling.
- Use lessons from Vietnam and China, tested on local demonstration plots.

1.2 Organic and Sustainable Practices

- Support farmers in adopting organic methods, intercropping, and reducing chemical inputs.
- Collaborate with regional organic producers for technical exchange and study tours.

1.3 Access to Quality Saplings & Local Varieties

- Provide high-quality planting material and test regional alternatives.
- Partner with national research institutions to develop varieties adapted to Boun Neua's climate and soil.

1.4 Local Nurseries & Knowledge Exchange

- Establish one or two nurseries to ensure long-term sapling supply, build skills, and generate employment.
- Strengthen peer-to-peer learning via cross-border ethnic networks and structured study tours.

1.5 Integrate BioTrade Principles

- Adopt sustainability, traceability, and ethical sourcing from the outset to enhance future market readiness.

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2. Processing

2.1 Shared Processing Facilities

- Develop centralized or cooperative facilities for de-husking, drying, and shell-cracking to reduce labor burdens and costs.

2.2 Equipment, Skills, and Quality Control

- Introduce small- to medium-scale processing equipment.
- Train producers in moisture control and standardized quality protocols.

2.3 Phased De-Husking & Cracking

- Start with low-capacity pilot machines and scale as production increases.
- Early pre-cracking can boost farmgate prices by 20–30%.

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3. Drying & 4. Roasting

Drying:

- Implement controlled-temperature drying to prevent mould, rancidity, and quality loss.
- Prioritize drying infrastructure before advanced processing.

Roasting:

- Introduce only after drying, storage, and packaging systems are stable.
- Scale roasting operations after confirming market demand.

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4. Storage

4.1 Centralized Macadamia Station

- Establish a hub for collection, drying, initial storage, quality control, and coordination.
- Managed by a cooperative or the Boun Neua Macadamia Association, it can serve as both **processing and export center**.

4.2 Storage Best Practices:

- Cool, dry, dark conditions
- Airtight or vacuum-sealed packaging
- Humidity control

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5. Packaging

5.1 Functional Packaging:

- Airtight containers (mylar bags, sealed plastics, glass jars) to preserve freshness.

5.2 Labelling & Traceability:

- Include origin, organic status, processing location, and best-before date.
- QR-code traceability for transparency and buyer confidence.

5.3 Market-Specific Packaging:

- Affordable formats for domestic retail.
- Premium and gift packaging highlighting **Boun Neua identity** and ethnic heritage.

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6. Marketing

6.1 Phased Market Strategy:

- **Phase 1:** Lao domestic market – build volume and experience
- **Phase 2:** China & Vietnam – stabilize cross-border sales
- **Phase 3:** ASEAN premium niches – organic and branded products
- **Phase 4:** Japan & South Korea – high-standard premium markets
- **Phase 5:** Europe & US – organic, Fairtrade, and BioTrade compliance

6.2 Key Actions:

- Engage buyers early to clarify quality and pricing
- Strengthening e-commerce and regional online sales
- Collaborate with experienced exporters and participate in trade fairs

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7. Governance

7.1 National & District Associations:

- National association: coordinate farmers, processors, traders, market intelligence, technical support, and regulatory liaison.
- Boun Neua District association: define local production standards, mediate disputes, facilitate marketing, represent farmer interests.

7.2 Transparent Farmgate Pricing:

- Multi-stakeholder negotiation considering costs, processing, organic status, and market benchmarks.
- Village-level information boards and digital channels improve price transparency.

7.3 Provincial & Cross-Border Cooperation:

- Exchange knowledge with Champasak Province and partners in Vietnam and China to strengthen technical and trade capacity.

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8. Certifications and Export Authorization

8.1 Early Engagement with Authorities:

- Dialogue with Chinese customs and regulatory bodies to clarify export requirements.

8.2 Facility Registration & Sustainable Standards:

- Register production and processing sites for export compliance.
- Implement GAP, reduce chemical inputs, and adopt environmental safeguards.

8.3 Certification Priorities:

- Focus initially on **organic certification** for broader market access.
- Pursue Fair Trade certification later once cooperative governance is established.

Conclusion

The sustainable development of Boun Neua's macadamia sector requires a **phased, practical strategy**. Immediate priorities include:

- Technical training and farmer capacity building
- Drying infrastructure and shared processing facilities
- Association formation and governance structures

Medium-term actions focus on **branding, traceability, organic certification, and regional market integration**. By combining local capacity building, value addition, governance reform, and market diversification, Boun Neua can transform macadamia into a **high-value, export-oriented crop** that provides stable incomes, strengthens rural livelihoods, and contributes to inclusive, sustainable development.

Introduction

1. Project Background and Scope of the Study

This report analyzes **macadamia cultivation, processing, marketing, and consumption** in Laos, Xishuangbanna (China), and globally. It also provides recommendations for **developing macadamia value chain opportunities in Boun Neua District, Phongsaly Province, Lao P.D.R.**

This macadamia value chain study has been conducted under the *Generating Inclusive Economic and Environmental Resilience* (**GREEN) Project**, a **Comité de Coopération avec le Laos (CCL)** initiative implemented between **2024 and 2026**. Targeting 40 villages in two districts (Boun Neua and Phongsaly) of Phongsaly province, the project aims to **strengthen local communities' resilience to the impacts of climate change** through sustainable, inclusive, and environmentally responsible economic development.

The project is structured around three interrelated components, each with a specific objective:

1. **Economic Resilience:** Rural communities in Phongsaly Province are economically more resilient and integrated within strengthened local value chains.
2. **Sustainable Resource Management:** The province's natural resources are preserved and sustainably managed to foster localized, inclusive economic growth.
3. **Local Governance and Participation:** Local stakeholders in Phongsaly Province are strengthened, recognized, and actively engaged in the territory's sustainable and inclusive development.

In collaboration with the **Boun Neua District and Provincial authorities**, CCL has identified **macadamia planting**, **tea cultivation**, **livestock and fish raising and NTFP collection** as key activities within this sustainable economic development framework.

The **objective of the macadamia value chain study** has to assess market opportunities and identify key actors across the value chain — from producers to consumers — for the Boun Neua macadamia sector in Laos, China, and other potential consumer countries.

The study aimed to produce the following outputs:

- **Output 1:** Analysis of the consumer market for the raw and processed macadamia products, including a comparison of the advantages and disadvantages of the different markets
- **Output 2:** Analyse the market opportunities offered by China, Lao PDR and other western countries to make a selection of 3 countries to prioritize
- **Output 3:** Analysis of the wholesaler and retailers' expectations and objectives in the development of the macadamia market
- **Output 4:** Analyse and list the macadamia producers and their expectations from the macadamia value chain in addition to the support needed

2. Geographic, Socio-Economic and Ethnic Overview

The **target area** for the development of macadamia plantations under the GREEN project is **Boun Neua District**, one of the seven districts of **Phongsaly Province**, located in northeastern Laos and bordering **China** and **Vietnam**. The province's landscape is characterized by rugged terrain, with deep valleys nestled between mountain ranges averaging **800 to 1,900 meters above sea level**. In Boun Neua elevation ranges from about 800 to 1200 meters.

Phongsaly is among the poorest and most isolated provinces in Laos, with a population of approximately **197,989 as of 2024**. It is also one of the most ethnically diverse, home to **15 minority groups** including Akha, Phunoy, Lao Lum, Khmu, Lae Seng, Tai Dam, Tai Deeng, Haw, and Tai Lue communities. Many upland villages in remote areas remain economically disadvantaged due to limited road access, weak infrastructure, and minimal integration into market economies.

Historically, Phongsaly's economy relied on non-timber **forest products**, **slash-and-burn agriculture**, and regional trade, but in recent years it has undergone a gradual transformation. The construction of rural roads by Chinese companies has facilitated trade and increased **monetization** and **cross-border exchanges** with China and Vietnam. A key feature of this shift has been the rise of contract farming with Chinese companies and entrepreneurs, particularly for sugarcane, corn, rubber, coffee, job's tears and fruit cultivation. While these developments have created new economic opportunities, they have also introduced significant challenges, including **environmental degradation**, **market dependency**, and a **decline in food crop production**. **Malnutrition** remains a critical issue, with over half of children under five suffering from stunted growth.

While growing economic connectivity has opened new prospects for trade and livelihood diversification, **interactions between Lao farmers and Chinese or Vietnamese companies and middlemen are often unequal, with foreign entrepreneurs holding greater bargaining power.** Strengthening the **production capacity**, **market access**, and **negotiation skills** of Lao farmers is therefore essential to ensure more equitable participation in regional trade. Within this context, the **promotion of macadamia cultivation** under the GREEN project represents an opportunity to enhance local production systems, diversify incomes, and **improve farmers' integration into regional and global value chains.**

3. Lao Policy Framework for Macadamia Development

The Lao government has prioritized the diversification of high-value perennial crops, including macadamia, as part of its strategy for **rural development, poverty reduction, and sustainable agriculture** *(Times Reporters 2024).* **Macadamia cultivation is promoted as an alternative to shifting cultivation, a replacement for sugarcane, and as a means to support agroforestry, income generation, and environmental protection in upland areas such as Phongsaly** (*ASEANALL 2024).*

In line with this policy, various provincial government agencies in Laos have supported macadamia cultivation over the past decade in Champasak, Luang Prabang, and Phongsaly provinces. The first macadamia planting initiative was launched in 2015 in Paksong District, Champasak Province, with financial and technical assistance from an Australian-funded development project. Subsequent initiatives in Champasak in 2022, 2024, and 2025 involved Vietnamese companies, supported by both Lao and Vietnamese authorities (MDA 2022; KPL 2025).

In 2023, the privately owned Tanjai Agricultural Import–Export Company began macadamia cultivation around Luang Prabang town, both on its own land and in partnership with smallholder farmers, with support from provincial authorities. In Phongsaly Province, macadamia planting has taken place in both Boun Neua and Mai districts. In Boun Neua District, cultivation was introduced between 2018 and 2019 through an agreement between a local Tai Lue entrepreneur and a Tai Lue investor from China. In Mai District, a macadamia demonstration plot was established following the signing of a Memorandum of Cooperation between the Department of Agriculture and Forestry of Phongsaly Province and the Department of Agriculture and Rural Development of Dien Bien Province, Vietnam (ASEANALL 2024). Further details on these agreements and cultivation models are presented in the section *Overview of Macadamia Cultivation, Processing, Marketing and Consumption in Laos* in this report.

These early initiatives across Laos provide a strong foundation for Phongsaly Province to build technical capacity, expand local knowledge of macadamia production, and lay the groundwork for future trade with China, Vietnam, and global markets. By leveraging the experience and market access of China and Vietnam, Phongsaly has the potential to accelerate the development of its macadamia sector, thereby enhancing farmers' livelihoods, promoting sustainable land use, and strengthening integration into regional and global value chains.

Study participants

Comité de Coopération avec le Laos (CCL) Team and GREEN team
DAFO: District Agriculture and Environment Office, Boun Neua
PAFO: Provincial Agriculture and Environment Office, Phongsaly
PICO: Provincial Investment and Commerce Office, Phongsaly
DICO: District Investment and Commerce Office, Boun Neua
LWU: Lao Women's Association, Boun Neua
COSKA: Cooperation for Development and Support to Local Knowledge Association
Prospective macadamia farmers in Boun Neua
Farmers already involved in macadamia planting in Boun Neua Province
Macadamia wholesalers and retailers in Laos, China, Germany, United States
Macadamia consumers in Laos, China, Europe and United States
Macadamia growers in Xishuang banna, China and Vietnam
Macadamia wholesalers and middlemen in Laos and Xishuang banna, China.

Methodology

The study adopted a purposive and mixed-methods approach to support the development of the macadamia value chain for the Boun Neua District in Phongsaly province. The methodology integrated both **quantitative and qualitative components**, combining multiple data collection tools to triangulate evidence and develop a comprehensive understanding of the macadamia production, processing, sale and stakeholder expectations. These stakeholders include Lao and Chinese producers, middlemen, wholesale and retail sellers and local and global consumers.

Additionally, the study employed a **hybrid approach**, combining one-to-one and participatory group methods, as well as online and field-based research. Efforts were made to ensure inclusivity wherever feasible and relevant.

1. Scope of the Study

The study relied on a combination of quantitative and qualitative research techniques to gather diverse data from stakeholders, capturing experiences and processes involved in the domestic, regional and global macadamia value chains.

1.1. Quantitative Research

Quantitative research focused on three main areas:

- **Socio-economic data collection** on key stakeholders of the macadamia value chain:
  - *Data Types:* land coverage of macadamia plantations in Laos and China; annual yields per hectare/tree and earnings, number of villages and farmers already engaged in macadamia production in Phongsaly Province, Boun Neua District and in other Lao provinces; annual trading volumes between producers, middlemen, wholesalers/companies and retailers; monthly consumer purchase quantities.
- **Price tracking in domestic, regional and global markets.**
  - *Data types*: farmgate, wholesale, and retail price (per kg) of different macadamia forms—husked, shelled, unshelled, processed, and unprocessed—across Laos, China, Europe, and United States.
- **Trend analysis** of macadamia production, sales, and consumption globally.
  - Data types: production volume trends by country and market fluctuations over the last 5 years.

1.2 Qualitative Research

The qualitative component explored the following aspects:

- Current income-generating activities, knowledge, expectations and concerns of Boun Neua target village farmers regarding macadamia cultivation and marketing,

- Experiences and expectations of Lao and Chinese growers in macadamia production, processing and trading.
- Existing inter-ethnic social and commercial networks between Boun Neua and neighboring regions in China and Vietnam.
- Policy and socio-economic development frameworks of Lao national, provincial and district governments related to macadamia expansion.
- Consumption patterns of Lao, Chinese, European and American macadamia consumers, including preferences for different forms of macadamia (e.g. shelled, unshelled, salted, unsalted, roasted, raw) and motivations for purchasing (e.g. dietary, nutritional, or organic preferences).
- Mapping the global macadamia value chain to identify major producers, distributors, and sellers, as well as forms, processing modalities, packaging types, and marketing strategies—comparing advantages and disadvantages across market segments.
- Identification of macadamia trading middlemen, companies, and wholesale and retail sellers in Laos, China, Vietnam, Europe and United States, along with their operational modalities.
- Identification of quality control check and export companies handling macadamia nuts in Southeast Asia, China, Europe or United States.
- Understanding of fair-trade certification processes, criteria, and standards for macadamia in the European and American markets, identification of possible partners.

2. Geographic and Stakeholder Coverage & Sampling Approach

Field data collection in Laos was conducted in **Vientiane Capital, Luang Prabang city, Boun Neua township and district,** and **Oudomxay city.** In China field research covered **Jing hong Municipality** and **Meng Yang**.

Online data collection involved reviewing websites of macadamia wholesale and retail companies in Europe and United States, as well as relevant academic and non-academic studies on macadamia production, marketing, and consumption.

A purposive and stratified sampling approach was adopted to ensure diversity across all stages of the value chain, including producers, manufacturers, traders, and consumers, and to capture variation by gender, age, ethnicity, and geographic location.

This approach ensured the inclusion of perspectives from experienced and prospective growers, traders, wholesale, retailers, policymakers and consumers. The sampling framework was developed in coordination with **CCL GREEN team**, **Phongsaly PAFO and Boun Neua DAFO** representatives to align with project objectives and practical constraints.

3. Data Collection Tools

To ensure robust data triangulation and analytical depth, the following tools were used:

- Document review
- Surveys

- Semi-structured interviews with diverse stakeholders
- Focus Group Discussions (FGDs)
- Content Analysis
- Primary Data Collection: Communication with Macadamia Companies

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3.1. Document Review

Purpose: To establish a baseline understanding of the project's target area, objectives, and expected outputs, as well as existing knowledge on macadamia cultivation in Laos, Asia and globally, **a systematic review** of project and contextual documents was conducted. This review included:

- The project master document, baseline report, and "Family Economy Typology Survey Report";
- Academic literature on sustainable macadamia production, marketing, and trade;
- Online media sources covering macadamia cultivation in Laos, Asia and other producing countries;
- Technical study on macadamia cultivation prepared by DAEO Boun Neua, Phongsaly PAFO

3.2 Survey

Survey of macadamia retail sellers in Laos and Xishuangbanna, China

Purpose: This survey collected information on the practices, challenges, and market conditions faced by macadamia retailers in central and northern Laos and in Xishuangbanna, China. It examined sourcing, packaging, storage, marketing, pricing, and sales volumes, as well as supply chain relationships, quality standards, consumer preferences, and logistical constraints. The findings support the identification of key bottlenecks and opportunities to strengthen macadamia value chains and cross-border market linkages.

Locations: Vientiane, Luang Prabang, Boun Neua, Oudomxay, Jing hong (Xishuangbanna, China)

Participants: 9 in Vientiane; 16 in Luang Prabang; 7 in Boun Neua; 2 in Oudomxay; 6 in Jing hong. Total: **40** **Surveyed Retail shops in LaosVientiane (Total: 9 shops)**

Table 1 Surveyed Retail Shops in Vientiane, Laos

	Retail Shop Name
1	Ban Khao Hom Shop
2	Tiddin Shop
3	VG Mart
4	Phonsili Minimart
5	Kok Kok Mega Mart
6	Siavone Minimart
7	J-Mart

8	View Mall Supermarket
9	Ramping

Luang Prabang (Total: 16 shops)

Table 2 Surveyed Retail Shops in Luang prabang, Laos

No.	Retail Shop Name
1	B-Mart
2	Stall at Dara Market
3	D & T Supermarket
4	SkyMart
5	AB Mart
6	Lansii Butik (Boutique)
7	New Century Chinese Market
8	Thansamay Epicerie Minimart
9	Signature Market
10	Street fruit stall
11	Street fruit stall
12	Lili Minimart
13	Sudalin Grocery Shop
14	Street nuts stall at Night Market (Thalat Meut)
15	TC Supermarket
16	Thalat Phosy, Chinese-run fruit stall

Boun Neua (Total: 7 shops)

Table 3 Surveyed Retail Shops in Boun neua, Laos

No.	Retail Shop Name
1	Vietnamese-run shop (Lady from Dien Bien Phu, Tai Dam ethnicity)
2	Phongsaly Provincial ODOP Product Exhibition Centre
3	Street grocery shop selling nuts, rice and other loose products
4	SuperMarket in Baan Bun Heua
5	Chinese-run supermarket
6	Minimak
7	Boun Neua vegetable and fruit market

Oudomxay (Total: 2 shops)

Table 4 Surveyed Retail Shops in Oudomxay, Laos

No.	Retail Shop Name
1	Grocery shop selling dried nut
2	Minimaak Du Du, Ban Hong Meengdaa

Overall Total in Laos: 34 Retail Shops Surveyed in Laos

Jinghong (Total: 6 shops)

Table 5 Surveyed Retail Shops in Jinghong, China

No.	Retail Shop Name
1	Walmart
2	Da Xing Liang Fan Supermarket
3	Zhen Wei Yuan Shop
4	Minimarket
5	Minimarket
6	Fruit and vegetable market

Overall Total in China: 6 Retail Shops Surveyed in Jinghong

3.3 Semi-structured interviews

Semi-structured interviews were conducted with a wide range of stakeholders as follows:

Semi-structured Interview with Macadamia Growers in China

Purpose: These interviews gathered insights from macadamia growers in the Jinghong area of China on cultivation practices, marketing, challenges, yields, income, and support received. They also examined market access, pricing, buyer networks, value-added opportunities, and farmers' perceptions of benefits and risks. The findings helped identify training and support needs, inform sustainable production strategies, and contribute to mapping the macadamia value chain and market positioning of Lao-produced macadamia in the Upper Mekong region.

Location: Jing hong Municipality countryside (Xishuangbanna, China)

Participants: 2 Nasha farmers for Team 3 State Farm 5

Semi-Structured Interviews with Macadamia Middlemen/Companies in Laos and China

Purpose: These interviews collected information from macadamia middlemen and companies in Laos and Jinghong, China, on their experiences in trade and marketing. They explored practices and expectations in sourcing, processing, packaging, storage, and sales, as well as traded volumes, income, and quality standards. Market dynamics, including buyer networks, pricing, consumer preferences, transport logistics, and trading challenges, were also examined. The insights aim to inform strategies for improving market linkages, trade efficiency, and sustainable production.

Location: Meng Yang, Jing hong Municipality, Boun Neua, Phongsaly Province and Luang Prabang

Participants: 2 in Laos; 1 in China. Total: 3.

Table 6 Middlemen/Companies interviewed in Laos and Xishuangbanna, China

Country	Middlemen/Company	Location	Number of People Interviewed
Laos	Tanjai Agricultural Import–Export Co. Ltd.	Luang Prabang	1
Laos	Mr. Ai Oun Keao, Tai Lue entrepreneur	Ban Nyor Village	1
China	Greenfield Agriculture and Forestry Group (Luye Nonglin Jituan)	Xishuangbanna	1
Total			**3**

Semi-structured Interviews with Macadamia Consumers in Laos and China

Purpose: These interviews collected insights from consumers in Laos (Luang Prabang, Vientiane, Boun Neua) and Jinghong, China, on their preferences, purchasing habits, and expectations. They explored why consumers buy macadamia, their quality and packaging preferences, price sensitivity, purchase locations, consumption frequency, and factors encouraging increased consumption. The findings inform marketing strategies, product development, and approaches to boost demand in these regions.

Location: Vientiane, Luang Prabang, Boun Neua, Jing hong municipality

Participants: 10 in Vientiane; 10 in Luang Prabang; 6 in Boun Neua, 10 in Jing hong municipality. Total: 36.

Table 7 Interviewed Macadamia Consumers in Laos and Xishuangbanna, China

Country	Location	Number of Consumers Interviewed
Laos	Vientiane	10
Laos	Luang Prabang	10
Laos	Boun Neua	6
China	Jinghong Municipality	10
Total		**36**

Table 8 Summary of semi-structured Interviews

Type of Interview	Location	Type of Participants	No. of Participants
1. Semi-structured Interviews with Macadamia Growers	Jing hong Municipality countryside (Xishuangbanna, China)	Farmers engaged in macadamia cultivation	2
2. Semi-structured Interviews with Macadamia Middlemen/Companies	Jing hong Municipality (China); Boun Neua, Phongsaly Province and Luang Prabang, (Laos)	Middlemen/Companies	3

3. Semi-structured Interviews with Macadamia Consumers in Laos and China	Vientiane, Luang Prabang, Boun Neua (Laos) and Jing hong Municipality (China)	Macadamia consumers	36

3.4 Focus Group Discussions

Focus group discussions (FGD) with farmers were conducted in place of semi-structured interviews with individual households due to time constraints. This component of the methodology adopted a participatory approach rather than a one-way question-and-answer format. The process included discussions with farmers, village headmen, and members of the village council, guided by a set of prepared questions.

Focus Group Discussions with experienced Macadamia growers

Purpose: These FGDs aimed to gather insights from farmers in Boun Neua District, Phongsaly Province, engaged in macadamia cultivation through contract farming with Chinese companies and CCL support. It explored farmers' knowledge, practices, challenges, and perceptions of production and marketing. Participants included representatives from macadamia-producing villages, model farmers nominated by CCL, and local government and GREEN Project representatives. The discussion helped identify key challenges, support needs, and informed future interventions, training programs, and policies to enhance sustainable cultivation, farmer capacity, and market access.

Location: Ban Vang Doy, Ban Khen Ko and Ban Mai Long Thong

Participants: a total of 54 participants (including farmers, the village headman, vice-headman, a member of the village council, and Lao Women's Union) from three selected villages in Phongsaly Province (Boun Neua District) involved in macadamia cultivation, 5 government officials (Boun Neua DAE, Phongsaly PAE & PIC and Boun Neua DIC, DA), 3 members from CCL GREEN Project.

Table 9 Participants in Focus Group Discussions with experienced Macadamia growers

Village	Ethnicity	Total Participants	Female	Male	No. of Villagers already Planted Macadamia
Ban Vang Doy	Phunoi, Tai Lue, Khmu, Akha	7	1	6	2
Ban Khen Ko	Akha Phusho	17	5	12	2
Ban Mai Long Thong	Akha Phusho	30	6	24	1
Totals	—	54	12	42	5

Focus Group Discussions with prospective macadamia growers

Purpose: These FGDs aimed to gather insights from farmers in Boun Neua District interested in starting macadamia cultivation. It explored their current farming practices, knowledge of macadamia, economic expectations, challenges, market awareness, and training needs. By engaging prospective and experienced growers, along with DAFO, PAFO, and GREEN Project representatives, the discussion identified motivations, constraints, and institutional support needed for sustainable macadamia expansion.

Location: Ban Vang Doy, Ban Khen Ko and Ban Mai Long Thong

Participants: a total of 48 participants (including farmers, the village headman, vice-headman, a member of the village council, and Lao Women's Union) from three selected villages in Phongsaly Province (Boun Neua District) involved in macadamia cultivation, 5 government officials (Boun Neua DAE, Phongsaly PAE & PIC and Boun Neua DIC, DA), 3 members from CCL GREEN Project.

Table 10 Participants in Focus Group Discussions with Prospective Macadamia Growers

Village	Ethnicity	Total Participants	Female	Male	Villagers Already Planted Macadamia	Interested Households
Ban Vang Doy	Phunoi, Tai Lue, Khmu	7	1	6	2	5
Ban Khaem Ko	Akha Phusho	17	5	12	2	23
Ban Mai Long Thong	Akha Phusho	24	6	18	1	84
Totals	—	48	12	36	5	112

Focus Group Discussions with Representatives from DAFO/PAFO and other Relevant Government Agency

Purpose: Purpose: This FGD with representatives from DAFO, PAFO, and the Boun Neua District Department of Industry and Commerce (DICO) collected baseline information on macadamia cultivation in Boun Neua. It explored policies, socio-economic planning, motivations for promoting macadamia, implementation modalities, agricultural practices, government support, environmental and land-use considerations, market opportunities, production costs, commercial networks, and strategies for farmer participation and capacity building. The discussion informed evidence-based planning and the promotion of sustainable macadamia production.

Location: Boun Neua District Town
Participants: 1 representative from the District Governor Office, 1 from the Commerce and Industry Phongsaly Provincial Office, 1 from Industry and Commerce Boun Neua District, 1 from Boun Neua Agriculture and Forestry District Office, 1 from the Provincial Agriculture and Forestry Office, and 4 representatives from CCL.

3.5 Content analysis

An additional component of the methodology involved a multi-level content analysis of the global macadamia value chain, covering prices, product forms, marketing approaches, and consumer preferences. This also included information on fair-trade and bio-trade regulations, certifications, and networks.

Analysis of online content on macadamia prices, product types, marketing, and packaging

Purpose: This analysis gathered insights on macadamia prices, product forms (e.g., shelled, unshelled, natural, roasted, chocolate-coated), marketing strategies, and packaging in the global market. The findings helped identify potential buyers and position Lao macadamia internationally. Due to time constraints, this replaced direct consumer survey or in-depth market research.

Location: Websites of fruit and nut wholesale companies and retailers in Europe and the United States.

Target informants: 10 fruit and nut wholesale companies and retailers in Europe and the United States.

Analysis of consumer reviews on European and American wholesalers' and retailers' website

Purpose: This component examined consumer experiences, expectations, and preferences as reflected in online reviews. The analysis identified the most demanded product forms and key drivers of consumer choice in the global market.

Location: Websites of fruit and nut wholesale companies and retailers, and existing studies on macadamia consumption.

Target informants: 35 consumer reviews from European and American markets.

3.6 Primary Data Collection: Communication with Macadamia Companies

Email communication with macadamia wholesale and retail companies in Europe and United States

Purpose: The communication engaged wholesale and retail macadamia sellers or distributors to collect information on sourcing practices, product preferences, quality and certification requirements, pricing, logistics, and market trends. The insights helped assess opportunities for introducing and expanding Lao-produced macadamia by clarifying standards, expectations, and potential partnerships with industry actors.

Location: Email correspondence

Target informants: 10 customer service representatives from fruit and nut wholesale companies and retailers in Europe and the United States

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Study Limitations and Mitigation Strategies

This study encountered several methodological and logistical constraints, primarily related to time and resources, which influenced the extent and depth of data collection. The key limitations and how they were addressed are outlined below:

1. ***Short Fieldwork Duration in Luang Prabang and Vientiane***
   With only two days allocated for each city, the number of consumers surveyed and wholesalers or retailers interviewed was limited. This could have restricted the overall understanding of domestic market dynamics and macadamia consumption preferences.
   Mitigation Measures: The consultant prioritized qualitative insights by focusing on key informants with extensive market experience. Findings were triangulated across both cities and cross-checked with secondary data on domestic consumption trends, ensuring reliable conclusions despite the brief fieldwork.
2. ***Limited Field Research Time in Jinghong Municipality, China***
   The two-day visit made it challenging to fully meet targets for interviewing wholesalers, middlemen, companies, and conducting detailed consumer surveys.
   Mitigation Measures: The consultant utilized her established professional network to gather supplementary information through semi-structured interviews with local producers and consumers. Collected field data was validated and integrated with online resources to ensure accuracy and completeness.
3. ***Indirect Analysis of European and American Consumer Preferences***
   Time constraints prevented direct surveys or interviews with consumers in Europe and the U.S. Instead, online consumer reviews were analyzed to infer preferences regarding product types and purchasing behaviors. Although this data is less direct, it still provided valuable insights.
   Mitigation Measures: Data was gathered from multiple platforms and brands to enhance diversity and reliability. Trends identified from online reviews were cross-checked with published market studies to strengthen the validity of findings.
4. ***Limited Engagement with European and American Macadamia Companies***
   Attempts to collect information via email received few or no responses, limiting insights into sourcing, processing, marketing, and packaging practices.
   Mitigation Measures: Publicly available sources, including company websites, trade reports, and industry publications, were systematically reviewed to fill information gaps.

Study Success Despite Limitations

Despite these constraints, the study successfully gathered critical data to provide a comprehensive understanding of the macadamia value chain—from production and marketing to sales in Lao PDR, across Asia, and globally. By strategically leveraging key interviews, secondary data, and professional networks, the research delivered meaningful insights into the sector's current dynamics, opportunities, and challenges. These findings form a solid evidence base to guide future interventions and support the sustainable growth of the macadamia industry in Laos and beyond.

Study Implementation and Data Collection Timeline

The study for the development of macadamia value chains followed a structured process consisting of three key phases—Preparation, Fieldwork, and Analysis & Reporting—implemented over a three-week period from November to mid-December 2025. Activities were aligned with CCL's quality standards and included a combination of document review, stakeholder consultations, field data collection, and iterative reporting.

Table 11 Study of Macadamia Value Chain Development Timeline

Phase	Description of Activity	Number of days
Phase 1 Preparation	Desk review of project materials	2
	Inception report writing and submission to CCL	4
Phase 2 Fieldwork	Analysis of online sources on macadamia global market and consumer trends	7
	Macadamia value chain field study in Laos and China	
Phase 3 Analysis and Reporting	Data cleaning and analysis	1
	Write the final report for submission to CCL team	2
	Finalize the final report and summary of results for presentation to local authorities and concerned villagers with CCL team	4

Table 12 Detailed Macadamia Value Chain Study Timeline

Date	Description	Participants	Location
5th-20th of November 2025	Desk review of relevant documents and literature, communication with macadamia companies, analysis of online consumer reviews.	AD	
24th of November 2025	Field study in Vientiane	AD	Vientiane
26th of November 2025	FGD with Government Representatives in Boun Neua at CCL Office Visit to macadamia orchard in Boun Neua (Ban Namphae) Survey of shops in Boun Neua	AD, GREEN Team, Government Reps.	Boun Neua
27th of November 2025	Interview with Mr. Ai Oun Keao in Ban Nyor FGD with farmers in Ban Vang Doy and Ban Khaemko	AD, GREEN Team, Government Reps.	Boun Neua
28th of November 2025	FGD with villagers in Ban Mai Long Thong	AD, GREEN Team,	Boun Neua

		Government Reps.	
30th of November 2025	Interviews with macadamia farmers and market and consumer survey in Jing hong, Xishuang banna (China).	AD	Jing hong, Xishuangbanna, China
1st of December 2025	Interview with macadamia company in Meng Yang, Xishuang banna (China). Market and consumer survey in Jing hong, Xishuang banna (China).	AD	Jing hong, Xishuangbanna, China
2nd of December 2025	Market and consumer survey in Jing hong, Xishuang banna (China).	AD	Meng Yang, Xishuangbanna, China
4th of December 2025	Market and consumer survey in Luang Prabang	AD	Luang Prabang
5th of December 2025	Market and consumer survey in Luang Prabang	AD	Luang Prabang
8th of December 2025	Interview with macadamia company in Luang Prabang (video-call from Vientiane)	AD	Vientiane
9th of December 2025	Interview with shop retailer (Ban Khao Hom) in Vientiane	AD	Vientiane
10th of December 2025	Interview with shop retailer and agribusiness company (Tiddin) in Vientiane	AD	Vientiane
6th-19th of December 2025	Report writing	AD	Vientiane

Overview of Macadamia varieties, production, and global markets

1. Macadamia: botanical species and commercial varieties

Macadamia, a premium and highly valued nut in international markets, traces its origin to the **rainforests of southeastern Australia**, where the first economically significant species were discovered by a German botanist in **1858**. The genus was named in honor of his colleague, **Dr. John Macadam**. Although wild macadamia trees have long been part of Australia's natural landscape, **commercial cultivation** began only in the **20th century**, and by the **mid-1960s**, the nut had become a globally recognized **export commodity**. Often referred to as the **"queen of nuts"**, macadamia is prized for its delicate flavor, rich oil content, and the long time required for trees to bear fruit, which contributes to its high market value. In English, it is also known by several other names, including **Queensland Nut**, **Bauple Nut**, **Bush Nut**, and **Baphal Nut**.

Figure 1: Macadamia nuts. Source: https://www.lifetimedaily.com/macadamia-nuts-health-benefits/

Commercial macadamia production is primarily based on two species—**Macadamia integrifolia** and **Macadamia tetraphylla**—along with their hybrids. Among the most common cultivars are the **hybrid Beaumont** and **Australian varieties** such as A 16, A4, MCT1, and 849, though many others exist and continue to be developed through ongoing breeding programs.

The species differ in shell characteristics, oil content, and commercial value, as outlined below:

- **Macadamia integrifolia** – Commonly called the Queensland Nut or Smooth-shelled Macadamia, this species features a smooth shell and is the dominant commercial type, prized for its high oil content.
- **Macadamia tetraphylla** – Also known as the Bush Nut or Rough-shelled Macadamia, it has a rougher shell and slightly lower fat content.

Hybrids and Selected Cultivars

1. **Beaumont** – A widely grown hybrid recognized for its high oil content and distinctive reddish new foliage and bright pink flowers, though its kernels are somewhat less sweet.
2. **Australian A-Series Varieties** – A group of hybrids developed in Australia:
   - **A 16** – Produces high yields, but the thin shell can lead to stick-tight nuts (those remaining attached to the tree).
   - **A4** – Offers acceptable nut quality but is often described as bland compared to other cultivars.
   - **849** – Sometimes referred to as the “new 246”, representing an improvement on the older 246 variety.
3. **MCT1** – A relatively new cultivar gaining commercial traction in Queensland.
4. **Nelmac II** – A South African hybrid with a sweet kernel and high recovery rate, though it is vulnerable to fungal infections.
5. **Maroochy** – A pure M. tetraphylla variety from Australia, valued for its productivity and effectiveness in cross-pollination.

2. Macadamia Nut Structure

The macadamia fruit consists of several distinct parts. The **outer husk** (**pericarp**) is a fibrous, green layer that splits open when the fruit ripens, allowing the nut to fall to the ground. Inside lies the **hard shell**, or **testa**, which protects the **kernel (embryo) -** the soft, edible seed valued for its delicate flavor and high oil content. Each inflorescence, 10–30 centimeters long, bears numerous creamy-white flowers that are pollinated by insects, leading to clusters of 10–30 nuts that mature over a period of seven to nine months[1]

Figure 2: The Macadamia Life Cycle. Source: https://australianmacadamias.org/industry/about-growers/growing-processing-macadamias

3. Macadamia Production Process: From Planting to Roasting

The **macadamia nut** ranks among the **most expensive nuts in the world**, primarily due to the challenges involved in cultivating the trees and the labor-intensive nature of its processing.

In **Australia**, the harvest season extends from **March to September**, with multiple collection rounds required since the nuts ripen at different times (https://www.atco.de/en/produkt/nusskerne/macadamia/). Once gathered from the ground, the nuts are stored for several weeks at temperatures above **30°C**, allowing the **moisture content** to decrease from about **30 percent** to just **1.5–2 percent**. This drying phase facilitates shell cracking but demands specialized equipment, such as **rotating steel cylinders**. The nuts are then **sorted by size**, with **low-quality specimens removed manually**, before the finest **macadamia kernels** are **roasted at approximately 120°C** to enhance their flavor and texture. (https://www.atco.de/en/produkt/nusskerne/macadamia/)

[1] Macadamias and other nut varieties in high quality | ATCO

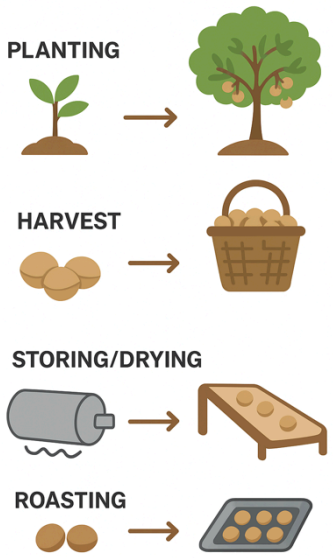


Figure 3: Macadamia production process: from planting to roasting. Source: Created with ChatGPT by the author

4. Global Macadamia Production

Macadamia production has expanded rapidly over the past two decades, evolving from a niche crop grown primarily in Australia and Hawaii into a globally traded nut cultivated across Africa, Asia, the Americas, and Oceania (International Nut and Dried Fruit Council 2025). Understanding global production patterns is essential for positioning Lao macadamia within regional and international markets, identifying competitors, and assessing opportunities for market entry and differentiation (International Nut and Dried Fruit Council 2025). This section provides an overview of major producing countries, followed by recent production trends in key producer nations, with a particular focus on China due to its proximity and relevance to northern Laos.

4.1. Origins and Global Expansion of Macadamia Production

The macadamia tree is native to Australia, which remains one of the world's major producers, with approximately two million trees under cultivation. Hawaii is another traditional production region, with a harvest season running from September to December, complementing Australia's harvest-free months (https://www.atco.de/en/produkt/nusskerne/macadamia/.)

Beyond these traditional centers, macadamia cultivation has expanded significantly across multiple continents due to rising global demand, favorable prices, and the crop's adaptability to subtropical and tropical climates. The following countries are now recognized as important macadamia producers:

- South Africa
- China
- New Zealand
- Malawi
- Kenya
- Israel

- United States (California)
- Brazil
- Guatemala
- Paraguay
- Bolivia

Together, these regions contribute to the growing global supply of macadamia nuts and reflect the crop's increasing economic importance worldwide (https://www.atco.de/en/produkt/nusskerne/macadamia/).

Table 13 Global Macadamia Production by Country (2023–2025 Estimates)

Country	Estimated Production Volume	Year / Basis	Source / Reference
South Africa	93,588 metric tons (in-shell basis, preliminary estimate)	2025	INC Global Statistical Review
Australia	53,950 tons (in-shell at 3.5% moisture)	2024	FreshPlaza
Australia	31,500 tons nut-in-shell from bearing farms	2023	Australian Macadamias Industry Report
Kenya	46,000 metric tons (in-shell)	2024	Produce Report – Global Macadamia Outlook
China	~40,000–45,000 metric tons (in-shell)	2024–2025	EssFeed – Top 10 Macadamia Producing Countries in 2025
USA (Hawaii)	36.8 million lbs (~16,700 metric tons)	2023	USDA NASS – Hawaii Fruits and Nuts Report
Malawi	3% of global output (approx. 19,500 metric tons)	2023	FAO – Growing Macadamia Nuts for Malawi's Future Generation
Guatemala	15,000 metric tons (in-shell)	2024	Produce Report – Global Macadamia Outlook
Brazil	6,500 metric tons (in-shell)	2024	Produce Report – Global Macadamia Outlook
New Zealand	100–150 tons annually (kernel basis)	2023–2024	MyGarden NZ
New Zealand	66 tons (kernel basis)	2023	MSC Newswire
Israel	Exported US$13.8k of macadamia nuts	2023	OEC – Macadamia nuts in Israel Trade
Paraguay	No official production data available	2023	FAO – Paraguay Hand-in-Hand Initiative
Bolivia	No official production data available	2023	FAO – Bolivia Hand-in-Hand Investment Forum 2025

Macadamia Global Statistical Review
Source: https://inc.nutfruit.org/macadamias-global-statistical-review-2

Table 14 Macadamia Global Statistical Overview

Kernel Basis. Metric Tons

	2024				2025			
COUNTRY	BEG. STOCK	CROP	TOTAL SUPPLY	ENDING STOCK	BEG. STOCK	CROP	TOTAL SUPPLY	ENDING STOCK
SOUTH AFRICA	n/r	28.800	28.800	n/r	n/r	30.600	30.600	n/r
CHINA	n/r	17.400	17.400	n/r	n/r	21.500	21.500	n/r
AUSTRALIA	n/r	17.300	17.300	n/r	n/r	18.200	18.200	n/r
KENYA	n/r	8.800	8.800	n/r	n/r	9.500	9.500	n/r
USA	n/r	3.300	3.300	n/r	n/r	3.400	3.400	n/r
MALAWI	n/r	2.500	2.500	n/r	n/r	2.800	2.800	n/r
GUATEMALA	n/r	2.000	2.000	n/r	n/r	2.400	2.400	n/r
VIET NAM	n/r	2.000	2.000	n/r	n/r	2.000	2.000	n/r
BRAZIL	n/r	1.625	1.625	n/r	n/r	1.250	1.250	n/r
COLOMBIA	n/r	220	220	n/r	n/r	230	230	n/r
OTHERS	n/r	4.275	4.275	n/r	n/r	4.300	4.300	n/r
WORLD TOTAL	n/r	88.220	88.220	n/r	n/r	96.180	96.180	n/r

WORLD CONSUMPTION (Supply - End. Stock)	88.220

Sources: Macadamias South Africa, China Chamber of Commerce for Import and Export of Foodstuffs, Australian Macadamia Society, Brazilian Macadamia Association and other INC sources. Reported at 3.5% nut-in-shell moisture content. n/r: not reported or not relevant. *Macadamias South Africa reports at 1.5% NIS m.c., the 3.5% figure is based on INC calculations.

Source: https://inc.nutfruit.org/macadamias-global-statistical-review-2

Table 15 Major companies in the macadamia nuts global market

Company Name	Country	Type of operations	Key products / Notes
Kenya Nut Company Ltd	Kenya	Farming & processing (macadamia & other nuts)	Macadamia nuts (export kernels), part of diversified nut business.
MacFarms	United States	U.S. orchard/processing (Hawai'i) – part of major branded group	Responsible for steep share of U.S. macadamia kernel production.
MWT Foods Australia	Australia	Sourcing & processing of Australian macadamias; supply chain services	Premium Australian kernels and grower-services for macadamia supply.
Alimentos Selectos S.A.	Guatemala	Cultivation & export business in Central America (macadamias among other crops)	Bulk raw kernel supply from Guatemala region.
Mauna Loa Macadamia Nut Corporation	United States	Large U.S. processor & branded consumer business (Hawai'i)	A major branded snack processor and visitor-centre operation.
Royal Macadamia (Pty) Ltd	South Africa	Farming, processing kernels, oil & spreads; value-added product business	Produces whole nuts, kernel, oil, spread – premium chain.
Nambucca Macnuts Pty Ltd	Australia	Processing / kernel supply (Australia) – listed among major players	Focus on kernel production and export from Australia.
Wondaree Macadamias	Australia	Grower- and processor-type business in Australian macadamia industry	Part of Australia's growing processing/export chain in macadamias.
Hamakua Macadamia Nuts Co. Inc.	United States	U.S. orchard & processor (Hawai'i) – vertical integration from orchard to product	Controls cultivation and processing chain in Hawai'i for macadamias.
Golden Macadamias	South Africa	Value-added product business (roasted/flavoured macadamias) among major players	Known for roasted/flavoured products aimed at premium snack markets.

5. Macadamia Production in Selected Countries (2024–2025)

Source: INC – Macadamias Global Statistical Review
This section reviews recent macadamia production trends in selected major producing countries to contextualize global supply dynamics, competitive pressures, and market opportunities relevant to the development of the macadamia value chain in Boun Neua District. The countries highlighted—South Africa, Australia, Kenya, and China—represent a mix of established exporters and rapidly expanding producers whose experiences provide useful benchmarks for Laos (INC 2025).

5.1. South Africa

South Africa is currently the world's largest macadamia producer and a dominant exporter to international markets. For 2025, preliminary estimates indicate production of:

- **93,588 metric tons** (in-shell at 1.5% moisture content), or
- **95,500 metric tons** (in-shell at 3.5% moisture content),

representing a **7% increase compared to 2024** (INC 2025; Macadamias South Africa 2025). Production growth is largely driven by strong performance of young orchards and stable yields from mature trees, although elevated temperatures may influence nut size and weight in some regions. South Africa's export-oriented industry supplies major markets including **China, Europe, and the United States**, highlighting the scale, efficiency, and competitiveness of global producers that Lao macadamia will face in international trade.

5.2. Australia

Australia remains one of the world's leading macadamia producers and continues to set industry benchmarks in quality, processing, and producer organization. Production in **2025 is projected at approximately 56,890 metric tons**, reflecting a **5% year-on-year increase** (INC 2025). The **2024 harvest exceeded expectations**, increasing by **11.5% compared to 2023** (Australian Macadamia Society 2025). However, the 2025 outlook may be affected by severe weather events linked to ex-Tropical Cyclone Alfred, and flooding and wind damage in key growing regions.

Final production figures may be revised once the full extent of cyclone-related impacts is assessed. Australia's experience illustrates both the benefits of a mature, well-coordinated industry and the growing risks posed by climate variability (INC 2025; Australian Macadamia Society 2025).

5.3. Kenya

Kenya is an important African macadamia producer, with the crop playing a significant role in smallholder-based agricultural exports. Although specific production figures for **2024–2025** are not available in the referenced data, Kenya consistently ranks among the major global producers (INC 2025). The country primarily:

- Exports **raw or semi-processed macadamia nuts**, and
- Supplies **Asian markets**, particularly **China**.

Kenya's experience demonstrates the opportunities created by strong export demand, while also highlighting persistent challenges related to quality control, farmer organization,

price volatility, and limited domestic processing capacity.

5.4. China

China has rapidly expanded macadamia cultivation over the past decade and is both a major producer and the **world's largest consumer of macadamia nuts**. Current in-shell production is estimated at approximately **56,000 metric tons**, with output in **2024 increasing by around 5,000 metric tons compared to 2023**, mainly due to expanded planting areas (INC 2025; EssFeed 2025). Despite this growth:

- China remains a **net importer**, and
- Production in **2025 was expected to increase by an additional 5,000–10,000 metric tons** (EssFeed 2025).

Macadamia production in China is highly concentrated in **Yunnan Province**, which accounts for:

- Approximately **3.79 million mu**[2] (about **252,667 hectares**) under cultivation, and
- Over **49% of the global planting area** (People's Daily Online 2024).

Within Yunnan, several counties are particularly important for macadamia cultivation:

- **Lincang** — A major production hub, with **Yongde County** alone having **40,000 hectares under cultivation**, with over **25,000 hectares bearing fruit**, and **Shuangjiang County** having **10,173 hectares** of macadamia orchards (Tridge 2023).
- **Dehong Dai and Jingpo Autonomous Prefecture** — **Yingjiang County** leads macadamia cultivation in this prefecture, with a total cultivation area of **350,100 mu (about 23,340 hectares)** and **163,000 mu (around 10,867 hectares)** of productive land. The county's annual dry shelled nut output is projected to reach **109,000 metric tons**, making it the world's largest single-region macadamia production base (China Nut Expo 2024).
- **Xishuangbanna Dai Autonomous Prefecture** — Macadamia production has expanded rapidly across former state farms and hill villages, driven by declining rubber income, government-led diversification programs, and the involvement of major companies.

Although China remains primarily an importing country, it exported **45 tonnes of macadamia nuts to Europe in 2023**, indicating emerging export capabilities alongside continued strong domestic demand (EssFeed 2025).

5.5. Implications for Boun Neua's Macadamia Development Strategy

Global macadamia production trends indicate that **Boun Neua District should not aim to compete with major producing countries on volume, but rather focus on quality, reliability, and strategic market positioning.** Increasing global supply from countries such as South Africa and Australia suggests growing competition, while China's continued

[2] Mu is the Chinese unit for land are measurement. 1 mu = 666.67 square meters, 1/15 of a hectare.

reliance on imports—despite rapidly expanding domestic production—presents a significant opportunity for cross-border trade.

For Boun Neua, these trends imply the need to:

- Prioritize post-harvest handling, drying, and storage to ensure consistent quality
- Target nearby regional markets, particularly China, before expanding to distant premium markets
- Differentiate Lao macadamia through organic production, origin-based branding, and seasonal complementarity
- Strengthen farmer organization and governance structures to support quality control and market access

Overall, aligning local production systems with regional demand, while gradually building capacity for higher-value markets, will be critical for the sustainable development of the macadamia value chain in Boun Neua District.

Overview of the Macadamia Market in Europe

1. Introduction

As of 2025, Germany is the leading consumer of macadamia nuts in Europe, with imports valued at approximately US$39.45 million in 2023, accounting for 11.3% of European imports (Tradeimex 2025).

Other important markets include the Netherlands, Spain, France, and the United Kingdom, all showing rising demand for healthy and premium snack options (Fortune Business Insights 2025).

The European market is defined by growing consumer awareness of health benefits, premium positioning, and culinary versatility, creating a high-potential niche for macadamia exporters (Tradeimex 2025; Fortune Business Insights 2025).

2. Major Macadamia Wholesalers in Europe

European wholesalers source macadamia through direct partnerships and intermediaries to maintain consistent quality and supply.

Direct sourcing:
• Partnerships with grower-owned companies or cooperatives in Australia, South Africa, and Kenya.
• Allows control over quality, transparency, and access to freshly processed nuts.
• Examples: LIMBUA (Germany-Kenya, sourcing from 9,000+ smallholders) and Marquis Macadamias (Australia, grower-owned processor).

Through importers and agents:
• Specialized importers connect European wholesalers with multiple global producers.
• Ensures wider supply access while meeting quality and logistical standards.

Quality and logistics:

• Many wholesalers operate European processing and packing facilities, e.g., Hamburg, for inspection and repackaging.

• Timely delivery is maintained via reliable logistics networks (ATCO 2025).

Table 16 Major Macadamia Wholesalers and Retailers in Germany

No.	Company	Website	Email	Phone	Address	Overview
1	LIMBUA Deutschland GmbH	limbua-group.com	info@limbua-group.com	+49 (0)171 488 6336	Raunerweg 13, 82211 Herrsching am Ammersee	German-Kenyan company specializing in organic macadamia nuts and dried fruits. B2B bulk supplies sourced directly from Kenyan farmers.
2	August Töpfer & Co. (GmbH & Co.) KG	atco.de	contact@atco.de	+49 (0)40 32003-0	Raboisen 58, 20095 Hamburg	Traditional wholesaler offering a range of high-quality products, including macadamia nuts, with personalized service.
3	Seeberger GmbH	seeberger-snacks.com	info@seeberger.net	+49 731 4093-0	Hans-Lorenser-Straße 36, 89079 Ulm	Well-known brand offering roasted and salted macadamia nuts, available online and in retail outlets.
4	Jurassic Fruit	jurassicfruit.com	customercare@jurassicfruit.com	+49 201 75 899 650	Lützowstraße 28a, 45141 Essen	Online retailer specializing in organic and raw macadamia nuts.
5	Horst Walberg Trockenfrucht Import GmbH (HOWA)	howa.de	-	+49 (0)4193 98190	-	Wholesaler and exporter offering premium macadamia nuts with creamy texture and rich buttery flavor.

Table 17 Major Macadamia Wholesalers and Retailers in France

No.	Company	Website	Email	Phone	Address	Overview
1	Macadamia Nut Farm	macadamianutfarm.fr	contact.macadamiafr@gmail.com	-	438831984 Evry	Offers natural macadamia products such as nuts, plant-based milks, and spreads with focus on sustainability.
2	Pertamina Group	pertaminagroups.com/france/macadamia-nuts.htm	-	-	-	Wholesale supplier and exporter of macadamia nuts in France, broad selection of agro products.
3	OPA Distribution	europages.co.uk/companies/macadamia-nuts.html	-	-	Marseille Cedex 14	European wholesaler supplying food products including macadamia nuts.

4	Macadamia Ltd	macadamia.co.uk	-	-	-	E-commerce retailer focusing on premium macadamia products worldwide.
5	Nutfields	nutfields.com	-	-	-	Wholesale and retail supplier specializing in macadamia nuts, recognized globally.

Table 18 Major Macadamia Wholesalers and Retailers in the Netherlands

No.	Company	Website	Email	Phone	Address	Overview
1	Nutsupply BV	nutsupply.com	info@nutsupply.com	+31 (0)85 760 0046	-	Supplier of premium nuts—including raw and roasted macadamias—for wholesale and private-label clients across Europe.
2	De Notenshop	denotenshop.nl	klantenservice@denotenshop.nl	+31 (0)85 743 0201	-	Major Dutch online retailer offering nuts, dried fruits, and seeds, including roasted and salted macadamias.
3	Tovano BV	tovano.com	info@tovano.com	+31 (0)162 510 555	-	Large importer and distributor of nuts and dried fruits, providing bulk macadamias to manufacturers and wholesalers.
4	Nutland BV	nutland.nl	sales@nutland.nl	+31 (0)76 596 3333	-	Supplier of natural and processed nuts, offering macadamias in raw, roasted, and salted varieties.
5	Holland Foodz Nuts & Dried Fruits	hollandfoodz.nl	info@hollandfoodz.nl	+31 (0)183 302 555	-	Distributor and exporter of nuts and dried fruits, including macadamias for retail and food service.

Table 19 Major Macadamia Wholesalers and Retailers in Spain

No.	Company	Website	Email	Phone	Address	Overview
1	Pertamina Group	pertaminagroups.com	-	-	-	Large-scale wholesale exporter of macadamia nuts and agro products.
2	Cardassilaris Family	cardassilaris.com	-	-	-	Wholesale supplier sourcing certified premium macadamias for industrial buyers.
3	Frutos Secos San Blas	frutossecossanblas.com	-	-	-	Offers macadamia kernels and a wide range

						of nuts, competitive pricing, reliable sourcing.
4	Ispanex Trade Comp. S.L.	go4worldbusiness.com	-	-	Seville	Supplier offering macadamias, honey, avocado products, and more.
5	Naxan Export S.L.	go4worldbusiness.com	-	-	Pamplona	Supplier of macadamias and other agro products.
6	International Nut and Dried Fruit Council (INC)	nutfruit.org	info@nutfruit.org	+34 977 331 416	-	Global organization promoting sustainable growth, trade, and consumption of nuts and dried fruits.

Table 20 Major Macadamia Wholesalers and Retailers in the UK

No.	Company	Website	Email	Phone	Address	Overview
1	Nelmosh	nelmosh.co.uk	-	+44 7966 762789	-	Bulk supplier of raw, shelled macadamias from Kenya, EU-standard packaging, flexible order sizes.
2	International Trading Corporation (ITC)	internationaltradingcorp.co.uk	-	+44 20 8432 1520	-	Wholesale supplier of roasted, salted, honey-coated, and cinnamon-coated macadamia nuts, with private-label options.
3	Nuts in Bulk UK	nutsinbulk.co.uk	-	-	-	Supplier of raw, organic, and broken macadamia kernels in packs from 500 g to industrial quantities.
4	The Whole Food Guys	thewholefoodguys.co.uk	-	-	-	Retail-focused supplier offering macadamias in packs from 500 g up to 10 kg.
5	VehGroshop	vehgroshop.co.uk	-	-	-	Organic ingredients wholesaler offering raw organic macadamias suitable for private label and food manufacturing.

3. Product Types, Formats, and Consumer Trends

European consumers value macadamias for their rich, buttery flavor and versatility.

Retail formats:

• Roasted and salted kernels dominate, often marketed as premium, ready-to-eat

products.
• Flavored and value-added snacks are increasingly popular (INC 2024; CBI 2023).

Industrial formats:
• Raw and broken kernels for bakery, confectionery, and snack manufacturing.
• Bulk procurement supports ingredient use in plant-based and gluten-free products.

Trends:
• Consumers increasingly seek healthy, natural, and indulgent snack options.
• Premiumization drives willingness to pay more for specialty products.

Table 21 Type/Formats of macadamia nuts consumed in Europe

Type / Format	Description	Common Use
Raw, Shelled Kernels	Whole macadamia nuts with shells removed; unroasted and unsalted.	Used in baking, chocolate coating, or as healthy snacks (CBI 2023).
Roasted and Salted Kernels	The most popular retail format; enhances flavor and aroma.	Consumed as snack nuts or included in nut mixes (INC 2024).
Unsalted Roasted Kernels	Lightly roasted for flavor without added sodium.	Preferred by health-conscious consumers and chefs (CBI 2023).
Nut-in-Shell (NIS)	Whole macadamias with shell intact; often imported for processing.	Primarily used by manufacturers and wholesalers (INC 2024).
Macadamia Pieces and Crumbs	Broken kernels or small pieces resulting from processing.	Used in bakery, confectionery, ice cream, and dairy products (CBI 2023).
Flavored and Coated Macadamias	Coated with chocolate, honey, or spices.	Premium retail snacks and gift products (INC 2024).
Macadamia Oil	Extracted from kernels; rich in monounsaturated fats.	Used in gourmet cooking and cosmetics (CBI 2023).

4. Macadamia Consumption Preferences and Habits

Consumers in Germany, France, UK, the Netherlands, and other European markets prioritize:

• Premium, ready-to-eat products
• Roasted, salted, and flavored varieties
• Culinary versatility in desserts, ice cream, chocolate, pastries, breakfast cereals, and nut butters (Fortune Business Insights 2024)

Industrial users focus on:
• Bulk raw or broken kernels for processing
• Incorporation into gluten-free and vegan foods (CBI 2023)

5. Supply Context: Production and Imports

Europe relies heavily on imports from major production regions:

• Australia, South Africa, and Kenya are dominant suppliers.
• Preferential EU tariffs benefit African exporters, providing cost and supply advantages (Austrade 2024).
• Wholesalers balance direct sourcing with intermediary channels to maintain consistent supply and quality control.

Production practices:
• Direct sourcing partnerships with cooperatives and grower-owned companies.
• Quality assurance through on-site processing in origin countries.

Logistics:
• European packing and processing facilities allow inspection, repackaging, and distribution management (ATCO 2025).

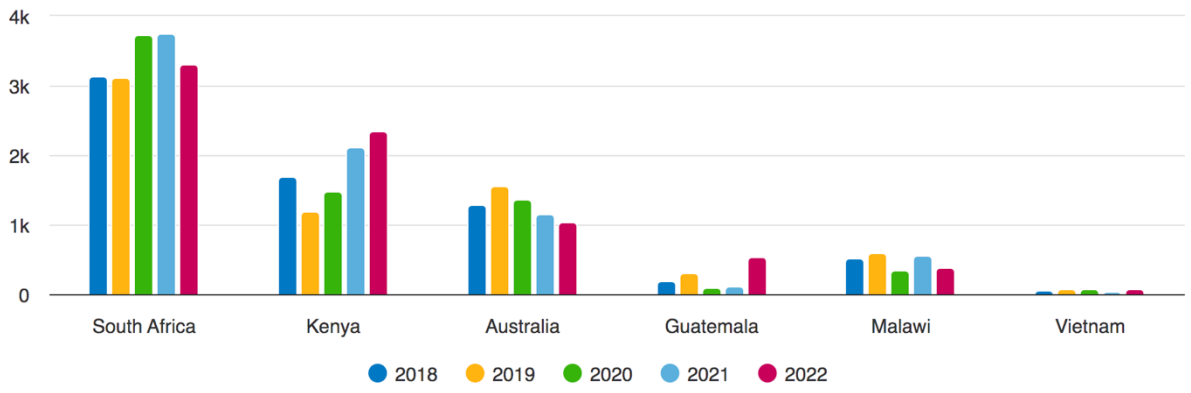


Figure 4: Leading Suppliers of Macadamia Nuts to Europe

6. Market Access Pathway

Entering the European macadamia market requires navigating:

• Strict EU regulations and quality standards
• Logistical complexities and import procedures
• Competition from established African suppliers (CBI 2024)

Success depends on:
• Consistent product quality
• Traceability and documentation
• Product innovation
• Targeted marketing emphasizing premium and health-oriented attributes

(CBI Webinar: Entering the European Macadamia Market[3])

7. Demand Drivers and Application Segments

Health & nutrition:
• Macadamias are rich in monounsaturated fats and micronutrients.
• Positioned alongside almonds and cashews in wellness-focused markets.

[3] CBI Webinar: Macadamia export opportunities in Europe - YouTube

Premiumization:
• Consumers willing to pay for luxury and specialty products.
• Associated with purity, high-end culinary experiences, and indulgence.

Lifestyle & dietary trends:
• Growth of plant-based, vegan, and gluten-free products.
• Applications include nut cheeses, vegan creams, and gluten-free pastries.

Culinary versatility:
• Ice cream, premium chocolate, cookies, breakfast granola, macadamia butter, and flavored snack blends.

Major application segments (Fortune Business Insights 2024):
• Snacks (raw, roasted, flavored)
• Ice cream & frozen desserts
• Chocolate & confectionery
• Vegan products (cheeses, creams)
• Gluten-free baked goods
• Nut butters

8. Regulatory, Quality, and Certification Requirements

Standards:
• UNECE and WMO frameworks for classification and quality control.
• Kernel grading based on size, whole vs. broken percentage; 11 styles from Style 0 (≥95% whole, >20 mm) to fine fragments (<3 mm).

Chemical properties:
• Moisture ≤1.8–2.0% (UNECE), industry best practice ≤1.5%
• Free fatty acids and peroxide values monitored

Traceability:
• Full documentation of origin, supply-chain mapping, and sustainability verification expected.

Certifications:
• Required: ISO 22000, BRC
• Optional/advantageous: Organic, Fairtrade, Rainforest Alliance (CBI 2024)

9. Market Entry Challenges

Competition & price pressure:
• Dominant suppliers: South Africa, Kenya, Malawi
• Established networks, tariff benefits, and strong quality control make price competition challenging

Tariffs & trade rules:
• Non-African producers face higher import duties; value-based positioning required

Consumer awareness:
• Limited familiarity with taste, culinary uses, and health benefits
• Marketing must educate to justify premium pricing (CBI 2024)

10. Logistics, Packaging, and Pricing Dynamics

Challenges:
• Vulnerable to oxidation, moisture, and temperature changes

Requirements:
• Controlled transport and predictable supply timing
• Packaging that preserves shelf life, prevents damage, and uses recyclable materials

Pricing:
• Retail roasted & salted macadamias can exceed €50/kg
• Export prices (Q1 2023) €9–11/kg FOB
• Value-chain margins: farmers/traders ~8%, shelling/processing ~40%, export/warehousing ~45%, roasting/packing/distribution ~50% (CBI 2024)

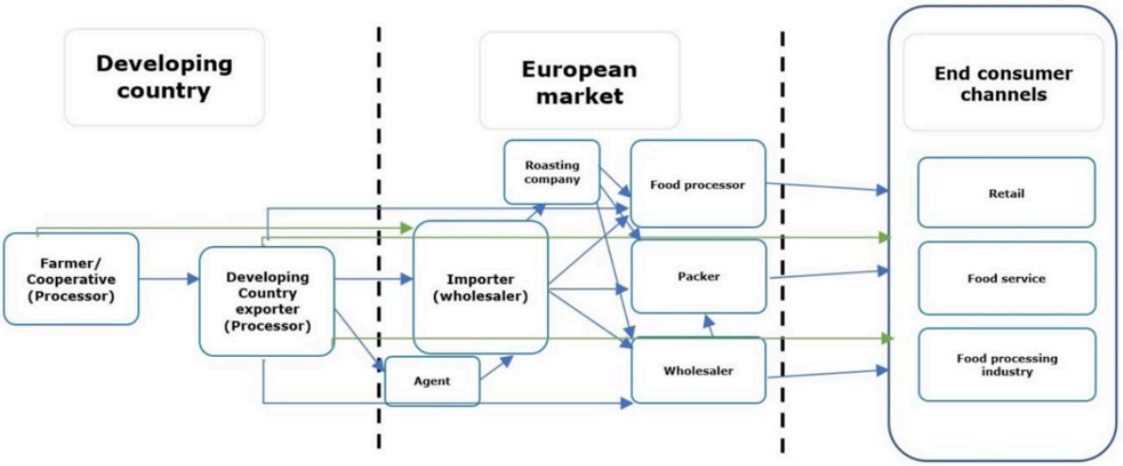
11. Sustainability Expectations

European buyers emphasize:
• Climate-neutral production
• Ethical farming and social responsibility

Documentation:
• Audits, environmental impact data, and labor compliance records strengthen market competitiveness.

Table 22 Summary of European Standards for the Quality of Macadamia Nuts

Criterion	Description
Overview	Quality requirements for macadamia nuts in Europe are primarily defined by the **UNECE (United Nations Economic Commission for Europe)**. The **World Macadamia Organisation (WMO)** has also introduced a global standard to harmonize definitions across producing countries.
Class	Nuts are categorized into two main classes: • **First Grade** – Free from visible defects. • **Commercial Grade** – Minor visual imperfections allowed. Defective nuts may be removed, trimmed, or used for oil extraction. Under UNECE guidelines, nuts are further divided into **Class I** and **Class II** based on quantitative quality measures.
Grading	Classification is based on **kernel size** and **proportion of whole nuts, halves, and pieces**. There are **11 styles**, ranging from: • **Style 0** – ≥95% whole nuts over 20 mm. • **Fine Pieces** – <3 mm. Buyer preferences may differ; for example, European roasters may mix **70% Style 1 (≥18 mm)** with **30% Style 2** before roasting.
Chemical Characteristics	Key chemical parameters include **moisture**, **free fatty acids**, and **peroxide value**. Standards generally allow **1.8–2% moisture**, but industry practice often maintains a stricter limit of **≤1.5%** to ensure freshness and quality.



Source: Autentika Global

Figure 5: European market channels for macadamia nuts

Source:
https://www.cbi.eu/market-information/processed-fruit-vegetables-edible-nuts/macadamia-nuts/market-entry

Macadamia Prices per kg/US$ — Wholesale and Retail in Major European Consumer Markets

This table summarizes available wholesale and retail price ranges per kilogram for macadamia nuts in different formats (in-shell, shelled/kernel, dried, roasted, salted, organic and non-organic) for the major European consumer countries. Where a reliable public price was not found the cell is marked "N/A".

Table 23 Available wholesale and retail price ranges of macadamia nuts in different format for the major European consumer countries

Country	In-shell (natural/raw/ dried) Wholesale	In-shell (natural/raw/dried) Retail	Shelled/Kernel Wholesale	Shelled/Kernel Retail	Roasted/Salted Wholesale	Roasted/Salted Retail	Organic, Shelled/ Kernel, Raw Wholesale	Organic Shelled/Kernel, Raw Retail	Notes / Source(s)
Germany	US$14.08 – 20.09/1 kg	US$29.35 – 56.35 / kg	N/A	US$20.1–$28.7 /kg (retail aggregate)	US$32.87 – 50/ kg (organic)	~ US$50.58 – 55.08/ kg (organic)	~ US$14.00 – 24.10/kg	US$36.39 – 56.35/kg	KoRo Drogerie, Bode Naturkost, Buxtrade. Selina Wamucii, Tradeindia, TradeWheel.
France	US$18.00 – 26.00/ kg	US$4.00 – 7.00/ kg	US$7.75 – 14.00/ kg	US$35.00 – 54.00/ kg	US$13.20 – 18.50/ kg	US$33.00 – 65.00/ kg	(shelled) US$12.00 – US$24.50 / kg	(shelled) US$45.00 – 56.00/ / kg	Retail & export trackers (SelinaWamucii; Tridge/DirTridge) Amazon.fr (Live Retail), Vrac

									engros (Organic Bulk).
Italy	US$14.09 to 17.61 per kg.	US$17.61 to 25.83 per kg (retail)	US$29.36 to 35.22 per kg. (wholesale reported)	US$35.22 to 58.70/kg (retail)	US$52.73-55.10 / kg.	N/A	N/A	US$52.73-55.10/ kg.	KoRo, Frutta a Bacche, TovaPrezzi.
United Kingdom (UK)	US$12.60 – 14.50/ kg	US$12.60 – 14.50 / kg	US$7.38 – 16.78/ kg	US$24.90 – 37.00/ kg Waitrose example: £32.50/kg (retail derived)	US$13.20 – 15.50/ kg	US$28.00 – 40.00/ kg	US$28.80 – 31.00/ kg	US$39.00 – 41.50/ kg	Waitrose product page; Alibaba listings. Nuts in Bulk UK (Live Wholesale/Retail), Selina Wamucii UK.
Spain	US$3.50 – 6.50/ kg	US$17.00 – 24.00/ kg	US$10.50 – 16.50/ kg	US$32.00 – 52.00/ kg	US$13.00 – 17.00/ kg	US$34.00 – 58.00/ kg	US$32.00 – 52.00/ kg	US$42.00 – 55.00/ kg	Alibaba Wholesale (Regional Import/Export), Marquis Macadamias (2025 Global Benchmarks).

Conclusion

Europe offers strong potential for macadamia exporters, driven by premium, healthy, and versatile product demand.

Key success factors:
• Consistent high-quality products
• Compliance with EU regulations and certifications
• Strong brand identity and consumer education
• Value-added innovation and sustainability leadership
• Strategic partnerships with importers

Although African suppliers remain dominant, new entrants can succeed through targeted strategies, traceability, and premium positioning (Tradeimex 2025; Fortune Business Insights 2025; CBI 2023).

Organic Certification Requirements for Nuts in the European Union

Overview

Organic certification is a legal requirement for marketing nuts as organic in the European Union (EU). The regulatory framework establishes harmonized standards governing production, processing, labelling, and imports. Compliance applies to both EU-based and non-EU operators and is verified through certification by accredited control bodies and ongoing official controls.

1. Regulatory Framework

Organic production in the EU is governed by **Regulation (EU) 2018/848**, which has been applied since 1 January 2022. This regulation provides the legal basis for organic farming, processing, certification, and labelling across all EU Member States, replacing Regulation (EC) No. 834/2007 (European Union 2018; European Commission 2022).

Under this framework, organic nut production is based on the following core principles:

- Prohibition of synthetic pesticides, herbicides, and mineral fertilizers
- Ban on genetically modified organisms (GMOs)
- Maintenance of soil fertility through natural and biological processes
- Protection of biodiversity and natural ecosystems

These requirements apply equally to:

- Nuts produced within the EU
- Organic nuts imported from non-EU (third) countries

(European Union 2018).

2. Certification Requirements

2.1. Scope of Certification

Organic certification is mandatory for all operators involved in the organic nut supply chain, including:

- Primary producers (nut growers)
- Processors (e.g., shelling, roasting, blanching, packaging)
- Traders and wholesalers
- Importers placing organic nuts on the EU market

Certification must be conducted by an **EU-recognized control body or authority** (European Commission 2022; CBI 2023). Each Member State has multiple accredited certifiers. Three of the main European certification bodies are listed below: **Germany: CERES GmbH (Certification of Environmental Standards)**. **France: ECOCERT SAS**. **Italy: ICEA (Istituto per la Certificazione Etica e Ambientale)**.

2.2. Certification Procedure

The organic certification process typically involves the following steps:

- **Implementation of organic practices** in accordance with EU regulations
- **Conversion period** for conventional land transitioning to organic production
  - Generally two years for nut orchards
- **Application for certification** with an accredited control body
- **On-site inspection and audit**, covering:
  - Production methods
  - Input use
  - Record-keeping and traceability
  - Measures to prevent contamination or mixing with non-organic products
- **Issuance of organic certificate**, usually valid for one year
- **Annual inspections and recertification** to maintain organic status

(European Union 2018; European Commission 2022).

To support small-scale producers, **group certification** is permitted under EU rules, allowing multiple operators to be certified under a shared internal control system (European Commission 2022).

3. Import Requirements for Organic Nuts

3.1. Electronic Certificate of Inspection (e-COI)

All organic nuts imported into the EU must be accompanied by an **electronic Certificate of Inspection (e-COI)**, which is mandatory for customs clearance and market access.

Key requirements include:

- Issuance and validation of the e-COI through the **TRACES** system
- Verification that the product complies with EU organic rules
- Validation prior to release of the goods for free circulation

Without a valid e-COI, consignments cannot be marketed as organic in the EU (European Commission 2022).

3.2. Certification of Third-Country Operators

Organic nuts produced outside the EU may enter the EU market through one of the following routes:

- Production in a **third country recognized by the EU** as having equivalent organic standards (e.g. U.S.A.)
- Certification by an **EU-recognized control body** operating in the exporting country

In both cases, full traceability and compliance with Regulation (EU) 2018/848 are required (European Commission 2022).

4. Labelling Requirements

Certified organic nuts may display the **EU organic logo**, provided that labelling requirements are met.

Key labelling obligations include:

- At least **95 percent of agricultural ingredients by weight** must be organic (for processed products)
- Display of the **control body code number**
- Indication of the **origin of agricultural raw materials**, such as:
  - "EU agriculture"
  - "Non-EU agriculture"
  - "EU/non-EU agriculture"

Labelling must also comply with general EU food information and consumer protection legislation (European Union 2018; European Commission 2022).

5. Operational and Market Considerations

Operators handling organic nuts must ensure strict controls throughout the supply chain, including:

- **Physical separation** of organic and non-organic products
- **Administrative separation**, supported by clear documentation
- **Comprehensive record-keeping** to ensure traceability and facilitate inspections

(European Union 2018).

From a market perspective:

- Demand for organic nuts in the EU continues to grow
- Compliance with organic certification standards is a **prerequisite for market access**
- Certification enhances credibility and competitiveness in the European organic sector

(CBI 2023).

Fair Trade Certification in the European Union

1. Definition

Fair trade refers to a trading partnership based on **dialogue, transparency, and respect** that seeks **greater equity in international trade** and supports sustainable development by offering better trading conditions to marginalized producers and workers, especially in developing countries. This concept was defined in the EU context following international fair trade principles and emphasizes decent working conditions, fair prices, and sustainable supply chains (Eur-Lex+1).

Fair trade certification is a **product certification** indicating that a product has been produced and traded according to agreed ethical standards. The most widely used system within and beyond the EU is the **International Fairtrade Certification Mark** (IFCM) overseen by **Fairtrade Labelling Organizations International (FLO)** and audited by an independent certifier (FLO-CERT). (Wikipedia+1).

2. Standards and Criteria

Fairtrade certification embeds comprehensive **social, economic, and environmental criteria** designed to ensure fairness and sustainability in agricultural production. These standards apply to farmers' cooperatives, plantations with hired labour, and supply chain actors who buy and sell Fairtrade products. Key elements include:

- **Minimum price and Fairtrade Premium:** Producers receive a guaranteed minimum price to cover costs of sustainable production plus an additional premium for community development (Fairtrade).
- **Labour rights and conditions:** Standards reflect obligations under **International Labour Organization (ILO) conventions**, including bans on child and forced labour, safe workplaces, and respect for workers' rights (Eur-Lex).
- **Environmental stewardship:** Practices should protect the environment and comply with sustainable production methods (Eur-Lex).
- **Traceability and transparency:** Supply chains must be transparent and independently audited to maintain integrity of the certification (Fairtrade).

The Fairtrade certification process involves regular **audits and verification** by FLO-CERT, which inspects farms, verifies documentation, and conducts confidential interviews to assess compliance (Fairtrade).

3. EU Policy, Certification, and Challenges in Fair Trade

The EU does not have its own legal fair trade label but **supports private certification schemes and encourages public authorities to integrate fair trade into procurement and development policies.** Since the 1990s, the European Parliament has noted the **sector's reliance on voluntary standards and the risk of misleading claims**.

Recent legislation, including the **2024 Empowering Consumers Directive, mandates third-party verification of sustainability claims and clarifies the use of terms like "fair" and "equitable."**

The Fairtrade Certification Mark is widely recognized across the EU for products such as coffee, cocoa, tea, and bananas, with consumer demand driven by ethical and sustainability considerations. However, small producers, particularly outside the EU, face financial and administrative challenges, and the lack of a unified legal framework creates uncertainty and potential misuse of the term “fair trade.”

Comparing Organic and Fairtrade Certifications in the EU

1. General Overview

The difference between **Organic** and **Fairtrade** certifications lies primarily in their focus and benefits for producers.

- **Organic certification** emphasizes environmentally sustainable farming practices, such as avoiding synthetic chemicals, promoting soil health, and enhancing biodiversity.
- **Fairtrade certification** prioritizes fair economic conditions for farmers, including minimum prices, fair wages, and community development projects.

While Organic mainly addresses environmental and production standards, Fairtrade focuses on social and economic equity, though it also encourages sustainable practices.

Understanding these differences helps producers make informed decisions about which certification—or combination of both—best supports their farming methods, market opportunities, and social impact goals.

Table 24 Organic Certification VS Fairtrade Certification in the EU

Aspect	Organic	Fairtrade
Primary focus	Sustainable, chemical-free farming practices and soil/landscape health.	Fair economic conditions, minimum prices, and community benefits for producers.
Scope of standards	Limits synthetic pesticides, artificial fertilizers, GMOs; promotes biodiversity & soil health.	Includes social, economic & environmental standards; ensures fair pay and community support.
Environmental criteria	Central requirement; prohibits most synthetic inputs, requires land management practices.	Encourages environmentally friendly practices, but less strict than organic.
Economic benefit for farmers	No guaranteed price; potential market premium.	Fairtrade Minimum Price ensures income security; Fairtrade Premium funds community projects.
Social outcomes	Not a direct focus; may improve farmer health via reduced chemical exposure.	Emphasizes collective organization, labor rights, gender equity, and community investments.
Certification costs & barriers	Can be costly and paperwork-heavy; fees + compliance requirements.	Costs exist, but producer networks support training and market access.
Market positioning	Appeals to consumers seeking natural/chemical-free products.	Appeals to consumers seeking fair labor and livelihood outcomes; often combined with organic.

Compatibility	Can be combined with Fairtrade; many products carry both labels.	Encourages organic transition; many Fairtrade products are organic or in conversion.

2. Notes for Lao agricultural producers

- **Organic certification** may improve environmental sustainability and potentially command higher market prices, but it requires strict compliance and costs that might be significant for small farms (Fairtrade Foundation+1).
- **Fairtrade certification** helps stabilize income through minimum prices and community premiums, strengthens producer organization, and can support transitions toward better environmental practices (Fairtrade Foundation).
- **Dual certification (Organic + Fairtrade)** is common and can unlock premium markets that value both environmental and socio-economic attributes, often resulting in higher prices and better sustainability outcomes than either certification alone (Fairtrade Australia New Zealand).

Overview of the Macadamia Market in United States

Introduction

The United States is a major consumer market for macadamia nuts and one of the fastest-growing premium nut markets globally, although market size estimates vary across sources. Current projections place the U.S. macadamia market between approximately USD 150–400 million in 2024, with forecasts suggesting growth to USD 750 million–1 billion by 2035, depending on methodology (Market Research Future 2024; Prophecy Market Insights 2024). Despite these variations, all sources point to strong long-term growth, supported by rising demand for premium, healthy, and value-added nut products. Globally, macadamia nuts are positioned as a high-value category, with North America accounting for a substantial share of consumption (Grand View Research 2023).

Structurally, the U.S. market is characterized by:

- High levels of consumption
- Limited domestic production
- Heavy reliance on imports

This structure makes the U.S. market particularly attractive to international suppliers (Tridge 2025).

Table 25 Macadamia Market Projections in United States

Source	2022/2024 Value (USD)	2030/2035 Projection (USD)	CAGR (%)
Market Research Future	157.5 million (2024)	757.5 million (2035)	15.35%
Prophecy Market Insights	0.4 billion (2024)	1.0 billion (2035)	10.1%
Grand View Research (Global)	1.58 billion (2022)	3.57 billion (2030)	–
North America Share (2022)	–	37.9% of global market	–

1. Major Macadamia Wholesalers in the United States

The following table summarizes key macadamia nut wholesalers operating in the US market, including their contact details and product focus.

Table 26: Major Macadamia Wholesalers in the United States

Company	Website	Address	Phone	Email / Contact	Overview
Napa Nuts	https://www.napanuts.com	1755 Industrial Way #6, Napa, CA 94558, USA	+1 707 226 6083	info@napanuts.com	Offers bulk macadamia nuts (whole, halves, pieces) in roasted and raw varieties.
C.J. Dannemiller Co.	https://www.cjdannemiller.com	5300 S Hametown Rd., Norton, OH 44203, USA	+1 800 624 8671 / +1 330 825 7808	sales@cjdannemiller.com	Long-standing nuts and seeds wholesaler supplying bulk macadamia nuts.
Macadamia.US (Treat Of The Day LLC)	https://www.macadamia.us	Not publicly listed (US-based)	+1 888 824 7629	Website contact form	Supplies wholesale cases of macadamia nuts; ISO/FSSC certified; focused on wholesale distribution.
House of Macadamias	https://www.houseofmacadamias.com	Not publicly listed	Not publicly listed	Website contact form	Wholesale supplier of macadamia nuts and value-added products (butters, oils, milk); minimum order of four cases.
OFI (Olam Food Ingredients)	https://www.ofi.com/en-us/nuts/macadamias	24 E Washington St, Ste 1000, Chicago, IL 60602, USA	+1 630 320 7300	“Get in Touch” form	Large-scale ingredient supplier of macadamia nuts, suitable for industrial and food manufacturing buyers.

2. Product Types, Formats, and Consumer Trends

Macadamia nuts in the U.S. are marketed primarily as **shelled kernels**, as in-shell nuts remain a small niche due to handling constraints. Kernels are sold in multiple formats to serve different market segments:

- Whole kernels
- Halves or blends
- Pieces or chips

Processing and product differentiation play a critical role in market positioning. Key product types include:

- **Raw or unroasted kernels**, favored for baking, health-focused consumption, and further processing
- **Roasted and salted kernels**, which dominate snack retail
- **Flavored and coated macadamias** (e.g. chocolate- or honey-coated), positioned as premium or gift products

Demand for **organic and sustainably sourced macadamia** is increasing, particularly in specialty retail and health-oriented channels. Distribution is also evolving, with strong growth in:

- E-commerce platforms

- Direct-to-consumer sales
- Specialty retail and food service

(Market Research Future 2024; Fortune Business Insights 2024).

Table 26 Typologies & Estimated Percentage Shares in United States

Typology / Format	Description & Market Notes	Approximate U.S. Share*
Shelled kernels (whole/halves/blends/pieces)	Ready-to-eat or ingredient use; convenience drives majority consumption.	~ 65–75 %
Unshelled (in-shell) nuts	Nuts still in hard shell; niche segment due to cracking requirement.	~ 25–35 %
Raw / unroasted kernels	Minimal processing appeals to health-conscious consumers and baking markets.	~ 45–55 % of shelled format
Roasted kernels (dry or oil roasted)	Snack-focused format; includes salted or unsalted options.	~ 30–40 % of shelled format
Salted kernels	Seasoned snack form; often overlaps with roasted kernels.	~ 30 % of shelled format
Unsalted / natural kernels	Raw or roasted kernels without added salt; health/ingredient usage.	~ 15–20 % of shelled format
Coated / flavored kernels	Value-added segment; chocolate, honey, or other flavored coatings; premium positioning.	~ 10 %
Organic / certified natural kernels	Growing segment as consumers value sustainable and “health-first” snacks; still smaller than conventional.	~ 15–20 %

*Percentages are approximate; exact U.S. data by typology are not publicly reported but inferred from global trends and U.S. market observations

Table 27 Macadamia Prices in United States: Wholesale and Retail

Country	In-shell (natural/raw/dried) Wholesale	In-shell (natural/raw/dried) Retail	Shelled/Kernel Wholesale	Shelled/Kernel Retail	Roasted/Salted Wholesale	Roasted/Salted Retail	Organic Wholesale	Organic Retail	Notes / Source(s)
United States	US$4.22 – 6.50	US$15.00 – 28.00	US$6.83 – 13.67	US$35.00 – 55.00	US$8.50 – 15.50	US$40.00 – 70.00	US$12.00 – 18.50 (shelled)	US$54.00 – 89.00	Bureau of Labor Statistics (BLS) International Nut & Dried Fruit Council (INC) Mordor Intelligence Selina Wamucii SkyQuest Technology The Business Research Company Tridge U.S. Department of Agriculture (USDA) Economic Research Service (ERS) World Macadamia Organisation

3. Macadamia Consumption Preferences and Habits in the United States

In the United States, macadamia nuts are primarily consumed as a **premium product** rather than as an everyday staple. Consumption is concentrated among **middle- to high-income consumers** who are willing to pay higher prices for quality, flavor, and perceived health benefits (Fortune Business Insights 2024).

Macadamias are most commonly purchased:

- In shelled form
- As ready-to-eat snacks
- As ingredients in bakery, confectionery, and gourmet food products

U.S. consumer preferences vary by use case:

- **Roasted and lightly salted macadamias** dominate the snack segment
- **Raw kernels** are preferred by health-conscious consumers and for home baking and food service
- **Flavored and coated macadamias** are more closely associated with gift purchases, seasonal demand, and specialty retail

Purchasing behavior is increasingly influenced by:

- Health and wellness considerations
- Interest in plant-based fats and clean-label products
- Ethical and sustainable sourcing

However, macadamias compete with lower-priced nuts such as almonds and cashews, making **branding, packaging, and storytelling** critical to driving perceived value and repeat purchases (Grand View Research 2023; Fortune Business Insights 2024).

4. Supply Context: Production and Imports

U.S. domestic macadamia production is limited and largely concentrated in **Hawaii** and does not meet national demand. As a result, the U.S. market depends heavily on imported kernels, which are used for:

- Direct retail sale
- Further processing (roasting, flavoring, packaging)

Import data shows consistent inflows from a wide range of producing countries, reflecting the global nature of the supply chain and creating clear market access opportunities for foreign producers that meet U.S. quality and regulatory standards (Tridge 2025; Volza 2025).

5. Market Access Pathway

Entering the U.S. macadamia market typically involves the following steps:

1. Defining product specifications (format, quality, certification)
2. Meeting U.S. regulatory and food safety requirements
3. Identifying buyers and channels (importers, wholesalers, processors, specialty retailers)
4. Establishing logistics and landed cost structures

5. Positioning the product within premium retail or ingredient supply segments

Most foreign suppliers enter the market through partnerships with **U.S.-based importers or distributors**, who manage domestic logistics and market access.

6. Demand Drivers and Application Segments

Demand in the U.S. macadamia market is driven by:

- Health and wellness trends, including demand for plant-based fats and premium snacks
- Premium and gourmet positioning, particularly in confectionery and specialty retail
- Product diversification, including flavored nuts, nut butters, and dairy alternatives

Key application segments include:

- Retail snack products
- Bakery and confectionery
- Food service and hospitality
- Ingredient supply for processors and manufacturers
- Limited non-food uses (e.g. cosmetics via macadamia oil)

(Market.us 2024; Grand View Research 2023).

7. Regulatory, Quality, and Certification Requirements

Macadamia nuts imported into the U.S. must comply with **Food and Drug Administration (FDA) food safety regulations**, including Preventive Controls for Human Food, Good Manufacturing Practices, and facility registration. As a low-moisture food, macadamias still require controls against pathogens such as *Salmonella* (U.S. FDA 2024).

Key regulatory and quality requirements include:

- Tariff classification under **HTSUS 0802.62** (shelled macadamia nuts)
- Country-of-origin labeling (COOL)
- Allergen declaration (tree nuts)
- Compliance with contaminant limits (pesticide residues, heavy metals, mycotoxins)

Although formal USDA grading standards for macadamias are limited, U.S. buyers expect:

- Consistent sizing and kernel integrity
- Low defect rates and uniform color
- Controlled moisture content
- Acceptable chemical indicators (e.g. peroxide value, free fatty acids)

Voluntary certifications such as **organic, Fair Trade, or sustainability schemes** can enhance market access, particularly in premium channels, but all claims must be verifiable and compliant with U.S. labeling rules (USDA AMS 2024).

8. Market Entry Challenges

Key challenges for new entrants include:

- Price pressure from expanding global supply
- Competition from established brands and Hawaiian producers
- High expectations for quality, consistency, and documentation

- Limited consumer awareness compared to more common nuts

To succeed, suppliers must clearly differentiate on **quality, origin, sustainability, or value-added processing**.

9. Logistics, Packaging, and Pricing Dynamics

Macadamia kernels require careful moisture and temperature control due to high fat content and oxidation risk. Packaging formats vary by channel:

- Bulk sacks or cartons for ingredient buyers
- Consumer packs with resealable, oxygen-barrier materials for retail

Pricing reflects:

- FOB price
- Freight and insurance
- Import duties
- Inland logistics
- Value-added processing

While U.S. consumers accept premium pricing, margins depend on efficient logistics and consistent quality (Market.us 2024).

10. Sustainability Expectations

U.S. buyers increasingly prioritize:

- Traceability and transparency
- Ethical labor practices
- Environmental sustainability

Certifications, clear origin information, and sustainable packaging can provide differentiation, but sustainability claims must be supported by verifiable documentation.

Conclusion

The U.S. macadamia market offers strong growth potential driven by health trends, premium positioning, and import dependence. However, it is a demanding market that requires strict regulatory compliance, high quality standards, efficient logistics, and clear product differentiation. Exporters that combine reliable supply with strong market positioning and strategic partnerships can access a profitable and expanding market segment in the United States.

Organic Certification Requirements for Nuts in the United States

Overview

Organic certification is required to market nuts as organic in the United States. The regulatory framework is administered at the federal level under the **United States Department of Agriculture (USDA) National Organic Program (NOP).** The system establishes uniform standards for organic production, processing, labelling, and imports. Compliance applies to domestic and foreign operators and is verified through certification by USDA-accredited certifying agents and ongoing oversight.

1. Regulatory Framework

Organic production in the United States is regulated under the **Organic Foods Production Act of 1990 (OFPA)** and its implementing regulations codified at **7 CFR Part 205**. These regulations are administered by the **USDA Agricultural Marketing Service (AMS)** through the National Organic Program (NOP).

The U.S. organic framework defines organic production as a system that integrates cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity. For nut production, the core regulatory principles include:

- Prohibition of synthetic pesticides, herbicides, and fertilizers (unless specifically allowed on the National List)
- Prohibition of genetically modified organisms (GMOs)
- Emphasis on soil fertility management through natural inputs and crop-based practices
- Preventive pest, weed, and disease management strategies

These requirements apply to:

- Nuts produced within the United States
- Organic nuts imported from foreign countries

2. Certification Requirements

2.1 Scope of Certification

Organic certification is mandatory for most operations involved in the organic nut supply chain, including:

- Nut growers and orchard operators
- Processors (e.g., shelling, roasting, blanching, packaging)
- Handlers, traders, and wholesalers
- Importers and exporters of organic nuts

Certification must be carried out by a **USDA-accredited certifying agent**, which may be a public or private entity operating within the U.S. or abroad.

Operations with annual organic sales below **USD 5,000** are exempt from certification but must still comply with organic production and labelling rules.

2.2 Certification Procedure

The organic certification process under the USDA NOP generally includes the following steps:

- **Development of an Organic System Plan (OSP)** detailing:
  - Production practices
  - Inputs and substances used
  - Monitoring and record-keeping systems
- **Application to a USDA-accredited certifying agent**
- **On-site inspection**, covering:
  - Production and handling practices
  - Input records and supplier documentation
  - Measures to prevent commingling and contamination
- **Certification decision** issued by the certifying agent
- **Annual updates to the Organic System Plan**
- **Annual inspections and continued compliance verification**

For land transitioning from conventional to organic nut production, a **36-month transition period** is required from the last application of a prohibited substance before crops may be sold as organic.

3. Import Requirements for Organic Nuts

3.1 Import Documentation and Oversight

All organic nuts imported into the United States must comply with USDA NOP requirements and be certified to U.S. organic standards.

Key import requirements include:

- Certification by a **USDA-accredited certifying agent**
- Documentation demonstrating compliance with U.S. organic regulations
- Participation in the **NOP Import Certificate** system for traceability and fraud prevention

Organic imports are subject to verification and enforcement by USDA and U.S. Customs and Border Protection.

3.2 Foreign Certification and Equivalency Arrangements

Foreign producers and processors may access the U.S. organic market through:

- **Direct certification** to USDA NOP standards by a USDA-accredited certifying agent, or
- **Equivalency arrangements** between the U.S. and certain countries or regions (e.g., the EU, Canada, Japan, Switzerland), subject to specific conditions and limitations

In all cases, imported organic nuts must meet U.S. organic production, handling, and labelling requirements.

4. Labelling Requirements

Organic nuts marketed in the United States must comply with USDA organic labelling rules.

Key labelling categories include:

- **“100 percent organic”**
  - All ingredients and processing aids are organic
- **“Organic”**
  - At least 95 percent organic agricultural ingredients
- **“Made with organic [ingredients]”**
  - At least 70 percent organic ingredients (cannot use USDA organic seal)

For eligible products, labelling requirements include:

- Display of the **USDA Organic seal** (optional for “organic” products)
- Identification of the **certifying agent**
- Compliance with general U.S. food labelling laws

5. Operational and Market Considerations

Certified organic operators must maintain robust systems to ensure integrity throughout the supply chain, including:

- **Physical separation** of organic and non-organic nuts
- **Prevention of contamination** from prohibited substances
- **Comprehensive record-keeping**, typically retained for at least five years
- **Corrective actions** in response to non-compliance findings

From a market perspective:

- The United States represents one of the world’s largest markets for organic nuts
- USDA organic certification is a key trust signal for consumers
- Compliance is essential for domestic sales and for exports to markets that recognize USDA organic standards

6. Fair Trade Certification in the United States

Fair Trade certification in the United States is a **voluntary, market-driven system** aimed at promoting ethical trade, better livelihoods for producers, and more sustainable supply chains. The US government does not define or regulate fair trade through law; instead, certification operates entirely through **private standards and consumer-facing labels**.

Key features of Fair Trade certification in the US include:

- **Voluntary private certification:** Fair trade labels are managed by non-governmental organizations rather than public authorities.
- **Economic protections for producers:** Certified producers may receive minimum prices and community premiums intended to reduce exposure to market volatility.
- **Social standards:** Certification typically includes requirements on labor rights, safe working conditions, and the prohibition of child and forced labor.
- **Environmental practices:** Sustainable production is encouraged, though environmental requirements are generally less strict than organic certification.
- **Multiple certification schemes:** The US market includes several “fair trade” labels with differing standards, which can create inconsistency and consumer confusion.

Fair trade products are most common in the US in commodities such as **coffee, cocoa, tea, bananas, and sugar**, with demand driven largely by consumer ethics and corporate sustainability commitments rather than regulation.

7. Comparison with Fair Trade Certification in the European Union

While Fair Trade certification in the US and the EU is based on **similar international principles**, important differences exist. In the **European Union**, fair trade is more closely embedded in public policy, procurement practices, and sustainability regulation, even though certification remains voluntary. EU consumer protection laws increasingly require **verified sustainability claims**, strengthening the credibility and consistency of fair-trade labels. In contrast, the US relies more heavily on market trust and voluntary disclosure, with fewer legal safeguards against misleading “fair trade” claims.

As a result, **Fairtrade certification in the EU tends to offer greater market recognition, clearer labeling, and stronger consumer confidence** than in the US.

8. Implications for Lao Macadamia Farmers

For **Lao macadamia farmers**, Fairtrade certification linked to the **European market** is generally the more advantageous option. The EU offers stronger demand for ethically certified products, clearer regulatory support, and greater price premiums for certified goods. While Fair Trade certification can also be valuable in the US, the fragmented certification landscape and weaker regulatory backing reduce its reliability and market impact. Overall, targeting **EU-aligned Fairtrade certification—ideally combined with Organic certification—offers the strongest potential benefits** in terms of income stability, market access, and long-term sustainability for Lao producers.

Macadamia Market Overview in China

Overview

China has emerged as one of the world's largest consumers of macadamia nuts, surpassing North America in 2022 on a kernel-equivalent basis. Domestic production is growing, particularly in Yunnan province (Lincang, Dehong, Xishuangbanna), although quality and scale remain limited, with annual shelled production estimated at 60,000–70,000 tons. In-shell production at 3.5% moisture reached approximately 67,900 metric tons in 2023. Imports remain significant, with around 84,000 tons of in-shell macadamia reported in 2023. While macadamias were traditionally consumed primarily during the Chinese New Year, now about 40% of consumption occurs outside that period, driven by casual snacking.

1. Major Macadamia Wholesalers in China

China's macadamia market is served by a mix of domestic processors, international importers, and distributors. Key players often include:

- Domestic producers and processors in Yunnan, who supply both in-shell and kernel products.
- International importers sourcing from Australia, South Africa, and other macadamia-producing regions.
- E-commerce platforms (Tmall, JD.com) and offline distributors that cater to gift, snack, and premium retail segments.

2. Product Types, Formats, and Consumer Trends

- **In-shell nuts:** Represent roughly 50% of the market and remain dominant for gifting and festive occasions.
- **Kernel snacks:** Plain, flavored, and coated kernels account for ~45% of the market, with demand projected to grow from 1,000 t in 2022 to 8,000 t by 2027 (kernel-equivalent).
- **Other formats:** Nut powders, macadamia milk, and ingredient forms make up ~5% of the market.

Consumer trends include rising interest in health benefits, snack innovation (e.g., flavored and coated kernels), and diversified gifting formats beyond seasonal peaks.

3. Macadamia Consumption Preferences and Habits

- Health-conscious consumption: Chinese consumers value macadamias for digestive health, heart health, and nutritional benefits (healthy fats, fiber, low glycemic index).
- Gifting remains significant, particularly in-shell nuts during festivals, but more casual snacking is expanding.

- Snack and ingredient use is growing, including confectionery, bakery, ice cream, and plant-based products.

4. Supply Context: Production and Imports

- Domestic production in Yunnan is expanding but remains limited in scale and consistency.
- Imports remain crucial to meet growing demand, primarily from Australia, South Africa, and other exporting countries.
- Production challenges include quality variability, fragmented processing, and limited scale.

5. Market Access Pathway

- Partner with local distributors and importers familiar with retail, e-commerce, and gift channels.
- Participate in trade shows (e.g., China Nut & Dried Fruit Expo) to establish connections.
- Build brand awareness through education campaigns emphasizing health benefits, provenance, and premium positioning.
- Adapt product formats for Chinese tastes (crispy coated flavors, smaller snack packs, nut powders).

6. Demand Drivers and Application Segments

Key Demand Drivers:

- Health and nutrition awareness.
- Premium gifting culture, particularly around festivals.
- Snacking innovation and e-commerce expansion.
- Growing use in food processing: confectionery, nut powders, plant-based products.

Application Segments:

- In-shell nuts (~50%)
- Kernel snacks (~45%)
- Other formats, including powders and ingredient forms (~5%)

7. Regulatory, Quality, and Certification Requirements

- **Registration:** Overseas producers must register with China's General Administration of Customs.
- **Food safety compliance:** HACCP, microbiological criteria, aflatoxin testing, moisture control, and traceability are required.
- **Labeling:** Chinese language labeling, nutritional facts, origin, and importer information.

- **Certifications:** HACCP, ISO, FSSC 22000, organic, or sustainable certifications enhance market positioning.

8. Market Entry Challenges

- **Competition & price pressure:** Fragmented domestic production and many small processors create downward price pressure; imported macadamias must compete with local sourcing.
- **Tariffs & trade rules:** Shelled macadamias face a 48% duty; other formats up to 50%. Customs procedures are complex.
- **Product awareness:** Limited knowledge about nutritional benefits beyond gifting; consumer education is essential.
- **Brand differentiation:** Origin, quality, and traceability are crucial to avoid a race to the bottom on price.

9. Logistics, Packaging, and Pricing Dynamics

- **Shipping & storage:** In-shell nuts are bulky; kernels require cool, dry conditions, moisture control, and modified-atmosphere packaging.
- **Packaging:** Dual strategy for gift and snack segments; resealable, portable packs for everyday use, premium decorative packs for gifting.
- **Distribution:** Combination of e-commerce, domestic warehousing, and retail.
- **Pricing:** High tariffs increase landed costs. Premium positioning, economies of scale, and differentiated product offerings are critical to justify prices.

10. Sustainability Expectations

- Chinese consumers increasingly value sustainability, provenance, and responsible sourcing.
- Certifications like Rainforest Alliance, organic, or sustainable nut production improve credibility.
- Traceability systems demonstrating farm-level practices and environmental responsibility are differentiators in the premium segment.

Conclusion

China’s macadamia market offers substantial growth opportunities driven by health trends, gifting, and snack innovation. Success requires navigating high import tariffs, complex regulatory registration, fragmented competition, and consumer education. Exporters that focus on product innovation, local partnerships, sustainability, and traceability can establish a strong foothold in both the in-shell and kernel segments.

Overview of Macadamia Cultivation, Processing, Marketing and Consumption in Xishuangbanna, China

1. Cultivation

Introduction

The Dai Autonomous Prefecture of Xishuangbanna in southern Yunnan is one of China's largest macadamia nut producing areas. Macadamia is also largely planted in Yunnan's prefectures and sub-regions of Lincang, Baoshan, Dehong, and Pu 'Er. Similarly to other products grown in Xishuangbanna, the macadamia production landscape is quite variegated and involves different actors. Currently, there are three main categories of macadamia growers in Xishuangbanna: smallholders from hill villages, state farm farmers, and two large companies, namely the **Xishuangbanna Yunkun Macadamia Technology Development Co., Ltd. (XYMTDC)** (Xishuangbanna yunken aozhou jianguo kezhi kaifa youxian gongsi) and the **Yulin** . It is likely that small entrepreneurs are growing the nut in the region on contract farming with villagers or by leasing land from the latter. However, during the short-term investigation, it was not possible to collect any data that confirms this supposition.

1.1 State and Private-Led Macadamia Investments

A. Xishuangbanna Yunkun Macadamia Technology Development Co., Ltd.

Overview

Xishuangbanna Yunkun Macadamia Technology Development Co., Ltd. (XYMTDC) (西双版纳云垦澳洲坚果科技开发有限公司) is a state-owned enterprise established in 2008. The company is affiliated with the Yunnan Province Institute of Scientific Research for Tropical Crops (YPISRTC), which first introduced macadamia to Xishuangbanna in 1980. With the Institute's technical support, XYMTDC focuses on macadamia planting, processing, and marketing.

Founding and Development

The YPISRTC began experimental macadamia trials in Xishuangbanna 1980, developing hybrid varieties suited to local climate and altitude. Building on this work, XYMTDC was created to expand macadamia cultivation on a larger scale. The company produced its own saplings and began planting on former rubber plantation land in Jingha and Ganlanba townships, on state farms (e.g., State Farm No. 3 near Jinghong), and on state communal land.

Saplings were also distributed to villages—primarily Hani (Akha) and Bulang communities—located in mid-slope areas of Jinghong Municipality, including Ganlanba, Jingha, Bulangshan, and Dadugan. Farmers received technical training in planting, management, and harvesting.

Shift in Production Model

XYMTDC's macadamia expansion was carried out in cooperation with the Yunnan provincial government and the Xishuangbanna Dai Autonomous Prefecture. The initiative aimed to provide farmers with new income sources and to replace aging, low-yielding rubber trees planted in the 1960s on state farms.

To date, the company manages about **10,000 mu** (**666.67 hectares**) of macadamia, including **5,600 mu** (**≈ 373.33 hectares) in Jingha Township**, home to the first macadamia plantations established in China. The company sources nuts from its own plantations, former state farm members, and individual farmers.

Production and Quality

According to an informant from a processing company associated with the company, macadamia produced under XYMTDC and the Institute's guidance is considered to be of relatively lower quality compared with nuts grown by large private competitor in Xishuangbanna, ***Greenfield Agriculture and Forestry Group***. The Institute's growing standards are viewed as less rigorous. XYMTDC does not produce organic macadamia. Farmers supplying the company use chemical fertilizers to increase yields and do not follow organic production practices.

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B. Greenfield Agriculture and Forestry Group (Luye Nonglin Jituan)

Overview

Greenfield Agriculture and Forestry Group (绿野农林集团) is China's largest enterprise involved in macadamia cultivation, processing, and marketing. Founded in 2013 and headquartered in Mengyang Town, north of Jinghong in Xishuangbanna, the privately owned company manages 10,000 mu (about 666.7 hectares) of macadamia plantations in Nannuo Shan, Menghai Township.

Founding and Development

The company was established by Mr. Zhang Shifeng, an entrepreneur from Jiangxi with previous experience in telephone technology manufacturing and real estate in Shenzhen. After his earlier ventures became less profitable, he explored opportunities in macadamia cultivation following a trip to Australia. He assembled a team of experts and conducted multiple study tours in Queensland to learn macadamia planting and processing techniques.

Greenfield imported Australian seedlings and subsequently developed hybrid varieties better suited to local climate and soil conditions. The company continues to innovate by producing higher-yielding, more resilient, and higher-quality seedlings, as older varieties have shown declining productivity.

Shift in Production Model

Initially, the company implemented macadamia extension programs in Menghai Township villages under an agreement with the Xishuangbanna government. This included providing seedlings, training, and plantation management support. However, inconsistent yields from

smallholders led the company to shift toward managing its own plantations on State Farm land, some of which was previously used for rubber.

To maintain uniform quality, Greenfield relies exclusively on its own farmers, provides them with climate-adapted seedlings, fertilizers, and technical guidance, and does not source nuts from outside its plantations or from neighboring countries.

Production and Certifications

Greenfield currently produces approximately **30,000 tons of macadamia nuts annually** and is the only company in China offering **premium, organic macadamia products**. The company has obtained several key certifications:

- China Organic Food Certification (中国有机产品)
- HACCP Certification
- ISO 9000 Quality Management System Certification
- ISO 22000 Food Safety Management Certification

1.2 Small-holder Macadamia Cultivation in Former State Farms

As mentioned above, the Yunkun Company has engaged members of former State Farms or ethnic Han settlements, who now farmland distributed to them following the semi-privatization of State Farms, in macadamia cultivation. Semi-structured interviews were conducted with two members from Team 3 of State Farm No. 5 in Nasha, within the Jinghong Municipality.

The Nasha settlement, home to 15 households primarily of Han ethnicity, has a long history of rubber cultivation dating back to the 1970s–80s. However, declining latex prices have made rubber tapping less profitable over time. Over the past seven years, the local government has encouraged settlers in this Team to diversify their crops by introducing macadamia, mango, and other tropical fruits alongside rubber to boost income. Initially, farmers experimented with macadamia seedlings independently. Later, large-scale macadamia cultivation was implemented through a project titled **“Demonstration Construction of Macadamia Nut Quality and Efficiency in Jinghong City”**, led by the Jinghong Green Food and Rural Industry Development Centre and supported by the Jinghong Agriculture and Rural Affairs Bureau and the Jinghong Rural Revitalization Bureau. The project covers an area of 750 mu (50 ha).

Macadamia plantations by small holders at Team 3 of State Farm No. 5 in Nasha, Jinghong Municipality. Jinghong Municipality, established with the support of the Xishuang banna Dai Autonomous Prefecture government.

The project aimed to establish a demonstration plantation with standardized techniques and formats, including:

- Ditch and hole preparation for planting (80 cm depth × 90 cm mouth width)

- Plant spacing of 4 m × 5 m, with 20 plants per mu
- Standardized base management practices, including unified fertilization schedules, fertilizer amounts, brands, tree pruning, and soil weeding
- Green prevention and control technologies for pests, diseases, and weeds

One of the interviewees has planted 600 trees (1 mu fits 20 trees), and the other 500 trees. The first trees, of more water-demanding but resistant varieties (A4 and A16), were planted in 2018. In recent years, new drought-resistant varieties (Guihe No. 1), which produce lower yields, have also been planted.

The farmers reported that they were taken to the first State Farms and villages in the Bulang Mountains, where macadamia cultivation had already been established, to learn technical and management skills from experienced farmers.

According to the interviewees, macadamia nut prices are as follows:

- 8 yuan (≈ 1,16 US$)[4]/kg for nuts with husk
- 24–30 yuan (≈ 3,48-4,35 US$)/kg for whole, uncracked, unprocessed nuts (depending on size)

One tree can yield up to 20 kg, generating an annual income of up to 4,000 yuan (≈ 579,66 US$). **Macadamia seedlings are sold in the Jinghong area at 10 yuan each.**

1.3 Small-holder Macadamia Cultivation in Hill Villages

Macadamia nuts are currently widely cultivated by smallholders in hill villages across Xishuangbanna, with major concentrations in Jinghong Municipality, Mengyang, and the hilly areas of Mengla Township bordering Laos' Phongsaly province. Due to time and logistical constraints, field visits to these villages were not possible. However, based on previous research on crop value chains across the China-Laos border conducted by the macadamia value chain study consultant, the experiences of these smallholders in China provide valuable insights into the cultivation of macadamia. These experiences are particularly relevant as the geographic, farming, and marketing conditions closely resemble those of Lao smallholders across the border.

Exchange of technical knowledge, farming practices, and marketing expertise between smallholder farmers in China and their relatives or peers from ethnically similar villages in Laos is an important source of learning. Such exchanges should be actively supported by both local government agencies in Boun Neua and the CCL GREEN Project Team.

2. Processing

A. Xishuangbanna Yunkun Macadamia Technology Development Co., Ltd.

The company operates a macadamia processing factory near Jinghong. Processing steps include de-husking, grading (Grade A: larger/higher quality; Grade B: smaller/lower quality), drying, cracking, and packaging. Nuts are baked using low-temperature technology. A portion of the output is processed into flavored snacks (e.g., milk, algae, wasabi).

[4] Conversion used: 1 CNY ≈ 0.145 USD (13 February 2026), source: CurrencyLive – https://currencylive.com/exchange-rate/cny-to-usd-exchange-rate-today/

Products

- Non-organic dried, in-shell nuts (natural or creamy flavor)
- Packaged in sealed plastic bags with an inner aluminum vacuum bag
- Shelf life: 10 months
- Ingredients (flavored varieties): salt, white sugar, condensed milk, glucose, spices, MSG, food additives, edible essence
- Manufacturer: Xishuangbanna Yunkun Macadamia Technology Development Co., Ltd.

An informant reported that product quality is generally lower than that of Greenfield Agriculture and Forestry Group.

(Clockwise from top left) Macadamia nut cracking machinery, Macadamia de-husking machinery, Macadamia drying machinery, and, Macadamia storage at the Greenfield Agriculture and Forestry Group plant.

B. Greenfield Agriculture and Forestry Group

At the main warehouse, processing includes de-husking, pre-cracking, drying, and mechanical grading. Grade A nuts are shipped to Korea and major Chinese cities, while smaller nuts are sold locally. The facility is large, equipped with advanced, custom-designed machinery capable of handling high volumes.

Processed nuts are stored in vacuum-sealed sacks in sterilized, temperature-controlled rooms to prevent spoilage.

Products

Sold under the brand **Yulin Yunguo**, including:

- **Organic natural flavor** – dried, in-shell, pre-cracked
- **Non-organic milk flavor** – dried, shelled kernels
- **Non-organic seaweed flavor** – dried, shelled kernels
    - Ingredients: macadamia kernels, sugar, starch, wheat flour, salt, seaweed seasoning, butter, chicken essence, ammonium bicarbonate, sodium bicarbonate, tert-butyl terephthalene.

All products are packaged in sealed plastic bags with a silica sachet and nut opener. Shelf life: **240 days**

3. Marketing

A. Xishuangbanna Yunkun Macadamia Technology Development Co., Ltd.

Products are sold in small sealed plastic bags containing humidity-absorbing and oxygen-absorbing sachets.

Retail Products

- **Yunkun 218 g (18.9 yuan ≈ 2,74 US$)**
    - Non-organic, dried, in-shell nuts, natural or cream flavor. Includes inner aluminum vacuum bag and shell opener

B. Greenfield Agriculture and Forestry Group

Greenfield sells online via **TikTok (Douyin)** and **Taobao**, and supplies retail shops in major Chinese cities. Organic in-shell Grade A nuts are also exported to Korea, supported by the company's export license and certification.

Wholesale Prices

- De-husked, dried, in-shell nuts: **39.8 yuan / 1 kg ≈ $5.77 US$ / kg**
- Shelled, dried kernels: **130 yuan / 1 kg ≈ $18.85 US$ / kg**
- Yulin Yunguo 500 g jars (organic, in-shell, cracked): **59 yuan ≈ $8.56 US$**

Retail Prices in Jinghong (Supermarkets & Specialty Nut Shop)

- **Yulin Yunguo 500 g (39.8 yuan ≈ $5.77 US$)**
    - Organic, dried, in-shell, natural flavor
    - Manufacturer: Xishuangbanna Songge Industrial Co., Ltd.
- **Yulin Yunguo 218 g (25 yuan ≈ $3.63 US$)**
    - Organic, dried, in-shell, natural flavor

- **Yulin Yunguo 500 g (39.8 yuan ≈ $5.77 US$)**
  - Non-organic, dried, in-shell, milk flavor
- **Yulin Yunguo 70 g (16.8 yuan ≈ $2.44 US$)**
  - Non-organic, dried, in-shell, seaweed flavor

C. Zhen Wei Yuan Shop in Jing Hong

Zhen Wei Yuan is a shop in Jinghong specializing in the wholesale and retail of natural mountain products from the prefecture. The shop sources packaged macadamia directly from the two local processing companies and **stocks the full range of products from the Greenfield Agriculture and Forestry Group (Yulin Yunguo brand).**

Greenfield (Yulin Yunguo) Products Available at Zhen Wei Yuan

- **500 g – 59 yuan ≈ $8.56 US$**
- Organic, dried, in-shell, natural flavor. Plastic box
  Manufacturer: Xishuangbanna Songge Industrial Co., Ltd.
- **500 g – 39.8 yuan ≈ $5.77 US$**
  Organic, dried, in-shell, natural flavor. Plastic bag
  Manufacturer: Xishuangbanna Songge Industrial Co., Ltd.
- **218 g – 25 yuan ≈ $3.63 US$**
  Organic, dried, in-shell, natural flavor
- **500 g – 39.8 yuan ≈ $5.77 US$**
  Non-organic, dried, kernel, milk flavor
- **70 g – 16.8 yuan ≈ $2.44 US$**
  Non-organic, dried, kernel, seaweed flavor

The shop also sells large gift boxes that hold eight small macadamia packages, priced at **200–250 yuan ≈ $29.00–$36.25 US$**.

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D. Smallholders in Jinuoshan, Meng Yang, Jing hong

According to a local farmer, macadamia producers in Jinuoshan (Mengyang) sell their nuts to middlemen, who then supply them to processing companies.

Farmgate prices:

- **In-husk, unprocessed nuts:** 8 yuan/kg
- **In-shell, unprocessed nuts:** 20 yuan/kg

(Clockwise from top left) Macadamia nuts packaging by the Greenfield Agriculture and Forestry Group; Macadamia oil produced by the Greenfield Agriculture and Forestry Group; Yunkun brand natural and flavoured, in-shell macadamia nuts produced by the Yunken Group; A retail shop in downtown Jinghong, Xishuangbanna.

Table 28 Macadamia Price in Xishuang banna Summary

Brand / Source	Market Level	Product Type	Flavor	Quantity	Price (Yuan ≈ US$)	Notes
Yunkun	Retail	In-shell, dried (non-organic)	Cream	218 g	18.9 ≈ US$ 2.74	Vacuum bag + shell opener
Yunkun	Retail	In-shell, dried (non-organic)	Natural	218 g	18.9 ≈ US$ 2.74	Vacuum bag + shell opener
Qiao Qiao	Retail	Flavoured kernels (added sugar, salt, spices)		108 gr	19.8 ≈ US$ 2.87	Vacuum bag Manufacturer: Qiao Qiao Food Co., Ltd., Anhui province
—	Farmgate (Jinuoshan)	In-husk, unprocessed	—	1 kg	8 ≈ US$ 1.16	Sold to middlemen
—	Farmgate (Jinuoshan)	In-shell, unprocessed	—	1 kg	20 ≈ US$ 2.90	Sold to middlemen
Yulin Yunguo	Online retail	In-shell, dried	Natural	500 g	23.9 ≈ $3.47	Fast delivery
Yulin Yunguo	Wholesale	In-shell, de-husked, dried	Natural	1 kg	39.8 ≈ US$ 5.77	—
Yulin Yunguo	Wholesale	Shelled kernels, dried	—	1 kg	130 ≈ US$ 18.85	—
Yulin Yunguo	Wholesale	In-shell, cracked (organic)	Natural	500 g ja r	59 ≈ US$ 8.56	—
Yulin Yunguo	Retail	In-shell, dried (organic)	Natural	500 g	39.8 ≈ US$ 5.77	Manufacturer: Xishuangbanna Songge Industrial Co.
Yulin Yunguo	Retail	In-shell, dried (organic)	Natural	500 g	39.8 ≈ US$ 5.77	—
Yulin Yunguo	Retail	In-shell, dried (non-organic)	Milk	500 g	39.8 ≈ US$ 5.77	—
Yulin Yunguo	Retail	In-shell, dried (organic)	Milk	218 g	25 ≈ US$ 3.63	—
Yulin Yunguo	Retail	In-shell, dried (non-organic)	Seaweed	70 g	16.8 ≈ US$ 2.44	—
Zhen Wei Yuan (Gift Packs)	Retail	Mixed packages	Mixed	8 small packs	200–250 ≈ US$ 29.00	Gift box

					– US$ 36.25	
Loose		In-shell, dried, pre-cracked (non-organic)		1 kg	59.8 ≈ US$ 8.67	

4. Consumption

Introduction

Over the past five years, macadamia nuts have experienced growing popularity in China, particularly among urban upper-middle-class consumers and residents of production regions such as Xishuangbanna. This growth is driven by both health-oriented marketing strategies and increasing interest in premium snack products.

4.1 Consumer Segmentation and Preferences

Macadamia consumption patterns in China vary significantly across social and economic groups:

- **Upper- and Middle-Upper-Class Consumers:**
  These consumers tend to be more discerning regarding product origin, quality, and organic production methods. They primarily purchase whole, dried, in-shell macadamia nuts.
- **Middle- and Lower-Income Consumers:**
  These groups show greater acceptance of processed and flavored macadamia products containing sugar, salt, and artificial flavorings. Such products are typically sold in 180–250 g retail packages in large supermarkets.

Additionally, in-shell nuts are generally preferred over roasted kernels due to their longer shelf life and lower risk of spoilage.

4.2 Cultural Significance and Consumption Practices

As a premium and relatively expensive product, macadamia nuts have become integrated into Chinese gift-giving traditions. They are widely exchanged during major festivals such as the Lunar New Year and the Mid-Autumn Festival, and often given as courtesy gifts during household visits.

Macadamias are also popular among younger consumers as a snack paired with beverages. Health-conscious middle-aged consumers frequently include macadamias in their daily diet along with other nuts and dried fruits, seeking regular intake of vitamins, omega-3 fatty acids, and healthy fats.

4.3 Packaging and Retail Formats

Macadamia nuts in China are available in several packaging styles:

- **Most Common:**
  Sealed or vacuum-sealed plastic bags, widely available in supermarkets.

- **Less Common:**
  Cylindrical sealed boxes.
- **Gift Packaging:**
  Large paper bags or decorative boxes containing assorted natural and flavored macadamia in smaller individual packages.

Many small packaged products contain partially cracked nuts, each featuring a single incision to facilitate opening. These packages typically include a small metal key to assist consumers with cracking the shell.

4.4 Production-Area Sales and Local Market Characteristics

In production regions such as Xishuangbanna, local smallholders sell uncracked, sun-dried in-shell nuts at outdoor fruit and vegetable markets. These nuts vary greatly in size and flavor, and some may be of lower quality or rancid.

Local consumers often use simple manual nut-cracking devices that process one nut at a time. Such openers can be purchased on Taobao for approximately 25–35 yuan ≈ US$3.63–US$5.08.

4.5 Emerging Product Categories

Macadamia oil has become an increasingly sought-after gourmet product among affluent consumers. It is used both in cooking and in skincare. The food manufacturing industry also incorporates macadamias into processed foods, including cookies, cakes, and ice creams.

Overview of Macadamia Cultivation, Processing, Marketing and Consumption in Laos

1. Cultivation

Introduction

Macadamia cultivation in Laos is a relatively new agricultural initiative compared with neighboring countries such as China, Vietnam, and Thailand. Lao government authorities, traders, and an increasing number of farmers recognize the crop's high economic potential, and early efforts have begun to introduce macadamia in provinces with suitable climatic and morphological conditions. However, key challenges remain in producing high-quality nuts and establishing processing infrastructure capable of supporting domestic marketing and exports. Heavy reliance on Chinese and Vietnamese intermediaries continues to depress farmgate prices, limiting income opportunities for Lao farmers.

1.1 Initial Foreign-Led Macadamia Investments or Subsidized Projects

1.1.1 Vietnamese Investments

Early macadamia cultivation efforts in Laos were introduced through cooperation between Vietnamese companies and provincial authorities in Champasak (south) and Phongsaly (north).

Champasak Province:

- In 2022, MDA Laos Corporation (a Vietnamese group) signed a land concession agreement with the Champasak Provincial Government covering 150 hectares. The company imported **14,600 QN1** and **6,400 A38** macadamia seedlings to be planted over **76 ha**, and provided planting techniques, seedlings, fertilizers, and pesticides (MDA 2022).
- On 5th December 2025 a Memorandum of Understanding was signed between the Champasak Provincial Administration and the Paksong Agricultural Partnership and Coffee Production Company Limited (a Lao-Vietnamese group) to conduct a feasibility study on several crops, including macadamia, for planned 150-hectare project in Phahondong, Paksong District. The project is supported by the Socialist Republic of Vietnam (KPL 2025).

Phongsaly Province:

In June 2024, the Phongsaly Department of Agriculture and Forestry and the Department of Agriculture and Rural Development of Vietnam's Dien Bien Province signed a Memorandum of Cooperation to establish a **5-hectare macadamia demonstration plot** in Phongsaly's Mai District (ASEANALL *2024,* KPL 2024). Under this agreement, the Vietnamese have agreed to provide **seeds, fertilizers, pesticides**, and **technical training** in cultivation and maintenance (*ASEANALL 2024).*

1.1.2 Subsidized Projects

Champasak Province

- In 2015, an Australian-funded project supported farmers in Paksong District by providing macadamia saplings and technical assistance. The macadamia trees established under this initiative are now mature and produce substantial quantities of nuts, forming the **first and longest-standing macadamia cultivation area in Laos**.
- Macadamia from Paksong represents the **only locally produced macadamia currently sold within Laos**.
- Limited documentation exists on macadamia cultivation practices in Paksong. However, according to the owner of Tiddin Shop in Vientiane—who sources nuts from Paksong villagers—macadamia is typically grown **intercropped with coffee**, and farmers apply a mixture of natural fertilizers and chemical fertilizers (N15, P15, K15), originally used for coffee.
- Farmers are not organized into cooperatives and generally sell individually, mostly to Vietnamese companies during the harvest season. Nuts are sold **de-husked, unprocessed (not dried), and in-shell**.

1.2 Emerging Lao Entrepreneurial Initiatives

Foreign investments have stimulated interest among Lao entrepreneurs and farmers, some of whom have started planting macadamia or establishing nurseries.

1.2.1 Tanjai Agricultural Import–Export Co. Ltd. (Luang Prabang)

Tanjai Agricultural Import–Export Company is an agricultural enterprise based in Phoumork Village, Luang Prabang District, Luang Prabang Province. According to its CEO, Mr. Sinouane, the company has been active in Laos's farming, agricultural marketing, and trading sector for many years. Macadamia is among the products the company has recently promoted in Luang Prabang Province, alongside Sacha Inchi nuts.

The company introduced macadamia to the Luang Prabang region in 2023 after study tours and exchanges with producers and traders in Chiang Mai (Thailand) and Malaysia. Following soil assessments conducted by experts from Vietnam and Malaysia, between 2023 and 2025 the company planted 5,000 macadamia saplings sourced from Dien Bien Phu, Vietnam, on its own land and distributed an additional 3,000 trees to farmers as a trial. The aim was to familiarize growers with macadamia cultivation, allow them to experience its economic benefits firsthand, and encourage long-term adoption. Technicians from Vietnam and Thailand have since provided local farmers with training on macadamia cultivation and orchard management. As a result, many farmers in the area have expressed interest in planting macadamia, and the initiative has gained support from the Luang Prabang provincial government as a potential high-income crop for local farmers.

According to the CEO, macadamia cultivation has not been particularly difficult. He noted that he never watered the trees after planting, which contributed to some losses, and emphasized that the most important factor for healthy growth is regular grass cutting.

He has not yet practiced intercropping in his macadamia plots but suggested that coffee, rice, corn, and Job's tears can be intercropped during the first three years of tree establishment. Sacha Inchi is especially suitable, as it grows quickly and can provide income during the six- to seven-year period before macadamia trees begin producing nuts. Vietnamese, Thai, and Singaporean companies have expressed interest in sourcing macadamia from Laos. The company plans to export Grade A macadamia (whole, intact kernels) to Singapore and Grade B macadamia (smaller kernels with minor defects or cracks) to Thailand and Vietnam. Currently, 120-gram packs of macadamia retail for 9 Singapore dollars in Singapore.

Retail macadamia prices in Laos, as reported by the Tanjai company, are:

- 30,000 kip[5] ≈ US$1.38/kg for raw in-husk nuts
- 30,000-60,000 kip ≈ US$1.38–US$2.76/kg for in-shell nuts
- 300,000 kip ≈ US$13.80/kg for dried, shelled kernels

One issue highlighted by Mr. Sinouane is the high cost of macadamia saplings. Establishing plantations using imported seedlings requires substantial investment, making the development of domestic macadamia nurseries a priority. On 1 October 2025, the company announced via Facebook that it has begun producing macadamia seedlings from

[5] Conversion used: 1 Lao kip ≈ 0.000046 US$ (13 February 2026), source: https://www.forbes.com/advisor/money-transfer/currency-converter/lak-usd/?utm_source=chatgpt.com.

branches of previously planted trees.
Video reference: https://web.facebook.com/watch/?v=622797546660235
The company also sells saplings and can be contacted at **020 77 777 228**.

The CEO expressed strong interest in marketing macadamia from Boun Neua District with CCL's support, under the following conditions: he is willing to sign agreements with farmers—facilitated by Phongsaly authorities—provided that farmers sell their produce exclusively to his company; farmers use their own saplings (initially provided by CCL or sourced individually); he guarantees to purchase the harvest at an agreed price; and he assumes responsibility for marketing the produce from participating households. He noted that similar agreements often grant companies a monopoly over crop trading, and he stressed the need for formal approval from Phongsaly authorities to secure exclusive purchasing rights in Boun Neua.

Mr. Sinuane also believes that macadamia exports can be integrated with the company's existing Sacha Inchi trade. Although prices for Sacha Inchi declined over the past year, he has secured interest from an Australian company and is completing export documentation with the Australian Government for roasted nuts. The nuts will be shipped via Ho Chi Minh Port, for which he has already obtained Vietnamese clearance. He believes that if Sacha Inchi exports to Australia prove successful, Lao-grown macadamia could also be exported there, offering significant income potential for Lao farmers.

1.3 Cross-Border Ethnic Networks and Smallholder Adoption in Phongsaly

1.3.1 Sino–Lao Tai Lue Collaboration

Macadamia planting in Phongsaly's districts bordering China has also emerged through cross-border exchange among Tai Lue and Akha communities.

Between **2018 and 2019**, Mr. Ai Kham No, a Tai Lue entrepreneur from **Meng Man Township, Meng La County, Xishuangbanna Prefecture (China)**, signed a cooperation agreement with Boun Neua District (is this correct? Has there been any official agreement with the local government? Or did he sign a contract with the villagers?) GREEN team please double check with DAFO Boun Neua. We were not able to view the contract when we spoke to Mr. Ai Oun Keao, but he said he would provide it) to promote macadamia cultivation. Between 2018 and 2022, he distributed **~10,000 macadamia saplings** sourced from Jinghong Municipality to:

- Provincial and district government staff (including officials in Boun Neua), and
- Villages in Boun Neua District, including:
    - **Bua Hot, Bo Noi, Long Ngai Ma** (Boun Tai area)
    - **Pon Hom, Kong, Ponsai** (Boun Neua town area)

Mr. Ai Kham No collaborated closely with **Mr. Ai Oun Keao**, a Tai Lue entrepreneur from **Ban Nyor Village**, who has long engaged in vegetable trade with China. Mr. Ai Oun Keao's strong local networks—particularly his relationship with the former Vice-Governor of Phongsaly—facilitated the initiative. The GREEN team, together with the Macadamia Value Chain Study consultant, observed several macadamia trees planted in the garden of the former Vice-Governor of Phongsaly's residence in Boun Neua town. The trees, now four years old, currently yield up to 3–4 kg of nuts between September and October. According to the caregiver, organic fertilizer purchased in sacks is applied to the plants.

Overall, the trees did not appear to be well maintained, and some pruning had been done incorrectly.

Disruptions and Regulatory Barriers

Extension activities were halted due to:

- COVID-19 pandemic restrictions
- Bureaucratic delays related to China's import regulations on macadamia

Mr. Ai Oun Keao reported that his Chinese partner is currently completing documentation with the **Yunnan Provincial Government** to obtain authorization for importing Lao macadamia into China. The application has been transmitted from the Phongsaly Provincial Agriculture and Forestry Office to the Lao Ministry of Agriculture and Forestry for bilateral approval.

Small holder macadamia plants and in-husk and in-shell nuts in Boun Neua Town.

1.4 Smallholder Production Practices in Boun Neua District

1.4.1 Macadamia Cultivation by Mr. Ai Oun Keao, Ban Nyor

In **2021**, Mr. Ai Oun Keao planted **60 macadamia trees** at his farming station near Ban Nyor. The trees can yield **up to 20 kg** of nuts per year. He uses organic fertilizer sold in sacks and plans to expand production through intercropping with **mango, avocado, and beans**. He has also begun producing his own saplings.

At his station, only **de-husked in-shell nuts** were observed for sale. Drying is currently done **under the sun**, and de-husking is done by hand during the harvest season (September–October) using hired labour, making the process slow and costly.

Processing and Market Challenges

The key constraints faced by Mr. Ai Oun Keao and his partner include:

- **Lack of processing equipment:**
  - No de-husking machines
  - No drying ovens
  - No cracking equipment
    These tools are expensive and not locally available.
- **Quality and trust issues:**
  Chinese traders prefer **in-husk nuts** because:
  - They are cheaper
  - They do not trust the quality of sun-drying performed by farmers
  - Chinese companies prefer to dry and crack nuts using their industrial facilities, ensuring consistent quality
- **Market access limitations:**
  Without proper processing, Lao-grown macadamia cannot easily enter higher-value domestic or export markets.

Planned Upgrading

Mr. Ai Oun Keao and his partner aim to acquire machinery for drying, cracking, and packaging, enabling them to:

- Increase product value
- Improve quality standards
- Market Lao-produced macadamia domestically and internationally

1.4.2 Macadamia Cultivation in Ban Vang Doy

Ban Vang Doy is a village situated 32 km from Boun Neua town in Phongsaly Province, with a multi-ethnic population of Phunoi, Tai Lue, and Khmu. Macadamia cultivation in Ban Vang Doy remains limited, with only two households currently growing the crop out of 97 total households. Currently. There are 5 farmers interested in growing the crop with the support of CCL.

Agriculture in the village centers on rice, rubber, vegetables, and livestock. Around 18 households engage in rubber contract farming with a Chinese company, selling latex at 17,000–18,000 kip per kilogram. Farmers report concerns about low and controlled prices due to the monopoly buyer and issues related to latex quality disputes. No farmer groups or cooperatives are present in the village.

History and Status of Macadamia Planting

Macadamia was first introduced in Ban Vang Doy in 2016 when a woman farmer planted 240 trees from two Chinese varieties supplied by Ai Un Keao and his Chinese Tai Lue partner, Ai Kham Ngo. The lady previously cooperated with the two investors in planting vegetables. The investors provided fertilizer and basic training on soil preparation. The Tai Lue–Chinese investors also demonstrated cultivation techniques directly to the participating farmer. She reported that macadamia cultivation was not difficult, applying fertilizer twice a year, conducting pruning in the third and fourth years, and requiring

minimal watering. The trees grew well and appeared healthy, but she eventually removed them due to the lack of buyers and the need to free land for short-cycle crops.

The village head planted 80 trees in June 2025 through a CCL-supported model farmer initiative, using two Thai varieties. He has received basic training through CCL, covering planting techniques, soil preparation, pruning, and natural fertilizer application.

Production Experience and Technical Challenges

The lady who planted macadamia harvested the nuts, primarily for home consumption, and she reports challenges with cracking the nuts. No commercial sales have taken place. Verbal purchase agreements with the two Tai Lue investors —such as a proposed price of **4 yuan ≈ US$0.58 per kilogram** for raw in-husk nuts—were never implemented due to disrupted market arrangements and lack of buyers.

The lady expected to make a good income from macadamia, but when the sale perspectives failed, she felt she waisted time and labour. Currently, she is reluctant to plant the tree again. She said she could do so if the price offered is higher and if there are secure and sustainable market opportunities.

Key Constraints

Key constraints identified include:

- Unstable or non-existent market
- Lack of processing facilities
- Low local consumption
- Uncertainty about price stability if production increases

Farmer Perspectives and Future Needs

Farmers expressed interest in expanding macadamia planting but emphasized the need for:

- Reliable market linkages and sale opportunities
- Training in long-term orchard management and organic planting
- Assurances of stable pricing, even when overproduction may drive prices down.

Despite this interest, interested farmers remain cautious. They noted that without a confirmed buyer, the long gestation period of macadamia poses high risks.

1.4.3 Macadamia Cultivation in Ban Khen Ko

Ban Khen Ko, located in Boun Neua district and home to 208 residents across 43 households, lies only **5 km from the Chinese border**. The village is predominantly Akha Phusho, with strong kinship ties to Akha communities in China. Villagers frequently cross the border to Mengla and Man Bang—often without identification documents—to visit relatives, engage in informal trade, and exchange agricultural knowledge. Cross-border **intermarriage between Lao Akha and Chinese Akha households** has further

strengthened these connections and facilitated the flow of farming practices between both sides of the border.

Agricultural production in the village currently centres on **sugar cane, job's tears, rice (naa), and livestock** including buffalo, pigs, ducks, and chickens. Sugar cane is the primary cash crop and has been grown under a contract with **Zhong Yun**, a Chinese company from Mengla, since 2006. Cane is transported by village-owned trucks, with Chinese buyers hiring local drivers. Prices remain stable at **325 yuan/ton ≈ US$47.13/ton for high-quality cane** and **285 yuan/ton ≈ US$41.33/ton for lower-quality cane**, and farmers report no difficulties selling to the company.

One CCL-supported model farmer is also cultivating job's tears, and several villagers have shown interest in expanding this crop. However, heavy fertilizer use in sugar cane has contributed to soil degradation, and farmers recalled a failed coffee initiative introduced by a Chinese company before COVID-19, which was abandoned when buyers stopped returning.

No cooperatives or farmer groups exist in the village; agricultural activities are pursued individually.

History and Status of Macadamia Planting

Interest in macadamia in Ban Khen Ko is relatively recent and heavily influenced by experiences across the border. The village head received a small number of macadamia saplings from an Akha relative in China and has planted six trees, though he reports limited technical knowledge.

A model farmer trained by the CCL team has planted **80 macadamia trees**, with only three dying, and has learned basic plantation techniques through CCL support.

At the same time, **Ban Mososan**, an Akha village directly across the border in China, serves as a major reference point for Ban Khen Ko. There, a Han Chinese-run company, named Laoli, operates mixed coffee and macadamia plantations under contract farming arrangements. Because villagers in Ban Khen Ko have extensive family ties in Ban Mososan, they have received some knowledge of Chinese macadamia production models, pricing, and farm management practices.

During the consultation, **23 households in Ban Khen Ko** expressed clear interest in beginning macadamia planting, and some proposed planting up to **400 trees per household**, although this may not be feasible due to land limitations.

Production Experience and Technical Challenges

Local experience with macadamia cultivation remains limited.

- The village head's six-tree demonstration plot is still young, and he reports not knowing much about planting techniques.
- The CCL-supported model farmer has gained practical skills such as planting, spacing, and basic maintenance, but large-scale production experience is absent.

Through relatives and visits across the border, villagers have learned about Chinese practices, including:

- Applying **chemical fertilizer once a year** for macadamia.

- Using a **small machine to crack nuts in-shell**.

Farm-gate pricing practices, with **8 yuan** ≈ US$1.16**kg** for in-husk nuts in Chinese Akha villages.

Villagers also learned about **two main contract modalities** used in Ban Mososan:

- **Company-rented model:**
  - The company rents land from the villagers, provides saplings, training, and fertilizer, hires local labour to carry out orchard management and harvesting. Labour is paid at **120 yuan** ≈ US$17.40/ 1 day
  - Villagers receive **50% of the harvest**, which they may sell back to the company or to alternative buyers.
- **Farmer-managed model:**
  - The company provides saplings and basic guidance.
  - Farmers purchase fertilizers themselves and learn techniques by observing neighbours or other farmers working for the company.
  - All production is sold to the company.

Despite this exposure, Ban Khen Ko farmers still lack hands-on experience with crucial steps such as orchard management, pruning, large-scale harvesting, drying, and storage.

Key Constraints

Villagers identified several concerns that may limit the expansion of macadamia:

- **Uncertainty about market access**, especially the fear that buyers may not show up—as happened previously with coffee.
- **Dependence on cross-border transport**: If macadamia cannot be taken to China, farmers worry they might struggle to find consistent buyers.
- **Limited land availability**, particularly for households proposing large plantings (up to 400 trees).
- **Lack of domestic processing facilities** and minimal knowledge of cracking and post-harvest procedures.
- **Existing land dedicated to sugar cane**, which currently provides reliable income under a long-term contract.

These concerns make farmers optimistic yet cautious, especially given the long gestation period required for macadamia to become productive.

Farmer Perspectives and Future Needs

Despite constraints, the consultation revealed strong motivation to diversify away from labour-intensive sugar cane. Farmers emphasized that macadamia could reduce workload and improve their quality of life by lowering labour input while generating higher incomes.

Participants outlined several key needs to support future adoption:

- **High-quality saplings**, especially the *OC type* (known through Chinese relatives for high yields).

- **Technical support and continuous monitoring** from DAFO, PAFO, and the CCL GREEN project.
- **Assistance in establishing market linkages**, ideally with buyers in China or reliable domestic partners.
- **Training in long-term orchard management**, including planting techniques, fertilizer application, pruning cycles, pest control, and post-harvest handling.

1.4.4 Macadamia Cultivation in Ban Mai Long Thong

Ban Mai Long Thong, located in Boun Neua District with **565 residents (107 female)** and **170 households**, is an **Akha Phusho** community situated only **2 km from the Chinese border**. Villagers cross to China frequently—often without ID—to visit relatives in **Meng Ban** and in the nearby Akha village **Ban Mososan**. These long-standing cross-border relations, including **intermarriage**, have strengthened agricultural exchanges and enabled local farmers to learn directly from their Akha relatives in China.

Agriculture in Ban Mai Long Thong is diverse but dominated by a contract-farming arrangement with a Chinese company (**Zhong Yun from Meng La**) for **sugar cane**, introduced 18 years ago. Farmers also plant **job's tears, rice (naa), livestock, buffalo, pigs, ducks, and chickens**. Sugar cane requires chemical fertilizer, and **4–8 households per family group** typically engage in production. Prices vary by quality:

- **322 yuan ≈ US$46.69/ton** for high-quality cane
- **280 yuan ≈ US$40.60/ton /ton** for lower-quality cane

Transport is facilitated by **six villagers** who own trucks sending cane to Meng La via Pakkha–Ban Jom. Farmers report **no issues selling sugar cane**. Some **unused fallow land** remains available and could be converted to macadamia.

Land access is uneven: some households possess sufficient land for rice and cane, others much less. Historically, land was acquired through informal occupation by planting crops, and although land holdings differ, villagers negotiate access privately and **no land conflicts** are reported.

History and Status of Macadamia Planting

Interest in macadamia emerged through **cross-border Akha family networks**. The village head received **three macadamia saplings** from an Akha relative in **Ban Mososan** in China. In that Chinese Akha village, farmers have been harvesting macadamia for **three years** under partnerships with the Chinese company Laoli. These kinship-based exchanges—enabled by the village's geographic proximity to China—are the primary source of local awareness and enthusiasm.

Key production benchmarks shared from China include:

- **100 yuan ≈ US$14.50 per sapling**
- **22.5 kg yield per mature tree**
- **Up to 200 tons/ha** (farmer-reported figure)
- **6.5 yuan ≈ US$ 0.94/kg** paid for in-husk raw nuts

The Chinese company Laoli in Ban Mososan provides **saplings, fertilizer, technical training, and market outlets**, while farmers provide land, clearing, and labour. Sometimes **harvests are split 50/50** between farmers and the company.

In Ban Mai Long Thong, **84 households** have expressed willingness to plant macadamia. CCL has already trained the **village head (naiban)**, selecting him as a **model farmer**.

Production Experience and Technical Challenges

Technical knowledge varies significantly.

- **Women** reported they currently **know little** about macadamia cultivation.
- The **village head** gained initial hands-on experience from relatives across the border and through **CCL training**.
- Many **male farmers** have acquired practical experience by working in Chinese Akha macadamia orchards for **100–120 yuan ≈ US$14.50 – ≈ US$17.40/day**, as seasonal labourers in macadamia, tea, and long bean harvesting.

Key Constraints

Farmers identified several production, economic, and market risks:

Technical and Capacity Constraints

- Limited local knowledge on macadamia management.
- Uncertainty about **appropriate sapling varieties**; the naiban believes the Chinese variety performs well but lacks formal confirmation.

Infrastructure and Market Constraints

- **Poor road conditions** make transport to Boun Neua difficult; villagers requested support to improve the road.
- Fear of **limited market access**, especially without a formal buyer.
- Concern that Chinese companies may **refuse to purchase** their harvests, leaving farmers with unsold nuts.
- Preference for a **government-brokered contract** to ensure guaranteed markets.

Land and Labour Constraints

- Unequal land access limits how many trees each household can plant.
- Households requested **200–500 trees each**, but total land availability may not allow this.
- Farmers relying on sugar cane must secure **alternative income sources** during the **5–7 years** before macadamia generates returns.

Farmer Perspectives and Future Needs

Farmers are motivated by expectations of **increased income** and improved mobility—specifically the desire to **purchase vehicles**. They are eager to adopt

macadamia, but only with adequate support.

Support Requested from DAFO/PAFO and the CCL GREEN Project

- **Technical training** for both men and women on planting, spacing, fertilizer use, tree care, harvesting, drying, and storage.
- **Provision of high-quality saplings**, ideally about **1 meter in height**.
- **Land management support** for plot preparation and maintenance.
- **Marketing assistance**, including facilitation of formal agreements with buyers or companies.

Planting Plans

Households plan to plant macadamia on:

- Existing **sugar cane plots**, and
- **Unused fallow land** available around the village.

Conclusion

Macadamia cultivation in Laos is expanding through a combination of foreign-led investments, cross-border ethnic networks, and emerging local entrepreneurship. While early results show promise, the sector's growth is constrained by limited processing capacity, regulatory barriers, and dependence on foreign buyers. Developing local infrastructure for drying, cracking, and packaging will be essential for Laos to enter higher-value markets and ensure better returns for farmers.

2. Processing

Currently there is not macadamia processing done in northern Laos at the industrial level. The few farmers or government officials who have planted the crop sun-dry the nuts and consume them before it goes rotten as a seasonal fruit. Further research should be carried out in Champasak province where macadamia has been planted earlier than in Phongaly and has already been injected on the Lao domestic market. If any processing is done there, farmers from Phongsaly could undertake a study tour to learn how the processing is done.

A de-husking, drying and cracking station with mechanical equipment should be established in Boun Neua town or in the nearby village of Nyor so that all macadamia produced locally can go processing there and then distributed on the domestic, Chinese and Vietnamese markets.

The only exception found during the survey was the Tiddin Shop in Vientiane that has been processing macadamia nuts in small-scale and home-made modes. See details in the sub-section dedicated to the Tiddin shop under the Marketing section below.

3. Marketing

Introduction

The marketing of macadamia nuts in Laos varies significantly across regions, reflecting differences in consumer awareness, purchasing power, and the availability of imported versus locally produced nuts. Urban centers such as Vientiane offer a wider range of macadamia products sourced from neighboring countries and in small quantities from Paksong, Laos, while semi-urban and northern areas rely more on seasonal availability and informal distribution channels. The following section outlines the main marketing dynamics observed in Vientiane, Luang Prabang, and selected northern districts.

3.1 Vientiane

In Vientiane, macadamia nuts are mostly sold at retail outlets such as large supermarkets or small grocery stores catering to expatriates and affluent Lao residents living in well-off areas of the city. The research found macadamia nuts for sale at VG Mart, Phonsili Minimart, J. Mart, View Mall Supermarket, Kokkok Megamart, and Siavone Minimart. No macadamia products were found at the large Vientiane Morning Market (Talat Sao).

These retailers offer various types of macadamia nuts: raw shelled nuts, natural dried in-shell nuts, organic and non-organic, roasted and salted nuts, and flavored varieties (wasabi, honey, sour cream and onion, truffle). Most macadamia nuts sold in these shops are sourced from Vietnam and Thailand, with smaller quantities coming from China. Currently, no Lao-grown macadamia products are available in Lao retail outlets.

Manufacturing and distribution are carried out by Thai, Vietnamese, and Chinese companies, and in one case by a Lao company. **Healthy Choice**, a Laos-based nut company involved in importing and distributing nuts within the country, is the only brand that distributes **organic macadamia nuts** in Laos. Packaging typically consists of sealed plastic bags or transparent cylindrical containers. In-shell macadamia nuts are sold with a metal opener, and all packages include a silica gel sachet to absorb moisture and prevent spoilage. Details are presented in the table below.

3.1.1 Prospective retail sellers in Vientiane

Ban Khao Hom Shop

Ban Khao Hom, owned and managed by Mrs. Hom in Vientiane, specializes in retail sales of gourmet, premium-quality nuts and a wide range of Lao-made products. These include soaps, creams, handicrafts (bags, wallets, scarves), tea, honey, organic vegetables, and semi-processed groceries. Nuts are sold loose in refill format but can also be packaged. Most edible products are organic and sourced directly from farmers across Laos. Located in an upscale area near several embassies, approximately 90% of the shop's clientele is foreign. This makes Ban Khao Hom a suitable outlet for retailing macadamia nuts to affluent consumers seeking premium, organic products and willing to pay higher prices for quality.

Marketing prospects

Mrs. Hom currently does not sell macadamia nuts because she lacks knowledge about the product and is unsure where to source it within Laos. However, she is eager to buy macadamia directly from Lao farmers—without going through intermediaries—in order to provide farmers with higher revenues. She prefers organically grown, pre-dried, and pre-cracked nuts, as she does not have the facilities to dry or crack them herself; therefore, uncracked nuts would not be suitable.
Regarding packaging, she is open to selling either pre-packaged nuts or packaging the dried, pre-cracked nuts herself. Additionally, she is interested in varieties with the longest shelf life and best resistance to spoilage.

Contact: 20 55 756 616

(Left) Manual macadamia cracking machine in Tiddin shop, Vientiane, Laos; (Right) Macadamia packaging machine in Tiddin shop, Vientiane, Laos.

Tiddin Shop

Tiddin Shop, located in Vientiane across from Wat Xieng Vae, specializes in edible Lao products including nuts, honey, tea, pepper, cardamom, and other ready-to-eat agricultural goods. Mrs. Anousone, owner of the Tiddin Import–Export Company and Shop, has longstanding experience in agricultural production and trade in Laos through her work with international cooperation agencies and as a food inspector for the EU Food and Veterinary Office. She is strongly committed to supporting Lao farmers by promoting their products on the domestic market, reducing the outflow of raw materials, and ensuring that local consumers can access Lao-grown food. Her business follows an ethical approach aimed at generating profit while securing higher income margins for farmers.

In 2024, Tiddin Shop began selling macadamia nuts sourced from Vietnam and Paksong (Champasak Province, southern Laos). Vietnamese nuts arrived pre-dried and

pre-cracked, while Lao nuts were delivered raw and uncracked. Her early experience with Paksong macadamia highlighted several challenges:

- A 50 kg batch purchased at 70,000 kip ≈ US$3.26/kg during the 2024 rainy season suffered a 30% loss due to high moisture content and rapid spoilage.
- After informing producers, she purchased another 50 kg in April 2025 for 65,000 kip ≈ US$ 3.02/kg; although smaller in size, these nuts had better moisture control, with only a 5% loss.
- In October 2025, she bought another 50 kg batch toward the end of the rainy season; these nuts were larger but again spoiled easily, leading to a 10% loss.

Processing

To prepare Paksong macadamia nuts for sale, the shop uses basic, low-cost equipment operated by the owner and her team:

1. **Dehydrating machine** (originally used for banana chips), purchased in Thailand for 6,000 THB, used to dry nuts for approximately 8 hours.
2. **Metal hand-operated cracking machine**, purchased in Vietnam through personal contacts for 4,000,000 kip; cracks one nut at a time.
3. **Domestic oven** for roasting pre-cracked nuts (1.5-hour process).
4. **Lid-sealing machine** for plastic containers sourced from Tao Bao. Packaging materials (cylindrical plastic boxes) are purchased in bulk from Tao Bao or from a shop in Khon Kaen Province, Thailand.

The company has conducted extensive testing to improve processing, quality, and packaging. All processing is home-based and carried out in small volumes. Roasted in-shell nuts can be stored for up to one year. From past experience with various products, the owner noted that local farmers tend not to process agricultural goods themselves, preferring to sell raw produce despite the higher value that processing could add.

Current and Future Marketing

Tiddin Shop currently sells in-shell, pre-cracked, and roasted macadamia nuts both in-store and online via Facebook. Promotional campaigns are advertised in October during the harvest season (e.g., “buy 2, get 1 free”) to stimulate customer interest. The shop also supplies other retail outlets in Vientiane, such as Ban Eim Souk (a health food retailer).

Products come in two packaging types:

- **1 kg vacuum-sealed bags** (for refill customers)
- **100 g and 350 g cylindrical plastic boxes**
  All packaging includes a silica anti-humidity sachet.

Initially, the owner believed Vietnamese macadamia nuts were roasted rather than simply dried, so she began roasting her products as well. She did not realize at first that roasting is an additional processing step that creates a higher-value product. Currently, Tiddin does not sell shelled kernels because they have a shorter shelf life and higher spoilage risk compared to in-shell nuts.

Looking ahead, she is willing to purchase **pre-processed nuts (dried and pre-cracked)** from farmers, enabling them to secure higher profit margins. She also remains open to purchasing raw, de-husked nuts if farmers are unwilling to perform any processing. She

expressed interest in collaborating with CCL to support the marketing of macadamia grown in Boun Neua.

To encourage more Lao customers to try macadamia nuts, she keeps prices relatively low compared to other retailers, aiming to build broader consumer familiarity.

Table 29 Macadamia Nuts Farmgate and Retail Prices – Tiddin Shop (Vientiane)

Product Origin & Description	Price	Unit	Notes
Farmgate macadamia, Paksong (2024)	70,000 kip ≈ **3.26** US$	per kg	Raw, uncracked, undried, in-shell
Farmgate macadamia, Paksong (2025)	65,000 kip ≈ **3.02** US$	per kg	Raw, uncracked, undried, in-shell
Retail macadamia, Paksong	260,000 kip ≈ **12.09** US$	per kg	Cracked, in-shell, roasted; vacuum-sealed bags
Retail macadamia, Paksong	120,000 kip ≈ **5.58** US$	per 350 g	Cracked, in-shell, roasted; cylindrical plastic box
Retail macadamia, Paksong	50,000 kip ≈ **2.33** US$	per 100 g	Cracked, in-shell, roasted; cylindrical plastic box
Retail macadamia, Vietnam	360,000 kip ≈ **16.74** US$	per kg	Cracked, in-shell, dried

Traceability and Export

Because her company is registered as an import–export enterprise, the owner is also able to export macadamia. Drawing from her experience in product inspection and market trends, she noted increasing consumer demand for transparency regarding product origin. The company has already adopted GPS-based tracking to record the location of harvested trees and the volume sourced from each plot. She plans to apply this traceability system to macadamia in the future.

Consumers

The main customers purchasing macadamia from Tiddin Shop are Lao, Japanese, and Korean consumers, with smaller numbers of Western buyers. Lao customers are typically aged over 40 and have middle-to-high incomes. Lao buyers prefer the 1 kg refill packs, while foreign customers tend to purchase the cylindrical boxed products.

Contact: 20 54 928 326

3.2 Luang Prabang

In Luang Prabang, macadamia nuts are less common than in Vientiane and even less so than in Boun Neua. One informant reported that in October and November—shortly after the harvest season—some Chinese fruit sellers at Phosy Market (Talat Phosy) offered dried, loose, unpackaged in-shell macadamia nuts for 60,000 kip ≈ US$2.82 USD per kilogram. Now that the harvest season has ended, this type is no longer available. Macadamia nuts in Luang Prabang are sold mainly in small supermarkets or specialty shops catering to foreign travelers, expatriates, and affluent Lao consumers, often offering high-end imported goods. They are also available at large supermarkets (e.g., New Century Chinese Supermarket) that sell a wide range of affordable products.

Macadamia varieties found include a small proportion of dried, shelled organic nuts and a larger share of dried in-shell nuts. Flavored or salted nuts were not found in the surveyed shops. Packaging includes small sealed plastic bags and transparent boxes.
Most macadamia nuts sold in the city come from Vietnam, with smaller quantities from Thailand and China, distributed by companies from these countries, and in one case by a Lao company (Healthy Choice). Some distributors differ from those found in Vientiane. Brands include Hat Macca and Macca from Vietnam, Farm Valley, Hawaiian Fruit distributed by Chinese company Chuangyi Food, and Doi Chang from Thailand.
One shop owner expressed interest in selling Lao-produced macadamia nuts, provided that the quality is guaranteed and the nuts are packaged in sealed, moisture-resistant bags to prevent spoilage. Proper drying and packaging are therefore of utmost importance if Lao macadamia nuts are to be introduced into the domestic market.

3.3 Boun Neua, Phongsaly, and Oudomxay

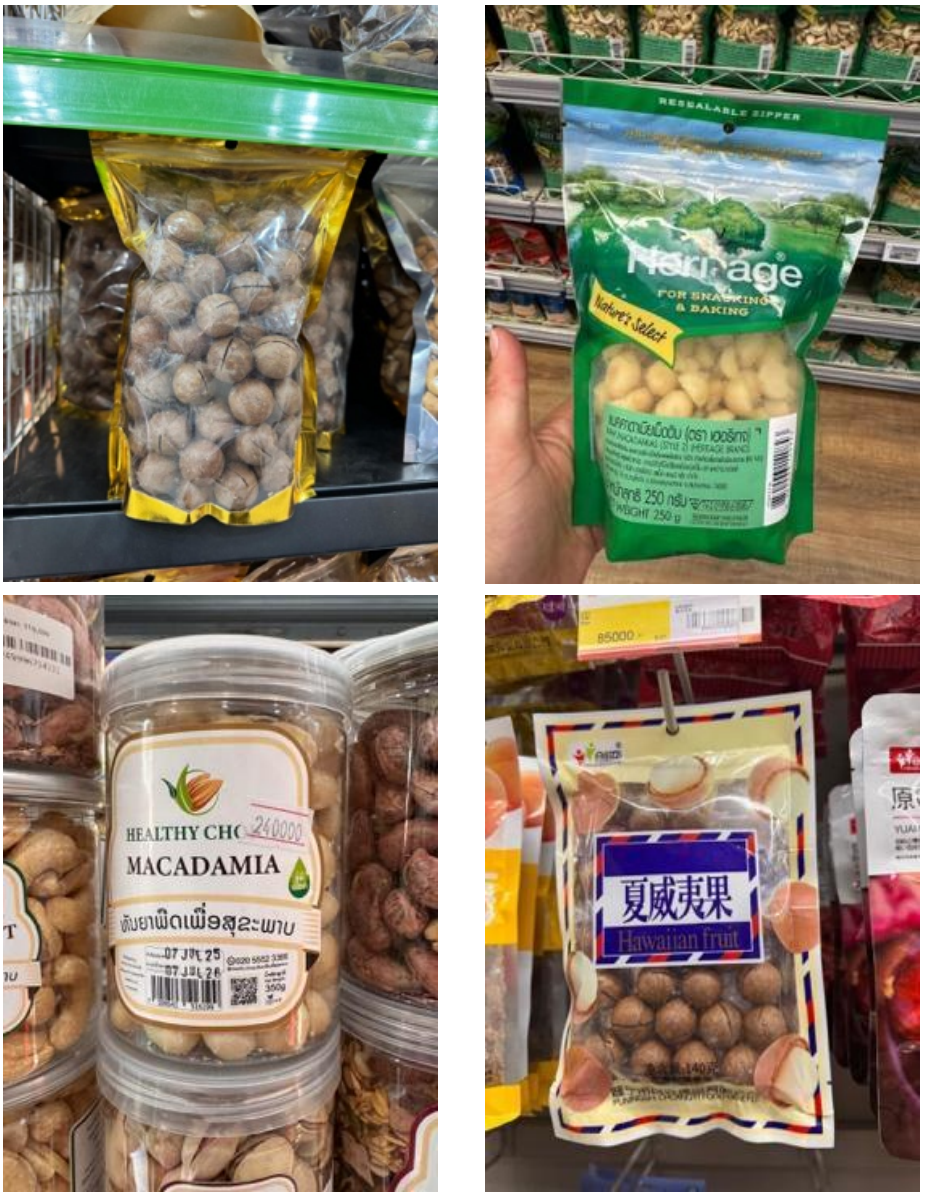
In Boun Neua, macadamia nuts are becoming increasingly popular due to the district's proximity to China—where macadamia cultivation has taken place for nearly a decade—and because macadamia cultivation has recently begun in Boun Neua itself.
Macadamia nuts are sold at retail in two main forms:

1. **Loose, unpackaged, natural dried in-shell nuts**, often pre-cracked and available during the harvest season in August-October.
2. **Dried, natural, pre-cracked nuts** sold in sealed plastic bags without labels, likely packaged informally by Chinese wholesalers.

At a Vietnamese-run grocery shop, dried, natural, pre-cracked in-shell macadamia nuts were found packaged in sealed cylindrical transparent plastic boxes, which included a nut opener and a silica gel sachet. Macadamia nuts sold in Boun Neua originate from Vietnam and China. Details on prices and types are provided in the table below.
According to Mr. Ai Oun Keao from Ban Nyor, at the Boun Neua market loose, unpackaged, in-shell dried macadamia is sold for 80,000 kip/≈ US$3.72 USD per kg.
At the Phongsaly Provincial ODOP (One District, One Product) Exhibition Centre, macadamia nuts were not displayed among the products on the shelves. However, the shop manager—who has planted macadamia trees in her village in Phongsaly—expressed willingness to market and sell them at this government-run outlet to promote local produce.

Conclusion

Overall, the macadamia market in Laos is still dominated by imported products, with Vietnam, Thailand, and China supplying nearly all varieties found in retail outlets. Marketing channels range from high-end supermarkets and specialty shops in major cities to small informal markets and grocery stores in northern towns. While demand is growing, particularly in areas close to China and in urban centers, **the absence of locally processed and packaged Lao macadamia nuts remains a key gap. Retailers express interest in stocking Lao-grown products, but meeting quality, drying, and packaging standards will be critical for successful entry into the domestic market.**



(Clockwise from top left) In-shell natural macadamia sold at a Supermarket in Oudomxay; Heritage brand, Thailand-produced shelled, natural macadamia nuts sold at View Mall Supermarket Ramping, Vientiane city; Vietnam-produced shelled, organic macadamia sold at B-Mart, Luang Prabang; China-produced in-shell, shelled, natural macadamia nuts sold at New Century Chinese Market, Luang Prabang.

Table 30 Shops, Markets and Supermarkets Surveyed in Vientiane for Macadamia Retail Sales

#	Shop name	Type of macadamia sold	Place of origin	Quantity	Price at retail	Price at wholesale	Type of buyers
1	**VG Mart**	**1** Brand: **Nut Walker Macadamia** Dry roasted salted shelled nuts packaged in a sealed aluminum cylindric box. Nounthong Trading Import Export Co. LTD. Khong Maduea, Krathum Baa, Samut Sakhon, 74110 Thailand	Thailand	130 gr	100,000 kip ≈ 5 US$	N/A	Very popular among Western expats and affluent Lao for all types. Westerners prefer the organic type. The shop sells around 10 boxes per weekend
		2 Brand: **Healthy Choice Macadamia** In-shell organic dried pre-cracked nuts, packaged in plastic cylindric boxes. The packaging includes a nut opener. Packaged and Distributed by Healthy Choice for Health Nong Rok Village, Sikhottabong District, Vientiane Contact Detail: 020 5552 3395	Vietnam	500 gr.	140,000 kip ≈ 6.4 US$	15% less than retail	
		3 Brand: **Healthy Choice Macadamia** Whole-shelled organic nuts packaged in plastic transparent cylindric boxes. Packaged and distributed by the Lao Healthy choice company	Vietnam	350 gr	250,000 kip ≈ 12.5 US$		
		4 Brand: **Healthy Choice Macadamia** Whole-shelled pre-cracked organic nuts packaged in plastic transparent cylindric boxes. Packaged and distributed by the Lao Healthy choice company	Vietnam	500 gr.	345,000 kip ≈ 17.25 US$		

2	Phonsili Minimart	**1** Brand: **Nut Walker Macadamias** Roasted unsalted nuts, packaged in a plastic sealed bag. It contains nitrogen in the packaging Nounthong Trading Import Export Co. LTD. Khong Maduea, Krathum Baa, Samut Sakhon, 74110 Thailand	Thailand	140 gr.	165,000 kip ≈ 8.25 US$	N/A	Expats and affluent Lao
		2 Macadamia Chocolate	Japan	67 gr.	85,000 kip ≈ 4.25 US$	N/A	
3	Kok Kok Mega Mart	**1** Brand: **Macadamia Doi Chang** In-shell pre-cracked dried nuts	Vietnam	400 gr.	145,000 kip ≈ 7.25 US$	N/A	Expats and affluent Lao
		2 Brand: **Healthy Choice Macadamia** Whole-shelled organic nuts packaged in plastic transparent cylindric boxes. Packaged and distributed by the Lao Healthy choice company	Vietnam	350 gr.	245,000 kip ≈ 12.25 US$	N/A	
		3 Brand: **Doi Tung** Shelled, natural flavour, roasted nuts. Grown in the Doi Tung mountains in northern Thailand by hill ethnic groups. 4 **Doi Tung** Shelled, honey flavour, roasted nuts **5 Doi Tung** Shelled, sour cream and onion flavor, roasted nuts **6 Doi Tung** Shelled, truffle flavour, roasted nuts **7 Doi Tung** Shelled, salted eggs flavour, roasted nuts **8 Doi Tung** Shelled, wasabi flavour, roasted nuts **9 Doi Tung**	Thailand	50 gr.	78,000 kip ≈ 3.9 US$		

		Shelled, salted flavour, roasted nuts					
4	Siavone Minimart	**1.** Brand: **Healthy Choice Macadamia** Whole-shelled organic nuts packaged in plastic transparent cylindric boxes. Packaged and distributed by the Lao Healthy choice company	Vietnam	500 gr.	355,000 kip ≈ 17.75 US$		Expats and affluent Lao
		2. Brand: **Healthy Choice Macadamia** Whole-shelled organic nuts packaged in plastic transparent cylindric boxes. Packaged and distributed by the Lao Healthy choice company	Vietnam	350 gr.	255,000 kip ≈ 12.75 US$		
5	J-Mart	**1.** Brand: **Healthy Choice Macadamia** Whole-shelled organic nuts packaged in plastic transparent cylindric boxes. Packaged and distributed by the Lao Healthy choice company	Vietnam	500 gr.	350,000 kip ≈ 17.5 US$		Expats and affluent Lao
		2. Brand: **Healthy Choice Macadamia** In-shell organic dried pre-cracked nuts, packaged in plastic cylindric boxes. The packaging includes a nut opener.	Vietnam	500 gr.	157,000 kip ≈ 7.85 US$		
6	View Mall Supermarket Rampin	**1.** Brand: **Koh Kae** Plus, salted mixed nuts, including macadamia nuts Manufactured and Distributed by: Mae-Ruay Snack Food factory Co. LTD Head Office 11/1, 11/2 Bangkunten/Chaithalay Rd. Samaedum, Bangkuntien, Bangkok 10150. Thailand	Thailand	30 gr.	70,000 kip ≈ 3.5 US$		Expats and affluent Lao
		2 Brand: **Heritage** for snacking and baking Whole, shelled raw macadamia (style 2), packaged in a sealed green plastic bag with resealable zipper. Packaged and distributed by Heritage Snack and Food Co., LTD, Samut Sakhon City, Samut Sakhno 74000, Thailand.	Thailand	250 gr.	258,000 kip ≈ 12.9US$		

		3 Brand: **Heritage** for snacking and baking Whole, shelled roasted salted macadamia, packaged in a sealed transparent plastic bag with resealable zipper. Packaged and distributed by Heritage Snack and Food Co., LTD, Samut Sakhon City, Samut Sakhno 74000, Thailand.	Thailand	325 gr.	455,000 kip ≈ 22.75 US$ (1400,000 kip ≈ 70US$ per kg Sold in small bags)		
7	Tiddin Shop	Brand: Tiddin	Laos, Paksong	1 kg		Farmgate price of macadamia from Paksong in 2024: 70,000 kip/1 kg, raw, uncracked, undried in-shell nuts	Affluent Lao, Japanese, Korean travelers or expats
				100 gr.		Farmgate price of macadamia from Paksong in 2025: 65,000 kip ≈ 3.25 US$/1 kg, raw, uncracked, undried in-shell nuts	
				350. gr.		Farmgate price of macadamia from Paksong in 2025: 65,000 kip ≈ 3.25 US$ / 1 kg, raw, uncracked, undried in-shell nuts	
			Vietnam	1 kg.	260,000 kip ≈ 13 US$ (sold in vacuum sealed bags),		

					cracked, in-shell, roasted 50,000 kip ≈ 2.5 US$ /100 gr (sold in cylindric plastic boxes), cracked, in-shell, roasted 120,000 kip ≈ 6US$ (sold in cylindric plastic boxes), cracked, in-shell, roasted 360,000 kip ≈ 18US$/ 1 kg cracked, in-shell, roasted		
8	Ban Khao Hom	N/A but willing to sell in the future					

Table 31 Shops, Markets and Supermarkets Surveyed in Luang Prabang for Macadamia Retail Sales

#	Shop name	Type of macadamia sold	Place of origin	Quantity	Price at retail	Price at wholesale	Type of buyers
1	B-Mart	Brand: **Healthy Choice.** Distributed by Healthy Choice for Health Nong Rok Village, Sikhottabong District, Vientiane Contact Detail: 020 5552 3395 Whole-shell organic nuts (without shell) in plastic jar. Packaged and istributed by the Lao Healthy choice company	Vietnam	500 gr.	240,000 kip ≈ 12 US$	220,000 kip	Mostly Europeans, Americans. Limited number of Lao buyers

2	Stall at Dara Market	N/A	Thailand	1 bag (weight not available)	140,000 kip ≈ 7 US$		
3	D & T Supermarket	N/A. Never sold					
4	SkyMart	N/A. Never sold					
5	AB Mart	Brand: **Hat Macca** Import and Export Trading One Member Company Limited. Ha Bac. Bac Ninh Packaging: Thang Linh Trading Company Limited, Hoan Kiem Hanoi. In-shell dried natural nuts in plastic sealed jars. It includes nut opener and silica gel packet.	Vietnam	500 gr.	115,000 kip ≈ 5.75 US$	N/A	Lao, Westerners
6	Lansii Butik (Boutique) Lao-Chinese run Snacks shop on Chaofa Ngum Road catering to travelers. It sells on-the-go small packaging snack. This shop has potential for selling macadamia in small packaging	N/A. Never sold					
7	New Century Chinese Market	Brand: **Chuanyi Food AiWeiyi** (Hawaiian Fruit) In-shell dried nuts with added salt, white sugar, food additives, edible spices) Place of origin Packaged and distributed by Puningshi Chuangyi Food Co. LTD.	Jieyang City, Guangdong , China	140 gr.	85,000 kip ≈ 4.25 US$	Not available	Chinese from mainland China, westerners.

8	Thansamay Epicerie minimart	N/A					
9	Signature Market (sells imported goods and has mainly an expats clientele)	Brand: **Macca Phung Trang Food** Company's address Thanh Oai, Hanoi. In-shell natural macadamia Plastic sealed jar Brand: **Farm Valley** Halved shelled macadamia nuts sold in vacuum sealed plastic packaging with resealing stripe. This type is used locally to bake small cookies	Vietnam	500 gr.	175,000 kip ≈ 8.75US$	N/A	Affluent Lao and Westerners. Shop sells an average of two jars per month of the shelled nuts
		Brand: **Farm Valley** Halved shelled macadamia nuts sold in vacuum sealed plastic packaging with resealing stripe. This type is used locally to bake small cookies		500 gr.	475,000 kip ≈ 22.33 US$		
		Brand: **Mila Saijai** (local family bakery) Matcha Macadamia Chocholate Cookies. 1 cookie per package		1 cookie about 100 gr.	45,000 kip ≈ 2.25 US$ -each		
10	Street fruit stall1	N/A					
11	Street fruit stall **2**	N/A					
11	Lili Minimart	N/A					
12	Sudalin grocery shop	Brand: **Hat Macca** Import and Export Trading One Member Company Limited. Ha Bac. Bac Ninh Packaging: Thang Linh	Vietnam. He places order on line from his grocery supplier in Vietnam and gets it shipped to LPB	500 gr.	130,000 kip ≈ 6.5 US$	110,000 kip	Mostly Chinese. Lao do not buy it, as they are not yet very familiar with the nut and price is too high.

		Trading Company Limited, Hoan Kiem Hanoi. In-shell dried natural nuts in plastic sealed jars. It includes nut opener and silica gel packet.	together with other groceries				
13	Street nuts stall at Night market (Thalat Meut)	N/A (only cashews from Vietnam)					
14	TC Supermarket	N/A	Thailand	1 bag (weight N/A)	140,000 kip ≈ 7 US$		
15	Thalat Phosy, Chinese-run fuit stall	In-shell semi-dried cracked nuts	China		60,000 kip ≈ 3 US$ per kg	N/A	

Table 32 Shops, Markets and Supermarkets Surveyed in Boun Neua, Phongsaly, for Macadamia Retail Sales

#	Shop name	Type of macadamia sold	Place of origin	Quantity	Price at retail	Price at wholesale	Type of buyers
1	Vietnamese-run shop (Lady from Dien Bien Phu, Tai Dam ethnicity) She places order from supplier based in southern Vietnam. Produce gets shipped to Dien Bien Phu and then the shop owner brings it over to Boun Neua by car or truck.	Brand: **Mac Ca** Cracked in-shell dried nuts in sealed plastic jars, including nut opener and silica gel packet. Type 1 nuts Dac Sain Tay Nguyen: processing station	Pak Tai, Vietnam	500 gr.	100,000 kip ≈ 5 US$	80,000 kip	Mostly local Lao buyers who eat it as a snack. She sells 20 plastic jars per month
2	Phongsaly Provincial ODOP Product Exhibition Centre	N/A					
3	Street grocery shop selling nuts, rice and other loose products	N/A					

4	SuperMaket cin Baan Bun Heua (Chinese supermarket)	Not available, but interested in selling it if available					
5	Chinese run supermarket	N/A					
6	Minimak		Thailand	500 gr.	120,000 kip ≈ 6 US$	N/A	
7	Boun Neua vegetablee and fruit market (info by Mr. Ai Oun Keao)	Dried, in-shell, un-cracked	Laos, Boun Neua	1000 gr	80,000 kip ≈ 4US$		

Table 33 Shops, Markets and Supermarkets Surveyed in Muang Xay for Macadamia Retail Sales

#	Shop name	Type of macadamia sold	Place of origin	Quantity	Price at retail	Price at wholesale	Type of buyers
1	Grocery shop selling dried nut	Brand: N/A In-shell dried nuts packaged in sealed plastic bag	N/A	500 gr.	147,000 kip ≈ 7.35 US$	N/A	
2	Minimaak Du Du Ban Hong Meengdaa	In-shell pre-cracked sold in sealed plastic bag	Thailand	500 gr.	147,000 kip ≈ 7.35 US$	N/A	

4. Consumption

Introduction

Macadamia consumption in Laos is still at an early stage, but awareness and appreciation of the nut are steadily increasing in both urban centres and more remote northern provinces. Demand is largely driven by health-conscious consumers, returning migrants, and expatriate communities, though local interest is growing as people become more familiar with the nut's nutritional benefits. The following sections outline current consumption dynamics in Vientiane, Luang Prabang, and selected northern districts.

4.1 Vientiane

In Vientiane, macadamia is becoming increasingly popular among expatriates, Japanese and Korean tourists and affluent Lao consumers who have been exposed to the nut abroad or through interaction with foreign residents. All groups appreciate the health benefits of macadamia—particularly for heart health and blood sugar regulation—and often consume it alongside other nuts as part of their daily vitamin, Omega-3, and mineral intake. Macadamia has also become a preferred snack among middle-aged Lao people while drinking beer. Two Lao consumers interviewed at a shop reported eating a few macadamia nuts each day to support heart health. According to the owner of VG Market, macadamia packages sell steadily, with at least ten sold every weekend and weekly restocking required.

Western expatriates, Asian tourists, and some health-conscious Lao tend to prefer natural dried nuts, either shelled or in-shell, whereas younger Lao consumers show a stronger preference for processed, flavoured varieties that contain salt, sugar, and additives.

4.2 Luang Prabang

In Luang Prabang, the main consumers of macadamia are Western and Chinese travelers and residents, along with a smaller group of affluent Lao locals. Several shop owners noted that many Lao residents are unfamiliar with macadamia, often asking how it should be eaten. The relatively high price further discourages some from trying the nut, as they worry they may not like the taste. Most consumers who do purchase macadamia prefer shelled or in-shell dried nuts because of their perceived health benefits. Flavoured macadamia varieties are not commonly found in shops and do not appear to be in demand.

One Lao informant reported purchasing dried pre-cracked macadamia from a Chinese stall at Phosy Market, but the nuts became rancid a few weeks after purchase. She noted that she did not particularly enjoy the taste and was disappointed that, after paying 60,000 kip per kilogram, the product spoiled so quickly.

4.3 Boun Neua, Phongsaly, and Oudomxay

In Boun Neua, macadamia nuts are gaining popularity among local residents who value their health benefits and often eat them as a snack after meals or when drinking beer, making the nut part of local social gatherings. Consumption is mainly in-shell, dried, cracked, and natural.

Local grocery shops may benefit from selling nut-cracking devices—commonly available in China or online for 30–40 yuan—to address consumers' difficulties in opening uncracked nuts. Although some uncracked nuts are available in shops, customers have complained about their toughness. Lower prices compared to other parts of Laos make macadamia more accessible to less affluent consumers in these northern towns.

Conclusion

Overall, macadamia consumption in Laos reflects a growing but uneven market. Awareness and demand are strongest in Vientiane and among expatriates, health-conscious consumers, and travelers, while local Lao interest is emerging gradually as people become more familiar with the nut's taste and benefits. Price, product quality, and proper drying and packaging remain key factors influencing consumer satisfaction and uptake. As knowledge spreads and accessibility improves, macadamia has the potential to become a more widely consumed nut across the country.

Summary of Macadamia Prices per kg/US$ — Wholesale and Retail (Selected Countries)

This table summarizes available wholesale and retail price ranges per kilogram for macadamia nuts in different formats (in-shell, shelled/kernel, dried, roasted, salted, organic and non-organic) for the requested countries. Where a reliable public price was not found the cell is marked "N/A".

Table 34 Available wholesale and retail price ranges for macadamia nuts in different formats for all surveyed countries

Country	**In-shell (natural/raw/ dried) Wholesale**	**In-shell (natural/raw/dried) Retail**	**Dried Shelled/Kernel Wholesale**	**Dried Shelled/Kernel Retail**	**Shelled Roasted/Salted Wholesale**	**Shelled Roasted/Salted Retail**	In-shell-Shelled Organic Wholesale	In-shell-Shelled Organic Retail	**Notes / Source(s)**
Germany	US$14.08 – 20.09/1 kg	US$29.35 – 56.35 / kg	N/A	US$20.1–$28.7 /kg (retail aggregate)	US$32.87 – 50/ kg (organic)	~ US$50.58 – 55.08/ kg (organic)	~ US$14.00 – 24.10/kg	US$36.39 – 56.35/kg	KoRo Drogerie, Bode Naturkost, Buxtrade. Selina Wamucii, Tradeindia, TradeWheel.
France	US$18.00 – 26.00/ kg	US$4.00 – 7.00/ kg	US$7.75 – 14.00/ kg	US$35.00 – 54.00/ kg	US$13.20 – 18.50/ kg	US$33.00 – 65.00/ kg	(shelled) US$12.00 – US$24.50 / kg	(shelled) US$45.00 – 56.00/ / kg	Retail & export trackers (SelinaWamucii; Tridge/DirTridge) Amazon.fr (Live Retail), Vracengros (Organic Bulk).

Italy	US$14.09 to 17.61 per kg.	US$17.61 to 25.83 per kg (retail)	US$29.36 to 35.22 per kg. (wholesale reported)	US$35.22 to 58.70/kg (retail)	US$52.73-55.10 / kg.	N/A	N/A	US$52.73-55.10/ kg.	KoRo, Frutta a Bacche, TovaPrezzi.
United Kingdom (UK)	US$12.60 – 14.50/ kg	US$12.60 – 14.50 / kg	US$7.38 – 16.78/ kg	US$24.90 – 37.00/ kg Waitrose example: £32.50/kg (retail derived)	US$13.20 – 15.50/ kg	US$28.00 – 40.00/ kg	US$28.80 – 31.00/ kg	US$39.00 – 41.50/ kg	Waitrose product page; Alibaba listings. Nuts in Bulk UK (Live Wholesale/Retail), Selina Wamucii UK.
Spain	US$3.50 – 6.50/ kg	US$17.00 – 24.00/ kg	US$10.50 – 16.50/ kg	US$32.00 – 52.00/ kg	US$13.00 – 17.00/ kg	US$34.00 – 58.00/ kg	US$32.00 – 52.00/ kg	US$42.00 – 55.00/ kg	Alibaba Wholesale (Regional Import/Export), Marquis Macadamias (2025 Global Benchmarks) .
United States	US$4.22 – 6.50	US$15.00 – 28.00	US$6.83 – 13.67	US$35.00 – 55.00	US$8.50 – 15.50	US$40.00 – 70.00	US$12.00 – 18.50 (shelled)	US$54.00 – 89.00	Bureau of Labor Statistics (BLS) International Nut & Dried Fruit Council (INC) Mordor Intelligence Selina Wamucii

									SkyQuest Technology The Business Research Company Tridge U.S. Department of Agriculture (USDA) Economic Research Service (ERS) World Macadamia Organisation
China	~US$4.50–6.50	CNY 100.6–167.6/kg (~US$14.3–23.9/kg retail)	~ US$7.00–16, 73/ kg	US$14.34–23.90/kg (retail)	~ US$4.00–5.59 (varies widely)	~US$ 5.30–6.60	~ US$7.00 –12.00 (some organic wholesale offers; verification varies)	114.68 Yuan ≈ 16.28 US$114.68/kg	Trade platforms (Tridge, Alibaba) and domestic retail trackers.
Vietnam	~ US$4.32–5.71		~ US$7.00–12.00 (wholesale reported for raw/dried kernels)	US$ 8–15/kg (local retail supplier listings) ~$6.84 (roasted, Grade 1)	~ US$ 6.84 (roasted, Grade 1)	N/A	US$10–12/kg (some organic FOB supplier listings) ~$5.00–7.00 (in/shell)	N/A	Tridge/DirTridge and supplier listings. Retail prices for dried nuts can range from ~$10 to over $50 per kg

							~$13.20–16.00 (Shelled)		depending on processing and brand.
Japan	N/A	¥3,000–6,000/kg (~US$20–40/kg) retail marketplace examples	~ US$17.50–24.00 (import price est.)	¥3,000–8,000/kg (~US$20–55/kg) shelled retail examples	N/A	N/A	N/A	.	Marketplace / Amazon Japan / retailer product pages.
South Korea	~ US$2.30–2.84 (wholesale est.)	Typical retail specialty > $20/kg (marketplace/supermarket examples); precise nationwide dataset N/A	~ US$18.50 (import price est.)	N/A	N/A	N/A	N/A	N/A	Public price trackers not found; rely on local retailer checks.
Singapore	N/A	SG$ ~18–45/kg (retail examples; ~ US$13–33/kg depending on brand)	~ US$29.00	SG$ ~18–45/kg (retail examples)	N/A	N/A	N/A	N/A	Supermarket and online product pages.
Laos	In-husk, farmgate 1.38 US$ Uncracked, raw, undried, farmgate price (Paksong) 3.5 US$ –3.25 US$	In-shell uncracked: ≈ US$1.38 – US$2.76 In-shell pre-cracked: 10 US$ – 11,5 US$ – 16,89 US$ – 18 US$	~ US$13.80	Halved shelled ~ 44.66 US$	Pre-cracked in-shell roasted (Paksong): 13 US$	Roasted and processed with and without flavouring 38.5 US$ - 54,92 US$ –78 US$	N/A	In-shell 13.04 US$ – 15,7 US$ Shelled 34,5 US$	Local supermarkets, markets, and retail shops

Recommendations

Introduction

This section presents a comprehensive set of recommendations to support the sustainable development of the macadamia value chain in Boun Neua District, Phongsaly Province. Drawing on field observations, stakeholder consultations, and comparative experience from other macadamia-producing regions, **the recommendations outline practical and strategic measures to strengthen production, processing, packaging, and marketing, while addressing key governance and trade constraints.** They propose actions to improve coordination among producers and authorities, establish effective local and national governance structures, develop new market networks and trade partnerships—particularly with neighboring countries and high-value international markets—and initiate certification processes such as organic and fair-trade standards. **The overall purpose of these recommendations is to enhance value addition, market access, price stability, and institutional capacity, thereby ensuring inclusive, competitive, and long-term growth of the macadamia sector in Boun Neua District.**

1. Cultivation

1.1 Provide Technical Training in Macadamia Cultivation

Focus group discussions with farmers in Boun Neua revealed that, with the exception of a small number of CCL-trained farmers and a few individuals with prior experience, most target villagers have limited knowledge of macadamia cultivation techniques. To address this gap, CCL, in collaboration with the Boun Neua District Agriculture and Forestry Office (DAFO), should proceed with its plan to provide comprehensive technical training.

Training should cover soil preparation, hole digging, plant spacing, fertilizer application, irrigation and plant care, weeding, pruning, harvesting, and other relevant cultivation practices. Technical guidance can draw on the report shared by the Vietnamese government with Phongsaly Provincial authorities. Knowledge and experience gained from Vietnam could be complemented by additional techniques from Chinese macadamia growers, as discussed below.

Practices adopted from neighbouring countries should first be tested in demonstration plots in Boun Neua and then adapted to local microclimatic and soil conditions before being widely promoted among farmers.

1.2 Promote Organic and Sustainable Macadamia Cultivation

Consumer surveys and market research indicate that macadamia buyers in Europe, the United States, Australia, Japan, South Korea, and Singapore increasingly prefer organically grown and sustainably produced nuts. To meet international quality requirements and BioTrade standards, and to better access these premium markets, organic cultivation represents a promising strategy for Lao macadamias. This approach could allow Lao production to differentiate itself from macadamias grown in Africa (e.g. South Africa, Kenya, Malawi) and other Asian countries (e.g. Vietnam, China, Thailand), where production is not always organic.

In line with CCL's existing plans, farmers in Boun Neua should be encouraged and trained to adopt organic macadamia cultivation practices. CCL should implement its planned training on organic fertilizer and compost production, enabling farmers to produce their own inputs locally. Farmers will require ongoing technical support and supervision, particularly during the early years, to address potential challenges such as reduced yields or quality issues linked to organic fertilizer use.

Survey findings also show that some land earmarked for macadamia cultivation is currently used for sugarcane production, involving heavy applications of chemical fertilizers and pesticides. European organic farming regulations require a minimum two-year conversion period for land previously under non-organic use. With support from CCL and DAFO agricultural technicians, sugarcane land could be gradually rehabilitated and converted to organic production. During this transition and the 6–7 year gestation period before macadamia trees reach full productivity, farmers could intercrop macadamia with other crops such as sencha ji, rice, maize, coffee, or other suitable products to maintain household income.

Additional learning opportunities on organic macadamia cultivation could be drawn from Menghai and Mengyang areas in Xishuangbanna, China, where the privately owned Greenfield Agriculture and Forestry Group has developed organic macadamia production systems by providing technical support to contracted farmers. Phongsaly Provincial Agriculture and Forestry Office (PAFO) could consider formally contacting this company to seek technical advice or to organize a study tour for selected Boun Neua model farmers and agricultural technicians.

1.3 Provision of Macadamia Saplings

Given the high cost of macadamia saplings in Laos and the difficulty farmers face in sourcing them, participants in the study strongly requested support with sapling provision. CCL plans to supply interested farmers with a sufficient number of high-quality saplings of suitable varieties, potentially sourced from Thailand.

At the same time, saplings of Chinese hybrid macadamia varieties are available in Xishuangbanna at lower prices than those currently found in Laos, particularly in Mengla and Jinghong areas. A small quantity of Chinese saplings could be procured and tested under Boun Neua's soil and microclimatic conditions. If proven suitable, importing saplings from nearby areas in China could represent a cost-effective alternative to Thai or Vietnamese sources, especially given the geographic proximity to the project villages.

1.4 Creation of Macadamia Hybrids Suitable for Boun Neua's Microclimate and Soil

Interviews with macadamia growers in China indicate that saplings imported from different agroecological zones often perform poorly when planted under new climatic and soil conditions, resulting in lower yields or reduced nut quality. To address this, Chinese large producers have developed locally adapted hybrid varieties through selective breeding and technical research.

Following initial testing of imported varieties in pilot plots, Lao technicians could explore the development of locally adapted macadamia hybrids that are better suited to Boun Neua's specific conditions. This work could be undertaken in collaboration with a national agricultural research institute, such as those based in Vientiane or Luang Prabang.

1.5 Establish Macadamia Seedling Nurseries in Boun Neua

Given the high cost of macadamia saplings and the strategic importance of long-term supply, CCL should proceed with its plan to establish one or two macadamia seedling nurseries in Boun Neua. Local nurseries would help reduce production costs, decrease dependency on imported planting material, and strengthen local self-sufficiency, while also providing an additional source of livelihood and skills development.

1.6 Support and Encourage Cross-border, Inter-ethnic Knowledge Exchange

Previous studies on rubber cultivation in northern Laos have shown that cross-border exchange plays a crucial role in transferring technical and market knowledge to smallholder farmers. Field research in Boun Neua villages along the Chinese border highlights strong family, social, and economic ties with communities across the border, particularly among ethnic groups such as the Akha and Tai Lue. These relationships have already influenced local knowledge and perceptions of macadamia cultivation.

These longstanding social networks should be actively leveraged as channels for technical learning, market information exchange, and confidence-building among Lao farmers. Within the limits of bilateral border regulations, the Boun Neua district authorities should encourage peer-to-peer learning and cross-border mobility to facilitate this exchange.

1.7 Organize Study Tours for Farmers and Agricultural Technicians

Study tours to high-performing macadamia production areas could provide valuable learning opportunities for Boun Neua farmers and Lao agricultural technicians (DAFO, PAFO, and CCL), particularly for those without existing cross-border connections. Phongsaly Provincial or Boun Neua District authorities, potentially with support from CCL, should establish contact with successful macadamia growers or companies in Laos, China, and Vietnam.

Where budgets are limited and to avoid complex administrative procedures, an initial study tour could be organized within Laos, for example to Paksong District in Champasak Province, where farmers could learn from successful domestic macadamia producers. However, given the similarities between Boun Neua's agroecological conditions and those of Xishuangbanna in China and northern Vietnam, study tours to these neighbouring regions would be particularly relevant.

In Xishuangbanna, potential learning sites include Ganlanba, Jingha State Farm settlements near Jinghong, or Jinuoshan in Menghai Township. Such visits should ideally be organized through official intergovernmental cooperation agreements between Phongsaly Province and counterpart authorities in Xishuangbanna (e.g. Jinghong Municipality) and Vietnam (e.g. Dien Bien Phu).

1.8 Produce Macadamia in Line with BioTrade Parameters

BioTrade is emerging as an important pathway for increasing product value and accessing highly selective European and US markets. BioTrade principles emphasize sustainability, ethical sourcing, natural and organic production, transparency, and traceability. To enhance the competitiveness of Lao macadamia on international markets, these parameters should be considered from the outset of cultivation.

Macadamia production should be environmentally sustainable and economically viable over the long term, respect farmers' labour rights and prohibit child labour, rely on natural and organic production methods, and ensure traceability throughout the value chain. While it may not be possible to meet all BioTrade requirements immediately in the Lao context, gradual efforts can be made as farmers gain experience and production systems mature.

2. Processing

2.1 Gradually Introduce Value-Adding Macadamia Processing in Boun Neua

Macadamia processing consists of several sequential stages, each adding value to the product along the value chain. These stages include:

- De-husking (removal of the green outer husk)
- Drying (controlled moisture reduction)
- Shell-cracking (opening the hard shell)
- Roasting (optional, for flavour enhancement)
- Storage and packaging

Field research indicates that **macadamia processing is currently extremely limited in Laos**, including in Paksong, where the country's oldest macadamia orchards are located. Farmers typically sell macadamia nuts to traders or companies **in-husk or de-husked, raw, in-shell, undried, and uncracked**.

Chinese and Vietnamese investors generally prefer to purchase macadamias at this early stage, as it allows them to:

- Pay low prices for raw material
- Retain full control over the technically sensitive drying process
- Capture most of the value by processing and marketing the nuts themselves

As a result, Lao farmers currently capture only a small share of the macadamia value chain. Introducing **gradual, locally managed processing steps in Boun Neua** would significantly increase farm-gate prices and local incomes, as macadamia value increases substantially with each additional processing stage.

2.2 Labour Constraints and the Need for Shared Facilities

At present, Lao farmers de-husk macadamia nuts manually, which is highly labour-intensive and time-consuming. According to interviews with buyers sourcing macadamias from Paksong, farmers are generally reluctant to engage in further processing due to:

- Lack of access to processing equipment
- Competing labour demands from other farming activities
- Absence of local processing and storage infrastructure

These constraints suggest that **individual household-level processing is not realistic in the short term**. Instead, shared or centralized facilities should be promoted, allowing farmers to benefit from processing without bearing the full labour or investment burden.

2.3 Equipment, Skills, and Investment Needs

Macadamia nuts are highly sensitive to moisture and improper handling, particularly during drying. To ensure long shelf life and food safety, producers in Boun Neua will need:

- Appropriate processing equipment
- Technical knowledge and training
- Strict quality control protocols

Initial investments in equipment could be supported by CCL through future phases of the GREEN project or through other initiatives focusing on BioTrade, organic certification, or sustainable agricultural value chains in Laos.

2.4 De-husking and Shell-cracking

Field research shows that in China, macadamia de-husking and shell-cracking are typically carried out in company warehouses using advanced, high-capacity machinery designed for industrial-scale processing. These machines are costly and unsuitable for small-scale use in the early stages of the Lao macadamia sector.

For Boun Neua, a **phased and scaled approach** is recommended:

- Start with smaller, lower-capacity machines suitable for pilot processing
- For example, combined macadamia husker–cracker machines are available online for approximately USD 9,000
- Such machines can handle around 60 kg/hour for husking and up to 30 kg/hour for shell-cracking

These machines are suitable for experimental and early commercial phases. As production volumes increase, more advanced machinery with higher throughput can be introduced. Husked and pre-cracked macadamias can already fetch **at least 30% higher prices** than in-husk nuts.

3. Drying

Drying is a **mandatory and critical step** in macadamia processing and must be completed before long-term storage, shell-cracking, roasting, or packaging. Drying removes excess moisture, preventing mould growth and spoilage while preserving flavour and nutritional quality.

Key characteristics of macadamia drying include:

- Low to moderate temperatures (generally 35–100°C)
- Long drying times (from several hours to several days or weeks, depending on moisture levels)
- Gradual and controlled dehydration

Excessive temperatures should be avoided, as they can damage kernel quality and increase rancidity. Macadamia dryers suitable for small to medium volumes can be purchased online (e.g. Alibaba, specialized manufacturers) at prices ranging from **USD 3,000 to 5,000**, depending on capacity (approximately 50–150 kg per batch).

Once properly dried, macadamia nuts can be:

- Packaged and sold on the Lao domestic market
- Initially marketed in neighbouring countries (Thailand, Vietnam, China)
- Potentially exported to higher-value markets (Europe, the United States, Australia, Japan, Korea) if quality and food safety standards are met

At this stage, drying alone represents the most important and realistic first step in local value addition.

4. Roasting

Roasting is an optional, higher-level processing step that enhances flavour and texture. It involves:

- Higher temperatures (approximately 135–160°C)
- Shorter processing times (10–30 minutes)

Roasting can be performed using:

- Small-scale ovens for pilot or artisanal production
- Industrial roasting machines for larger volumes

Roasting equipment prices range from **USD 400 to over USD 20,000**, depending on capacity and automation level. However, roasted macadamias generally have a **shorter shelf life** than dried raw kernels, as the high oil content increases the risk of rancidity.

For this reason, roasting should only be introduced once:

- Drying techniques have been fully mastered
- Proper packaging and storage systems are in place
- Market demand (especially among Lao consumers) has been tested and confirmed

5. Storage

Proper storage is essential to preserve quality and prevent spoilage of both dried and roasted macadamias. Recommended storage practices include:

- Vacuum-sealed or airtight packaging (e.g. Mylar bags)
- Storage in cool, dry, and dark conditions
- Ideally maintaining temperatures below 10°C
- Use of humidity control measures

Refrigeration can extend freshness for up to one year. Storage facilities must minimize exposure to moisture, light, heat, and air. If processing is conducted in Boun Neua, **dedicated storage infrastructure** should be established to prevent post-processing losses. Storage and quality control standards can be adapted from Chinese and Vietnamese practices through cross-border technical exchange.

5.1 Establish a Boun Neua District Macadamia Station

To support local value addition, a **central Macadamia Station** should be established in Boun Neua District. Potential locations include Ban Nyor or other villages with:

- Good road access
- Proximity to producing villages
- Easy access to the Chinese border

The station would serve as a hub for:

- Collection of macadamias from all target villages
- De-husking, drying, and initial storage
- Quality control and grading
- Administration and coordination

The station should be established **while macadamia trees are still maturing**, ensuring that processing capacity is ready once production increases. After collection and de-husking at farm or village level, in-shell nuts should be transported quickly to the station for drying to prevent mould formation. Efficient transport and infrastructure will be critical.

The macadamia station could also function as an **export hub** for sales to China and Vietnam and could be operated by:

- A locally established macadamia cooperative, or
- A Boun Neua Macadamia Association

Personnel should include individuals with expertise in processing, quality control, marketing, management, and trade. Where such skills are not available locally, CCL could support targeted capacity-building and technical training.

This phased, realistic approach to macadamia processing would allow Boun Neua producers to retain more value locally, build technical capacity over time, and progressively integrate into higher-value domestic and international markets.

6. Packaging

6.1 Functional Packaging: Preserving Freshness and Quality

To preserve freshness, crunchiness, and shelf life, macadamia nuts should be packaged in **airtight containers** that effectively control moisture and oxygen exposure. Suitable packaging options include:

- Glass jars
- Mylar bags
- Airtight plastic boxes

Breathable materials such as paper bags should be avoided, as they do not provide adequate moisture control and increase the risk of spoilage. For maximum shelf life, vacuum sealing is recommended, particularly for dried and pre-cracked macadamia nuts, which can be stored for up to one year under optimal conditions.

In regional markets (China, Thailand, Vietnam, and Laos), macadamia nuts are commonly sold in sealed multilayer plastic packaging, such as aluminium-laminated foil structures (e.g. OPP/AL/PE/LLDPE) or linear low-density polyethylene (LLDPE) bags, as well as sealed plastic cylindrical containers. These packages typically include:

- A small silica gel sachet to absorb residual humidity
- A metal key-like opener for pre-cracked in-shell macadamias

Similar packaging solutions should be adopted for Lao macadamias to meet consumer expectations and ensure product quality.

6.2 Labelling and Traceability

Each package should clearly display the macadamia brand name and include essential product information, such as:

- Country and specific area of origin (e.g. Boun Neua District, Phongsaly Province)
- Organic or non-organic status
- Processing location
- Best-before date and storage instructions

To enhance transparency and trust, packaging should incorporate a **traceability system**, such as a QR code linked to information on farm location (GPS), production practices, and the growers involved. This feature is increasingly valued by both international buyers and middle- to upper-income Lao consumers.

6.3 Packaging for Domestic Retail Markets

Simple, functional plastic packaging can be used for macadamia products sold in Lao domestic retail outlets catering to regular Lao consumers and long-term foreign residents. These formats should prioritize affordability, durability, and clear labelling, while still meeting food safety and quality standards.

6.4 Gift and Premium Packaging with Lao Identity

For higher-value markets—such as souvenir shops, premium food stores, organic groceries, and airport retail outlets—macadamia nuts can be positioned as a **distinctive Lao gift product**. In these cases, the sealed plastic food-grade packaging should be enclosed within an attractive outer package that reflects Lao cultural identity.

Potential premium packaging options include:

- **Hand-made mulberry paper boxes**, showcasing traditional Lao craftsmanship
- **Woven bamboo boxes**, similar to those used for high-quality Lao tea packaging

These natural materials serve as strong identity markers and enhance the perception of macadamias as an authentic, artisanal, and culturally rooted product. They also make macadamia nuts suitable as souvenirs for visiting customers.

6.5 Emphasising Boun Neua and Ethnic Identity

To appeal to foreign consumers and increasingly quality-conscious Lao customers, packaging should highlight **provenance, culture, and story-telling**. Labels and inserts may include:

- References to the mountainous landscapes of Boun Neua
- Photographs or illustrations of local orchards and villages

- A short narrative about the growers and their way of life

The identity and history of local ethnic groups—such as the **Akha, Phu Noi, and Tai Lue**—can be presented as markers of remoteness, traditional knowledge, and environmentally respectful farming practices. For example, Akha identity may be associated with organic and natural production systems, reinforcing perceptions of purity and authenticity.

6.6 Additional Appealing Packaging Traits

To further strengthen market positioning, packaging could incorporate:

- Eco-friendly or recyclable materials (for shell packaging) to reinforce sustainability claims
- Minimalist, natural design elements aligned with organic and BioTrade values
- Multilingual labelling (Lao and English) for international accessibility
- Resealable features for convenience and freshness

Well-designed packaging that combines product protection, traceability, sustainability, and strong cultural identity can significantly enhance the value of macadamia nuts grown and processed in Boun Neua, supporting both domestic sales and future export opportunities.

7. Marketing

7.1 Market Diversification and Phased Market Entry Strategy

Adopt a market diversification and phased market entry strategy, with an initial focus on the Lao domestic, Vietnamese, Chinese, Thai, and Singaporean/Malay markets, followed by a gradual expansion into the European, United States, Australian, Korean, and Japanese markets.

Based on the findings of this study, Asian, European, and American markets are all potentially suitable destinations for Lao macadamia. However, these markets differ significantly in terms of regulatory requirements, quality standards, certification needs, and consumer expectations. A **phased approach is therefore recommended**, **moving progressively from lower-regulated markets to highly regulated, high-value destinations.**

Overall, international macadamia markets vary widely in their food safety requirements, labeling and traceability obligations, and preferred product formats. Lao macadamia can successfully access these markets by aligning processing levels, certification, and packaging with each destination's requirements and by gradually upgrading capacity and compliance.

7.2 Overview of Target Markets

Europe

The European market is highly regulated, with strict standards related to food safety, pesticide residues, traceability, labeling, and organic or BioTrade certification. Consumers place strong emphasis on sustainability, ethical sourcing, and clear provenance.

• **Opportunities:** premium pricing for organic and sustainably produced macadamias

supported by strong origin storytelling
• **Challenges:** high compliance costs and competition from established suppliers
• **Preferred products:** organic or natural shelled kernels and premium in-shell gift packs

United States
The US market is regulated by FDA and USDA requirements and demands robust food safety systems, particularly for processed and organic products. Consumers value health attributes, convenience, and transparent labeling.
• **Opportunities:** large-scale demand from snack and food-processing industries and a growing health-food segment
• **Challenges:** intense competition and high logistics and marketing costs
• **Preferred products:** shelled kernels (natural or lightly roasted), organic and snack-ready formats

Japan
Japan is among the most demanding markets globally, with extremely strict sanitary controls, quality consistency requirements, and high expectations for packaging and presentation. Giftability and provenance are key purchasing drivers.
• **Opportunities:** high willingness to pay for premium, distinctive products
• **Challenges:** very low tolerance for quality defects and complex import procedures
• **Preferred products:** premium in-shell gift formats and high-grade whole kernels, often organic

South Korea
South Korea enforces strict food safety and labeling standards and shows rapidly growing demand for premium snacks and health-oriented foods. Flavor innovation and attractive branding are important.
• **Opportunities:** expanding market for healthy and flavored nut snacks
• **Challenges:** competitive landscape and need for strong branding and local partnerships
• **Preferred products:** shelled kernels (plain, roasted, or flavored) and premium in-shell nuts

Vietnam
Vietnam is familiar with macadamia trade and has moderate regulatory barriers compared to Western markets. Buyers are generally price-sensitive and often prefer to conduct further processing themselves.
• **Opportunities:** geographic proximity and established cross-border trade networks
• **Challenges:** strong price competition and limited scope for premium differentiation
• **Preferred products:** in-shell macadamias for gifting and affordable shelled kernels for processing

Singapore
Singapore is a small but high-value market with strong emphasis on food safety, traceability, organic certification, and premium presentation. Consumers are affluent and quality-driven.
• **Opportunities:** niche positioning in boutique, organic, and gift segments
• **Challenges:** limited volumes and relatively high entry and branding costs
• **Preferred products:** organic shelled kernels and premium souvenir or gift packaging

Australia
Australia has a well-developed domestic macadamia industry and strict biosecurity and quality standards. Consumers strongly favor local products but are receptive to niche, differentiated imports.

• **Opportunities:** specialty and organic segments valuing unique origin stories
• **Challenges:** dominance of domestic producers and stringent standards
• **Preferred products:** high-quality shelled kernels, particularly certified organic

China

China combines complex import registration and customs procedures with one of the world's largest macadamia markets. Demand is divided between festive gifting and everyday snacking.
• **Opportunities:** very large and growing market, geographic proximity, and cultural familiarity
• **Challenges:** strong domestic production, price pressure, and administrative complexity
• **Preferred products:** in-shell macadamias for gifting and shelled kernels for snacks and processing

Lao Domestic Market

The Lao domestic market has relatively light regulatory requirements, although food safety and labeling expectations are increasing in urban centers. Consumers are price-sensitive but increasingly interested in local, natural, and organic products.
• **Opportunities:** strong "Made in Laos" appeal and low market entry barriers
• **Challenges:** limited purchasing power outside major cities and low awareness of macadamia uses
• **Preferred products:** affordable in-shell nuts and simply packaged shelled kernels, with premium organic formats targeting urban and tourist consumers

7.3 Phased Market Entry Pathway for Lao Macadamia

Phase 1: Lao Domestic Market (Foundation Phase)

Objective: Build production volume, basic quality control, and farmer confidence.

In the initial phase, macadamia production should focus on the Lao domestic market, where regulatory requirements are limited and entry barriers are low. This phase allows farmers to gain experience without the pressure of strict export standards.
• Processing level: de-husked, dried, in-shell; limited shell-cracking
• Packaging: simple airtight bags or containers with basic Lao/English labeling
• Markets: local shops, urban retail, tourist outlets, domestic wholesalers
• Key actions: farmer training, mastery of drying techniques, basic storage infrastructure

Phase 2: Cross-Border Regional Markets (China and Vietnam)

Objective: Generate stable cash flow and upgrade post-harvest handling.

Once drying and storage practices are well controlled, Boun Neua macadamia can enter nearby regional markets, particularly China and Vietnam.
• Processing level: dried in-shell nuts; limited cracked kernels
• Packaging: sealed bags with basic traceability elements (batch codes, QR codes)
• Markets: border trade, regional wholesalers, gifting channels
• Key actions: customs registration, buyer relationship building, logistics coordination

Phase 3: ASEAN Premium Niches (Singapore and Selected Urban Markets)

Objective: Test premium positioning and organic differentiation.

With consistent quality and improved packaging, Lao macadamia can target high-value ASEAN niche markets.
• Processing level: dried in-shell gift packs and shelled kernels

• Packaging: premium identity packaging highlighting Boun Neua and ethnic heritage
• Markets: organic shops, gourmet retailers, airport and souvenir outlets
• Key actions: transition toward organic production, branding, traceability systems

Phase 4: Advanced Asian Markets (Japan and South Korea)
Objective: Enter high-standard markets with fully compliant premium products.

Entry into Japan and South Korea should occur only once processing, storage, and documentation meet consistently high standards.
• Processing level: high-grade dried in-shell nuts and premium whole kernels
• Packaging: gift-ready, high-quality packaging with detailed labeling
• Markets: specialty importers, premium retail, gift segments
• Key actions: laboratory testing, importer partnerships, packaging refinement

Phase 5: Western High-Value Markets (Europe and United States)
Objective: Maximize value through organic (and Fair Trade) certification and BioTrade positioning.

The final phase targets Europe and the United States, where regulatory requirements are most stringent but price premiums are highest.
• Processing level: shelled kernels (natural or lightly roasted) and selected value-added products
• Packaging: certified organic, BioTrade-compliant, consumer-ready formats
• Markets: health-food brands, ingredient buyers, premium snack producers
• Key actions: organic certification, HACCP/FSSC systems, marketing and origin storytelling

7.4 Cross-Cutting Principles Across All Phases

Across all phases, the following principles are critical to success:
• Gradual scaling of processing capacity and investment
• Strong quality control, particularly moisture management and storage
• Use of cooperatives or a Boun Neua Macadamia Station to centralize processing
• Progressive adoption of traceability, sustainability, and BioTrade principles

7.5 Liaise with Lao Farmers and Local Authorities in Paksong to Gather Market Intelligence

It is recommended that the GREEN project stakeholders liaise closely with Lao farmers, cooperatives, and local authorities in Paksong to collect up-to-date information on farmgate prices, trading practices, and market dynamics related to macadamia. Paksong hosts some of the earliest macadamia orchards in Laos and has established trading relationships with Lao and Vietnamese, wholesalers and retailers. Engaging with farmers, PAFO/DAFO staff, and local traders in Paksong would allow Boun Neua stakeholders to better understand prevailing price levels, seasonal fluctuations, quality requirements, and buyer expectations. This information would be essential for benchmarking prices, anticipating market risks, and designing realistic pricing and marketing strategies for macadamia produced in Phongsaly Province.

7.6 Develop Business Collaboration with Lao, Chinese, and Vietnamese Macadamia Middlemen and Companies

During the tree gestation period, before macadamia orchards in Boun Neua begin producing commercial yields, it is advisable for Phongsaly Provincial and Boun Neua District authorities (PAFO, DAFO, Department of Industry and Commerce, Department of Domestic Trade, and the Governor's Office), together with the Boun Neua Macadamia Association (to be established), to proactively identify and engage Lao, Chinese, and Vietnamese companies interested in sourcing macadamia from the district. Early engagement would help establish business relationships and clarify future purchase conditions, including farmgate prices, product formats (in-husk, in-shell, shelled, dried, or unprocessed), quality standards, nut size, expected volumes, and organic versus non-organic production. Defining these parameters in advance would reduce uncertainty for farmers, support production planning, and help ensure that Boun Neua macadamia enters the market under transparent and mutually beneficial terms.

7.7 Liaise with Lao Agribusiness Exporters to Learn about Market Access and Certification Requirements

It is further recommended to engage with Lao agribusiness companies that have already gained experience exporting agricultural products to regional and global markets. Companies such as Phongsaly Green Tea, Somneuk Laothang Tea Factory, Sengkham Laoly Tea Factory, SD Forest, Tiddin, and Tanjan have developed export channels and compliance systems for organic certification, pesticide management, and quality control. Learning from their experiences would provide valuable insights into export procedures, certification costs, risk management, and buyer expectations. Notably, Tiddin and Tanjan have expressed interest in sourcing macadamia from Boun Neua in both raw and pre-processed forms (dried and pre-cracked), indicating potential early market opportunities. Collaboration with these firms could help Boun Neua producers shorten learning curves and avoid common pitfalls in export-oriented agribusiness.

7.8 Draw on Cross-Border Ethnic Networks to Access Market Knowledge in China

Existing cross-border ethnic networks, particularly among Akha, Tai Lue, and other groups with social and family ties across the Lao–China border, represent an important source of informal market intelligence. These networks can provide timely information on macadamia price trends, buyer preferences, seasonal demand, and quality standards in Xishuangbanna and other macadamia-producing or trading areas in China. Leveraging these long-standing social connections can help Boun Neua farmers and authorities better understand market dynamics, reduce information asymmetries, and build trust with potential buyers. When combined with formal trade channels and institutional support, such cross-border knowledge exchange can enhance the competitiveness of Lao macadamia in regional markets.

7.9 Develop E-Commerce Sales Channels for Lao Macadamia in Regional Markets

Once cultivation, post-harvest handling, drying, and storage practices are sufficiently mastered, the sale of dried in-shell or shelled macadamia through online platforms in China and Vietnam should be actively pursued. E-commerce channels such as Taobao, Alibaba, and TikTok offer direct access to large consumer markets, allowing Lao macadamia to reach buyers without relying exclusively on traditional intermediaries. Selling through online platforms can increase price transparency, improve profit margins

for producers or associations, and enable the promotion of Lao macadamia as a distinctive product based on origin, quality, and sustainable production practices. This approach requires consistent product quality, adequate packaging, basic branding, and reliable logistics, but it offers a scalable and relatively low-cost pathway to test market demand, build brand recognition, and gradually expand market access in neighboring countries.

7.10 Establish Collaboration with Specialized Nut Importers or Agents to Access the European Market

To enter the European market, Lao producers or Lao-based export companies should establish early contact and collaboration with specialized nut importers or agents operating within the European Union. A significant share of macadamias consumed in Europe is imported and distributed through such specialized intermediaries, who possess in-depth knowledge of market requirements, regulatory compliance, quality standards, and buyer expectations. Partnering with an experienced importer or agent—particularly in key markets such as Germany (OMNITRADE Handelsgesellschaft mbH / OMNITRADE Handelsgesellschaft GmbH), the Netherlands, Spain, or France (TCC Logistics)—would help Lao macadamia producers navigate complex EU regulations related to food safety, traceability, labeling, and organic certification. In addition, engagement with sector organizations such as the International Nut and Dried Fruit Council (INC), headquartered in Spain, could enhance visibility, market intelligence, and networking opportunities within the global nut industry. Through these partnerships, Lao macadamia producers can strengthen production systems, align with international quality benchmarks, and position themselves more competitively in the European macadamia market.

7.11 Initiate Dialogue with Fair Trade Organizations and Buyers in Europe and the United States

In parallel with conventional market entry pathways, it is recommended to initiate discussions with Fair Trade organizations and Fair Trade–oriented companies operating in European and American markets. These organizations typically work with smallholder farmers and emphasize fair pricing, ethical labor practices, environmental sustainability, and long-term trading relationships. Early engagement would allow Lao macadamia producers and relevant authorities to better understand Fair Trade certification requirements, minimum price mechanisms, premium structures, and quality standards. While Fair Trade certification may not be immediately attainable, initiating dialogue at an early stage would help align production practices with Fair Trade principles over time and assess whether this certification pathway could offer a viable and value-added market channel for Boun Neua macadamia in the medium to long term.

7.12 Adopt Robust Traceability and BioTrade-Compliant Marketing Systems

For marketing and international positioning, it is strongly recommended to adopt robust traceability systems that clearly demonstrate responsible sourcing, sustainability, and transparency at the farm level. Traceability—such as batch-level tracking linked to farm locations, production practices, and processing steps—significantly enhances brand credibility in premium and ethical markets. Lao producers could draw practical lessons from the GPS-based traceability system currently adopted by Tiddin in Vientiane and explore how similar tools could be applied to macadamia production in Boun Neua. Such systems would support compliance with BioTrade parameters, including sustainability, ethical sourcing, natural and organic production methods, transparency, and traceability.

Even if full BioTrade certification is not immediately pursued, aligning production and marketing practices with these principles would strengthen Lao macadamia's market appeal and future certification readiness.

7.13 Explore Access to International BioTrade Networks through Helvetas and Regional Partners

It is further recommended to explore opportunities to access international BioTrade networks by liaising with the Helvetas project and its regional BioTrade team. BioTrade products possess several strong unique selling points (USPs), notably sustainability, ethical sourcing, natural and organic characteristics, and high levels of transparency and traceability. These attributes resonate strongly with a growing segment of consumers in Europe and North America who prioritize environmental responsibility and social impact. Engagement with BioTrade networks could provide technical guidance, capacity building, market linkages, and visibility in specialized ethical and sustainable product channels. Over time, this approach could help position Lao macadamia as a differentiated product within high-value niche markets rather than competing solely on price.

7.14 Promote Lao Macadamia through Trade Fairs and Trade Shows in Laos, Asia, and Selected Global Markets

Participation in trade fairs and trade shows should be a core component of the marketing and partnership-building strategy for Lao macadamia. Trade fairs offer direct access to buyers, importers, distributors, and industry stakeholders, while also providing insights into market trends, packaging standards, and competing products. Initially, participation could focus on trade shows in Laos and neighboring Asian countries such as Thailand, Vietnam, China, Malaysia, and Hong Kong, where entry costs and regulatory barriers are relatively lower. Examples include specialized nut and food exhibitions in China, such as the China Nut & Dried Fruit Expo. As capacity and readiness increase, participation could be extended to selected fairs in Australia and Europe. In Europe, relevant events may include specialty food, organic, or cosmetic ingredient fairs (such as In-Cosmetics Global in France, where macadamia oil and by-products could also be promoted). Strategic and phased participation in such events would help build brand recognition, establish buyer relationships, and progressively integrate Lao macadamia into regional and global value chains.

8. Governance

8.1 Establish a National Lao Macadamia Association

Major macadamia-producing countries, such as Australia, Malawi, and Kenya, have established national macadamia associations to coordinate production, marketing, and trade. Similarly, the formation of a countrywide Lao Macadamia Association would bring significant benefits and could be incorporated into the National Five-Year Development Plan or the broader National Development Strategy. The association would act as a central coordinating body for all stakeholders in the macadamia value chain, including farmers, processors, traders, government agencies, and research institutions. Its core functions could include:

- **Price Stabilization:** Develop and implement fixed price ranges for both raw and processed macadamia products to protect farmers against market volatility and ensure equitable returns.
- **Knowledge and Technology Sharing:** Facilitate the dissemination of best practices in cultivation, harvesting, post-harvest handling, and processing techniques among producers nationwide.
- **Market Intelligence:** Collect and share information on marketing strategies, buyer preferences, and trading trends within Laos and neighboring countries such as China, Thailand, and Vietnam.
- **Buyer and Market Coordination:** Identify potential common buyers across regional markets, negotiate bulk sales, and coordinate logistics to improve efficiency and reduce transaction costs.
- **Regulatory Liaison:** Act as the primary interlocutor with government agencies regarding customs clearance, food safety standards, and quarantine regulations in key export markets. This official status enhances credibility, expedites negotiations, and provides a unified voice for producers in discussions with ministries, trade agencies, and foreign import authorities.

By providing a structured, credible, and professional forum, the National Macadamia Association would strengthen the competitiveness of Lao macadamia in regional and international markets.

8.2 Establish a Boun Neua District Macadamia Association

At the local level, a Boun Neua District Macadamia Association would ensure that governance, quality standards, and market facilitation are effectively implemented within target villages. The district association's committee would perform the following roles:

a. **Production and Quality Standards:** Define guidelines for cultivation, harvesting, storage, and quality control, ensuring that all target villages meet consistent production standards.

b. **Mediation and Dispute Resolution:** Serve as an intermediary between growers and middlemen or companies, mediating issues related to pricing, payment schedules, and product quality to maintain trust across the supply chain.

c. **Association Board Composition:** Include key local macadamia growers, a representative from the District Agriculture and Environment Office (DAEO), and one member from the GREEN project with agriculture expertise. This ensures a balance of farmer input, technical knowledge, and project oversight.

d. **Marketing and Trade Facilitation:** Assist in formalizing agreements with buyers, promoting collective bargaining, and supporting local producers in entering regional and international markets.

This district-level structure creates a strong foundation for local governance while aligning with national strategies for macadamia development.

8.3 Set Fair Farmgate Prices Through Multi-Stakeholder Negotiation

To ensure equitable benefit-sharing and long-term farmer engagement, farmgate prices should be established through structured negotiations involving:

- Phongsaly Provincial Authorities
- Macadamia middlemen or purchasing companies
- Boun Neua District Macadamia Association

Key considerations for price-setting:

- Production costs and labor intensity
- Processing levels and quality attributes
- Farming method (organic vs. conventional)
- Transportation and logistics costs
- Certification status (organic, fair trade)
- Market comparisons with regions such as Paksong (Laos), Vietnam, and southern China

Mechanisms for Price Transparency:

- Village or cluster-level cash crop price information points, hosted at local leaders' houses or civil society offices, to disseminate market information.
- Digital communication tools, such as WhatsApp groups, to share real-time price updates and facilitate communication between farmers and buyers.

This approach would reduce information asymmetry, protect farmers from exploitation, and strengthen trust among stakeholders, ultimately promoting a stable and sustainable macadamia value chain.

8.4 Facilitate Knowledge Exchange Between Provinces

Boun Neua District and Phongsaly provincial authorities should actively liaise with authorities in Champasak Province to benefit from existing macadamia extension programs. Collaboration could include:

- Technical assistance and training in cultivation, processing, and post-harvest handling
- Exchange visits for farmers and extension officers to observe best practices
- Joint workshops on market access, organic certification, and value addition

Additionally, leveraging the memorandum of cooperation signed in June 2024 between the Department of Agriculture and Forestry of Phongsaly Province and the Department of Agriculture and Rural Development of Dien Bien Province, Vietnam, will be useful. This cooperation provides:

- Opportunities for demonstration plantations to acquire practical planting know-how
- Platforms for exploring regional marketing and trade opportunities
- Sustainable support for extension services, technology transfer, and market linkages

8.5 Strengthen Trade Cooperation with China

To expand export opportunities, Phongsaly Provincial authorities should pursue trade cooperation with counterparts in Yunnan Province and the Xishuangbanna Dai Autonomous Prefecture. Strategic actions could include:

- Negotiating preferential VAT rates and temporary tax reductions to improve the price competitiveness of Lao macadamia in Chinese markets

- Signing formal trade agreements or memoranda of understanding to facilitate cross-border export processes
- Benchmarking Lao macadamia against competing suppliers (South Africa, Mozambique, Malawi) to ensure competitive positioning
- Coordinating with customs, trade, and quarantine agencies to streamline export procedures and reduce delays

Such agreements would enhance Lao macadamia's access to China while creating a favorable environment for sustainable growth and long-term export stability.

9. Certifications and Export Authorization

9.1 Conduct Field Research with Chinese Customs and Trading Authorities

To ensure smooth export of macadamia products to China, it is essential to carry out comprehensive field research with Chinese customs and trading authorities. This research should focus on understanding the quarantine protocols, certification requirements, and food safety standards applicable at key border crossing points such as Mohan and those near Boun Neua. By gathering firsthand information, Lao exporters and the Lao Macadamia Association can identify potential regulatory bottlenecks, clarify documentation requirements, and develop strategies to ensure that products meet all Chinese import standards. This proactive approach reduces the risk of shipment delays or rejections and builds trust with Chinese trading partners.

9.2 Register Lao Overseas Production Facilities with Chinese Authorities

Compliance with China's *Provisions on Administration of Registration of Overseas Producers of Imported Food* is a mandatory step for exporting macadamia products. Lao production facilities, including processing plants, must be formally registered with China's General Administration of Customs. Registration ensures that Chinese authorities recognize the facility as a legitimate exporter and allows the products to undergo import inspection and clearance. This process also requires adherence to Chinese food safety, quarantine, and labeling standards for macadamia kernels, powders, and other value-added products. Early registration not only facilitates trade but also signals credibility to Chinese buyers.

9.3 Support Sustainable Agricultural Standards and Fair-Trade Certifications

To access high-value markets in Europe and the United States, producers and the Lao Macadamia Association should be supported in developing sustainable agricultural practices and obtaining fair-trade certifications. This includes implementing good agricultural practices (GAP), minimizing the use of synthetic chemicals, and ensuring environmentally sustainable farming techniques. Certification for sustainability and fair-trade standards enhances product credibility, opens doors to premium markets, and allows Lao macadamia to compete effectively with established producers globally. Assistance can include technical training, farm audits, and guidance on certification documentation.

9.4 Liaise with Accredited Organic Control Bodies in Europe, the US, and Australia

Achieving organic certification requires coordination with accredited organic control bodies in target export markets. Lao exporters or the Lao Macadamia Association should engage

directly with these bodies to understand the compliance requirements, conduct necessary inspections, and ensure that farm management, processing, and storage practices meet organic standards. Successful certification enables labeling of macadamia products as “organic” in the EU, US, and Australia, significantly increasing market appeal and allowing entry into mainstream retail chains and high-value segments. Continuous communication with certifying bodies ensures that standards are maintained and facilitates renewals and audits.

9.5 Prioritize Organic Certification over Fair-Trade Certification in the Initial Stage

For market entry into Europe and the US, organic certification should be prioritized over fair-trade certification. Organic certification has a broader mainstream market reach and higher demand, while fair-trade certification targets a smaller, niche segment that requires strong cooperative structures, democratic governance, and collective decision-making. For smaller and fragmented communities in Laos, building the governance and organizational capacity for fair-trade certification may take time. Fair-trade certification can therefore be considered a complementary step, implemented after establishing strong cooperatives and targeting ethical, niche buyers. Prioritizing organic certification maximizes market access and revenue potential in the initial stages.

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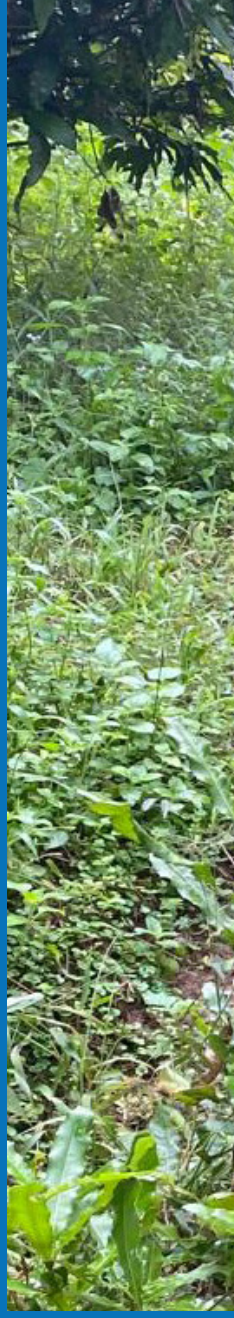

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