



Pacific Horticultural &
Agricultural Market Access
Plus Program

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Samoa Noni (Nonu)

MARKET STUDY

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Aid Programme

Samoa Noni (Nonu)

MARKET STUDY

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AFM	Avocados from Mexico, collaborative agricultural export marketing organization
CBD	Cannabidiol, extract of the Cannabis sativa plant (also known as marijuana or hemp), which contains no psychoactive ingredient THC
CTAHR	College of Tropical Agriculture and Human Resources at the University of Hawaii, Manoa campus
EBITDA	Earnings Before Interest, Taxes, Depreciation, and Amortization
FAO	Food and Agriculture Organization of the United Nations
FDA	U.S. Food and Drug Administration
GDP	Gross Domestic Product
GMO	Genetically Modified Organism
HACCP	Hazard Analysis Critical Control Points, a food safety standard
IPC	Independent Product Consultant, term used to identify multi-level market distributors for Tahitian Noni® products
ITC	International Trade Centre
IWG-Nonu	Samoa Industry Working Group-Nonu
MAF	Samoa Ministry of Agriculture and Fisheries
MCIL	Samoa Ministry of Commerce, Industry and Labour
MLM	Multi-level marketing; business structure where non-employee salespeople earn commissions on sales to subordinate recruits in a legal pyramid scheme
NESOI	Not Elsewhere Specified Or Included
NZAID	New Zealand Agency for International Development
PINA	Pacific Islands Noni Association
RTD	Ready-To-Drink
SAT	Currency: Samoan Tala
SEC	U.S. Securities and Exchange Commission
SKU	Stock-Keeping Unit; a unique retail product often represented as a number and barcode on package labels
SROS	Scientific Research Organisation of Samoa
WIBDI	Women in Business Development Incorporated

NOMENCLATURE

Nonu (*Morinda citrofolia*) is known worldwide by dozens, if not hundreds of vernacular names (Nelson & Elevitch, 2006). Popular common names include the “awl tree” (Australia, India, Java, Malaya); “morinda” (Australia, Vietnam, USA, Surinam); various cheese-like terms, “cheesefruit” (Australia), “limburger tree” (USA), “formagier” (Haiti), and references to painkilling properties, “pain bush” (Trinidad & Tobago), “pain killer” (Puerto Rico, Virgin Islands) (Nelson, 2006). The word *Morinda* in its botanical name is derived from the Latin *morus* for “mulberry” and *indicus* for “Indian,” in reference to its most common English name: the “Indian mulberry.”

In Samoa and among some other Polynesian nations, the plant and its fruit are best known as nonu. There are many similar variations of this pronunciation used worldwide: non, noni, nony, nono, nho, nen, nin, nino, nuna, nenu, mona, monii, atoni, and nhau just to name a few (Nelson, 2006). Among these, “noni” is the most common used in trade, and best recognized by English-speaking consumers searching for products derived from the *Morinda citrofolia* tree¹. “Nonu” Google searches for “nonu” outnumber “noni” searches only in New Zealand, where a popular professional rugby player shares the same name².

For the purpose of consistency, this report uses “noni” herein where referencing *Morinda citrofolia*, its fruit and products, except where referring to a report title, direct quote, or brands and entities containing the word as a proper noun.

Samoa’s producers/exporters may consider doing the same when communicating with international markets. International companies engaged in consumer public relations and marketing have made substantial investments in the term “noni,” over the past 30 years, including but not limited to the world’s best-known product brand Tahitian Noni®. Developing similar awareness of the term “nonu” will be costly and may add to market confusion with the well-established “noni” product name.

By standardizing external communication using the term “noni,” the industry can leverage existing name equity established by others for maximum accessibility in English-speaking markets. Translation or regionalization may additionally be appropriate when marketing consumer products within specific predominantly non-English speaking countries, such as China, Korea, and Japan³.



Figure 1: Ripening noni fruit.
Photo credit: Andrew Hetzel.

1 Google Trends keyword search results
2 Too few searches are made within Samoa for Google to display results for either term
3 Research for this study was conducted entirely in English

1.

EXECUTIVE SUMMARY

Noni is an important agricultural export from Samoa, providing income for more than 17,000 smallholder semi-subsistence farming households and contributing more than SAT\$10m annually to the country's economy. As a crop, noni is unique in many ways. The tree is hearty, growing in an unusually wide range of soil and environmental conditions. It has an exceptional tolerance to heat, wind, fire, flooding, saline, and drought that make it arguably the most durable climate-change immune crop in commercial production anywhere today. Its fruit is harvested continuously throughout the year, containing high vitamin content and potential health benefits unmatched by popular produce.

Also, unlike other agricultural exports from Samoa, noni is new to world trade. Despite being consumed or used as traditional medicine for thousands of years in the areas where it grows wild, noni fruit was unknown to most consumers outside of Polynesia just 30 years ago. Samoa only began commercial production in 2000. This creates a number of challenges unique to noni trade that do not exist for other commodities, such as a lack of market data, product standards, supporting institutions, and established markets with predictable demand. However, being new can also have benefits: novel products are not constrained by commonly accepted uses or historic sales performance. The non-traditional markets where noni trades welcome innovation, creating opportunities for industry growth and value addition only limited by imagination.

Widespread demand for commercial noni products began with an American company that introduced Tahitian Noni® juice to mainstream North American consumers as an ancient but newly rediscovered health tonic⁴. Others followed seeking to capitalize on the growing consumer curiosity for noni juice and by developing new channels for sale in Europe and Asia. French Polynesia's noni production industry was entirely committed to production of Tahitian Noni® juice as the company grew, so competing retail product manufacturers looked for wholesale juice and fruit concentrate suppliers in Samoa, Hawaii, the Cook Islands, Fiji and other tropical regions. This created a noni gold rush among producing countries, which quickly established commercial farming and processing facilities.

In the early 2000's, consumer media featured noni products as the latest health fad, universities began research on promising compounds found in the plant's unique biochemistry, and noni industry associations were formed to discuss issues of standards and quality. Development workers championed noni production as a new potential source of income for developing countries uniquely positioned to meet escalating consumer demand. During these golden years, global noni exports grew quickly, and experts predicted billion-dollar retail noni product market valuations by the decade's end. That vision stalled during the Great Recession of 2007-2008 when Samoa's noni export volumes and values plunged. In retrospect, it was likely an illusion anyway due to a critical misunderstanding about the market fundamental driving the noni juice craze: Tahitian Noni® is a multi-level marketing (MLM) company.

⁴ There is little scientific evidence supporting noni juice health claims; however, this situation is no different for any other fruit juice or nutritional supplement.

MLM is a legal form of pyramid scheme where independent product distributors recruit others to do the same, each receiving some percentage of downstream sales. New recruits generally buy inventory, which is a main source of upstream commissions. An analysis of data published by the company shows that less than 0.5% of 300,000 active distributors earn a profit from noni product sales (Taylor, 2011). While Tahitian Noni® used noni juice as a vehicle to collect revenue, the real product being purchased by distributors was a dream of financial independence. It is unclear how much Tahitian Noni® juice was ever consumed by paying customers and how much remains in the unsold inventory of aspiring sales recruits.

Demand for Samoa's noni exports returned after the recession but without the enthusiastic enabling environment that previously encompassed the industry. Published independent research declined over the following decade⁵, as did new noni product launches, online searches, and coverage by consumer press. The few organizations representing noni's interests, like the Pacific Island Noni Association and Australian Noni Growers Association disbanded. Today, noni has been surpassed by newer novel trends like turmeric, kombucha, coconut water, spirulina, cannabidiol (CBD) oil, and others.

Few entities aside from a handful of brands vertically integrated from farm to retail⁶ have a long-term interest to advocate for noni. Retail product manufacturers will bottle whatever consumers are willing to buy with no allegiance to a single ingredient. The same indifference is extended to their wholesale supplier network. When goji berries, collagen, or pomegranate pips become more popular than noni fruit, manufacturers quickly change suppliers and introduce a new flavour to the production line. Today, Hawaii or India may be perceived as competitors to Samoa's noni industry, but the reality of competition is not from another country, it is from other crops.

Consumer demand, however, does not grow spontaneously. It is carefully cultivated by private companies or collaborative associations of product manufacturers through a sustained series of marketing activities⁷. Agricultural commodity marketing boards like the California Milk Processor's Board (Got Milk?), Japan's Kobe Beef Marketing and Distribution Association, and the Avocados from Mexico collaborative marketing entity all work tirelessly to keep their products relevant and popular. Combined with a strict set of quality standards for their branded agricultural products, targeted collective marketing pays a substantial return on investment for producers by sustaining visibility and communicating differentiated value to achieve high prices. No entity is currently fulfilling this role, so worldwide attention from noni's main "healthy lifestyle" audience has drifted to other crops perceived as being more relevant in 2020.

Economic growth in S. Korea and China⁸ have allowed Samoa's noni export industry to expand output dramatically to those countries since 2010 due to an across-the-board increase in demand for all types of natural fruit juices. Additionally, eruption of the Kilauea volcano in 2018 damaged some Hawaii noni-producing estates causing Hawaiian retail noni product manufacturers to look for convenient alternate suppliers. Although these events have buoyed the industry to record export volumes in recent years, the future of Samoa's noni industry is far from secure.

Noni trees produce fruit in just three years after planting and are relatively easy to maintain. Any country in the tropics has the potential to quickly become a noni grower, and commercial fruit juice production facilities are inexpensive relative to other manufacturing industries. This has not escaped the notice of entrepreneurs in places like India, Myanmar, Vietnam, and Peru, where small wholesale juice industries have recently emerged.

Although Samoa has the experience and potential to offer juice and other noni products of superior quality, the wholesale market of trade for noni remains immature and is unwilling to pay for differentiating value beyond meeting minimum standards for product safety compliance. Samoa also faces the burden of high costs of production and distribution due to its remote location and inefficient traditional methods of non-intensive smallholder farming. This places Samoa in the unenviable position of being a premium supplier in a commodity market where anyone can quickly be a less expensive competitor. Worse, it is a market where most participants are operating blind since so little information like prices and trade volumes are published. The scant market intelligence that exists stays within the offices of buyers and sellers who perceive no incentive to share⁹. This results in an unstable and unpredictable market where client-supplier relationships are purely transactional based on short term factors of convenience without long-term stability. Disposable supplier relationships are low-value and easily substitutable.

The turbulent environment created by these factors present Samoa's noni industry with the need to innovate in order to protect its economic future as a noni producer. Without quick action, the country risks becoming a high-cost supplier of wholesale commodities in an unpredictable market with increased competition from substitutes. Lacking a vocal industry champion, the noni fruit itself may fade into obscurity among consumers, threatening the economic contribution it currently makes to the livelihoods of thousands of families.

Samoa's noni producers must collaborate with each other and with government to take the lead and set the industry's highest standards for quality to create value while concurrently transforming into niche specialty consumer product manufacturers. As a consumer product maker rather than wholesale ingredient supplier, Samoa will then set the market message for the noni industry while building consumer geographic brand loyalty. Producers will capture new value from downstream consumer sales leading to new manufacturing jobs, more demand for noni fruit from farmers, and better market communication unhindered by layers of middlemen.

Women, in particular stand to benefit from this as they currently participate only in the far up-stream low value segment of the value chain, yet offer a diversity of perspectives that promise the potential of innovation to reach to new markets. Consumers¹⁰ motivated by authenticity, utility, and sustainability will pay for the added value provided by Samoa's specialty noni goods. Wholesale noni juice can be produced in many places, but there will be no substitutes for the strong brand reputation that Samoa can achieve.

⁵ The makers of Tahitian Noni® have funded a significant portion of the noni-related research recently published.

⁶ e.g. Tahitian Noni®, Dave's Noni® (India) and some small estate brands in Hawaii.

⁷ Positive scientific discovery, like clinical proof of some health benefit also increases demand; however, no scientific discovery is certain and may conclusively prove negative characteristics that reduce demand.

⁸ In addition to a recent tariff reduction in China to 5%.

⁹ In stakeholder consultations, exporters reported not knowing the final country destination or application of goods sold. Nearly two dozen commercial buyers failed to respond or refused to comment for this study claiming participation would disclose company secrets.

¹⁰ Particularly Generation Z and Millennials

1.1. Key Findings Of This Report

- Noni is a robust, climate-adaptable tree that produces fruit with uniquely desirable biochemistry. While misunderstood and historically misrepresented by opportunists, it offers nutrition and health impacts comparable to or better than most widely consumed fruits available today.
- Noni is farmed by thousands of semi-subsistence households in Samoa, who will benefit from increased noni production and value.
- Some potential exists to expand noni exports as a wholesale ingredient, but this strategy will be short-lived due to increasing low-cost competition and the availability of numerous superfruit substitutes.
- The value of noni exports from Polynesia has doubled in the past five years, while Samoa's market share has decreased by one third.
- A vacuum of industry coordination presents an opportunity for Samoa to take a leadership role in advancing commercial interests and brand image of noni fruit, which is to Samoa's benefit.
- Fruit ingredient suppliers are easily substitutable. To ensure consistent long-term market demand, Samoa must advance into consumer markets as a supplier of innovative retail products with a strong brand identity among consumers.
- The future of Samoa's noni industry is far from secure. Without coordination to strengthen its position and consumer interest in noni, the market may collapse.

1.2. Priorities

1.2.1. Set high standards

- Complete national standards and grading system for fruit and preparations
- Document best practices for farming and cultivation
- Contribute to CODEX proceedings and implement resulting safety standards

1.2.2. Build capacity and innovate

- Organize IWG-Nonu for participation in retail niche markets as a trade association
- Provide extension training and reference tools for smallholder farmers
- Develop a supply chain for women-produced products, and encourage women's ownership of noni businesses
- Facilitate development of new range of products targeting healthy lifestyle (including natural foods and nutritional supplements), livestock and pet products industries
- Provide certification assistance in relevant and popular schemes (HACCP, organic, Fair Trade, non-GMO, kosher, gluten free, and others)

1.2.3. Commercialize

- Collect retail market intelligence
- Develop Samoa noni origin brand and assets
- Establish and implement a marketing communications plan
- Conduct targeted marketing campaigns in high-value markets
- Participate in relevant industry trade events and missions
- Establish trade representation and distribution partners or facilities in consumer markets

2.

OBJECTIVES

This study was commissioned to better understand the global market for production and consumption of noni and noni-based products. The resulting report is intended to provide useful information for Samoa's noni industry (represented by IWG-Nonu) to increase competitiveness and recommend opportunities that add new value to noni production. The end goal is to protect and improve the welfare of Samoa's noni industry, particularly smallholder farming families, including women and people with disabilities.

Specifically, this report seeks to identify:

- A clearer picture of the market for noni and noni products
- Technical and strategic advice for Samoa's noni value chain based on study findings
- Opportunities to improve returns from sales of current products in existing and new markets
- Opportunities for diversification and value addition from the development of consumer products
- Mechanisms for IWG-Nonu to improve capacity:
 - collecting and communicating market information, and
 - providing quality assurance services and traceability
- Issues affecting gender equality, disability, and social inclusion (GEDSI) within the value chain, with suggestions on how they may be addressed
- Other issues of relevance that are discovered or occur during the duration of the study, which includes potential COVID-19 impact.

2.1. Methodology

Within the scope of this assignment, the author has examined available market and trade data, published reports and academic journal articles, consulted with industry stakeholders, and analyzed market trends using desktop research. A number of past reports have discussed noni agriculture, biochemistry, and potential health impacts. As noni is a relatively new commercial crop, few published studies have considered product economics and trade issues; no reports were found featuring market opportunities. Where other data is not available, this study has looked to the performance of the broader markets for trade (e.g. nutritional supplements, fruit juice) where noni is a participant but not the sole commodity.

In many cases, it was not feasible to gather new primary data for this report but stakeholder consultations confirmed that key findings from past assessments of the sector remain valid. As a result, this document focuses on the potential for improved market positioning of Samoa's noni industry, as this is an area that has not been well-addressed in previous analyses.

3.

LITERATURE REVIEW

For the purpose of avoiding unproductive duplication of work, the following documents have been identified as primary sources. Most published reports featuring noni fall into two broad categories: those examining plant biochemistry and medical effects, and others documenting agronomic or processing best practices. Marketing and trade topics are underrepresented in this body of knowledge, although a few studies make mention of speculative market values and trading considerations like product safety.

3.1. Academic Research

The most comprehensive resource dedicated to all aspects of noni production and use is ***Noni: the Complete Guide for Consumers and Growers*** (2006) by University of Hawaii professor (retired) Scot Nelson and Hawaii Island agroforestry writer Craig Elevitch. Nelson also launched ***The Noni Website*** (2006), which is maintained by CTAHR and presents several articles detailing good practices for noni production and processing, known health issues, plant pests and diseases, as well as the proceedings of a 2002 conference held in Hawaii dedicated to noni production. Nearly all future noni studies and extension training materials reference these materials. In all of its content, however, little is mentioned about the economics of noni production opportunities for trade. The few references to market demand are upbeat, but without substantiating data or sources: “worldwide markets for noni products are expanding yearly, from a US\$400 million industry in 2001 to a projected \$2 billion industry in 2006” (Nelson & Elevitch, 2006). There is no known source of retail data available

to directly confirm or refute these figures, however, present-day value is likely lower.

A study written at around the same time by researchers Olivier Potterat and Matthias Hamburger from the University of Basel examines the phytochemical properties of noni, then assesses health claims and safety for human consumption. They conclude that despite an inadequate amount of available clinical data, noni contains chemicals with interesting properties that “warrant further investigation,” and that “adverse [health] events seem rare and may be idiosyncratic in nature” (Potterat & Hamburger, 2007). On marketing practices, they observe “there is a stark contrast between the sweeping claims on curative and disease preventive properties of Noni products and testimonials published on numerous websites, on one hand, and the almost complete lack of clinical data on the other” (Potterat & Hamburger, 2007). Speaking to the size of a global market, they note “reliable sale figures are not available, but it is claimed that the market has reached US\$1.3 billion in annual sales” (Potterat & Hamburger, 2007). No source is cited for this value but this report is nonetheless misrepresented as fact by multiple future research teams.

3.2. Market Studies

Two noni market studies were produced in the early 2000’s examining the market potential for noni and Samoa’s noni value chain:

“The Potential for a New Value Adding Industry for Noni Tropical Fruit Producers” (Macpherson, Daniells, Wedding, & Davis, 2006) was commissioned by Australia’s

Rural Industries Research and Development Corporation for the purpose of evaluating growth and value-added opportunities for Queensland noni farmers, represented by the Australian Noni Growers Association. Their report mainly focuses on agronomic, genetic, and biochemical issues resulting from processing and fermentation. An attachment to the report from the Australian Institute for Commercialisation attempts to quantify market value “based primarily on revenue information from Tahitian Noni® International

(later Morinda, Inc., a subsidiary of New Age Beverages), trade information from Oceania regions and sales information from Japan” (Macpherson et al., 2006). As the market leader, this is a reasonable starting point but fails to take into consideration Tahitian Noni’s multi-level marketing distribution scheme. MLM significantly reduces the correlation between Tahitian Noni revenues (largely from sales to its own salesforce as inventory) and world market demand for noni products. The report’s conclusions point to “a bright future [for noni production] although more studies are needed...” (Macpherson et al., 2006). An addendum to the executive summary further notes widespread destruction to Queensland’s noni farming by Tropical Cyclone Larry (2006), which struck near the time of publishing. There is no mention of the Australian Noni Growers Association or its activities online after 2006 and attempts at reaching them for this study were unsuccessful.

“Samoa *Morinda citrifolia* (Nonu): A Case Study of Agriculture for Growth in the Pacific” (Rogers, Tuioti-Mariner, & Tuoro, 2009), provides a comprehensive overview of Samoa’s noni value chain, economics, and industry constraints immediately following the Great Recession of 2007-2008. The authors stress the importance of international exports to the small island nation, and particularly high value exports that directly impact semi-sustenance farming families. They further recognize Samoa’s dominance as an early supplier to world

3.3. Related

Broadening the scope of research to other relevant areas of crop promotion, this study includes concepts of value addition through differentiation and niche marketing described in “Markets and Marketing Strategies for Agroforestry Specialty Products in North America” (Gold, Godsey, & Josiah, 2004). Noni trade is similar to agroforestry in that “many products typically lack established marketing institutions, market information, and grade or quality

“ **innovation will continue to be the critical factor for future success** (Rogers et al., 2009) ”

markets due to comparative advantages but caution, it “is now being eroded through increased competition from new entrants on the international market; therefore significant efforts will be needed to maintain competitiveness in a changing world market” (Rogers et al., 2009).

Many of the industry needs identified by the report have not been addressed since the time of publication, leading to present day challenges they predicted. The authors forewarn, “with increasing price competition it will be essential to maintain high quality products and differentiate and brand these accordingly” (Rogers et al., 2009). As a small Pacific Island nation with limited domestic opportunities, Samoa “must establish international market niches that will allow them to charge prices that will cover their high international trade costs,” stressing that “innovation will continue to be the critical factor for future success” (Rogers et al., 2009). Although the private industry had performed admirably, they suggest “interventions are required by the government to ... stimulate the industry so as to regain export competitiveness” (Rogers et al., 2009).

standards” (Gold et al., 2004). This creates an environment with asymmetric information between buyer and seller, which the authors describe as a “black box” where downstream value chain processes and ultimate consumer uses are hidden from producers. This study advocates use of the Five Forces model to analyze competitive frameworks and develop specialty niche markets among wood products, which are applicable to noni as a small but high value agricultural niche good.

3.4. Excluded Literature

One other notable publication, arguably the most famous study of noni, has not been directly cited in this report. “The Pharmacologically Active Ingredient in Noni” (Heinicke, 1985) is thought to have launched modern commercial production of noni through its discovery of a mysterious compound that caused a frenzy of consumer interest. Dr. Ralph Heinicke was a Dole company scientist studying pineapples who claimed to have found an unknown compound in noni similar to one in the pineapple enzyme bromelain (Brown, 2012). He named and patented the substance *xeronine* and theorized a precursor substance *proxeronine* necessary for its activation. The discovery was described in an article for the *Pacific Tropical Botanical Garden Bulletin*, the non-scientific member newsletter of a botanical preserve in Hawaii¹¹.

In addition to curing drug addiction without withdrawal, Heinicke suggested “noni could be used for ‘arthritis, atherosclerosis, blood vessel problems, drug addiction, gastric ulcers, high blood pressure, injuries, menstrual cramps, mental depression, poor digestion, relief of pain, senility, sprains, and many others’” (Brown, 2012). The article was not peer reviewed and Heinicke provided no chemical structure for *xeronine* or supporting data for his assertions. Neither *xeronine* nor *proxeronine* has been found since (Wanjek, 2006). This article has nonetheless become the central supporting evidence of noni marketing for its cure-all powers. Heinicke later worked as a consultant for the makers of Tahitian Noni® into his 90’s (Smillie, 2004).

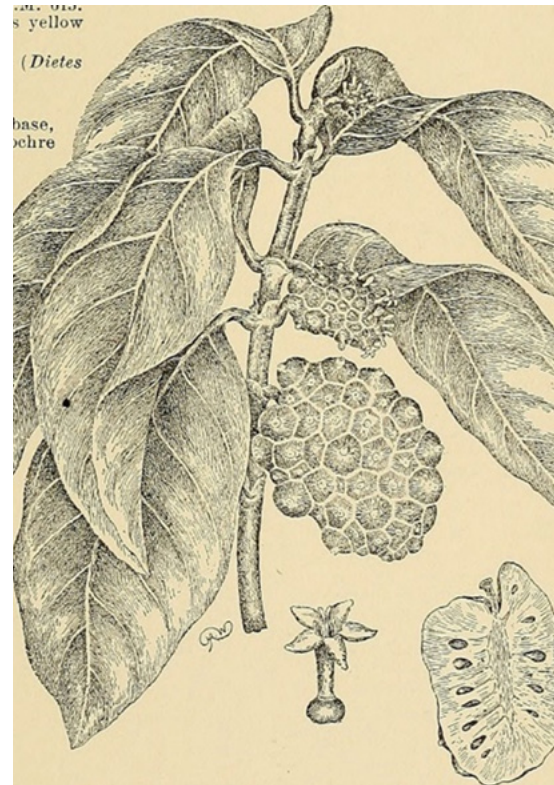


Figure 2. Plant atlas drawing c.19th century

4. BOTANY

¹¹ The Pacific Tropical Botanical Garden was later gifted The Kompong botanical estate of horticulturist Dr. David Fairchild in South Florida and changed its name to the National Tropical Botanical Garden.

Noni is a fruit-bearing evergreen tree or shrub native to Australia, Indonesia, and New Guinea that reaches 3 – 10 m (9 – 33 ft) tall at maturity. It is found in tropical climates between 19° north and south latitudes worldwide, with particularly dense populations among the islands of Polynesia (Nelson & Elevitch, 2006). Elsewhere, noni has been naturalized or is commercially cultivated in South Asia (India, Sri Lanka) and Southeast Asia (Myanmar, Thailand, Vietnam, Laos), coastal areas of Central and South America, the Caribbean and West Africa.

Fruit of the noni tree are lumpy and potato-shaped, with lime-green to pale-yellow exterior skin, and translucent off-white fleshy interior with dark seeds. It emits a strong smell similar to cheese as it matures.

Noni trees flower continuously and fruits are harvested multiple times annually. Mature trees grown on well-maintained farms are capable of achieving 230 kg of fruit per plant annually, though it is often less. Farmed using intensive practices under good growing conditions, a five-year-old crop produces approximately 78,100 kg/ha of fresh fruit, yielding 35,700 liters of pure juice¹² (Nelson & Elevitch, 2006).



Figure 3 Noni plant growing in a lava field
Photo credit: Scot Nelson

Known by the botanical name *Morinda citrifolia*, noni is a part of the *Rubiaceae* genetic family. *Rubiaceae* includes coffee, quinine, gardenias, and jasmine, all of which have commercially significant biochemical properties (Nelson & Elevitch, 2006). Noni is most likely to be consumed as whole fruit, fruit juice and extracts, however, leaves, bark and roots served as tea, and seed oil also contains bioactive components that may offer health benefits. While its chemistry and interaction with human physiology is not fully understood, studies have shown that noni's high nutritional content may have therapeutic value (Almeida, Oliveira, & Hotza, 2019). Compounds found in noni have demonstrated antioxidant, antimicrobial (antibacterial, antiviral), anti-inflammatory, and analgesic properties.

Unlike its biological relatives, however, noni is a remarkably hearty plant that grows in a wide range of soil types (infertile or fertile, from alkaline to acidic) and severe environments from extremely dry to extremely wet. It can be found thriving in wild forests, along shorelines, fallow fields, in waste areas, or near inhabited villages. It's often the first plant to colonize waste areas or lava fields, and has an uncommon tolerance to heat, wind, fire, flooding, saline content, and drought (Nelson & Elevitch, 2006).

The plant's resilience and utility as a famine food, medicine, and source of construction material made it valuable to the seafaring ancestors of Polynesia. It remains a traditional medicine used in curing and preventing diseases in Polynesian cultural medicine today but was popularized among broader consumer markets only in the past thirty years.

4.1. History

Noni has been used by humans for thousands of years. The plant is thought to have originated in the area north Australia or New Guinea (Nelson & Elevitch, 2006, p. 2). It was one of the original “canoe plants” carried by the Lapita¹³ peoples who populated most of Polynesia. The Lapita are one of human history's great civilizations; skilled seafarers possessing navigation and survival abilities that allowed them to reach and inhabit the most isolated lands of the planet, like astronauts of their day. Where they traveled, they brought noni with them.

Skilled sailors, the Lapita left from Taiwan 4,000 years ago (2,000 BCE) and traveled thousands of miles past the Philippines over the open ocean in canoes to the Bismarck Archipelago (Gibbons, 2016). They brought food and survival goods like taro, yams, breadfruit, pigs, and chickens with them. Combined with fishing, local game, and trade, this allowed for the establishment of sustainable settlements in distant locations.

Along the way, they collected other plants and materials that proved useful. Noni was a multipurpose crop used for medicine, dyes, emergency food rations, animal fodder, and

building or firewood. It was a reliable choice, with the ability to thrive in an unusually wide range of soils and climates and the ability to tolerate droughts of six months or longer (Nelson & Elevitch, 2006, p. 45).

From the Bismarck Archipelago, the Lapita rapidly continued east to establish the first settlements of the South and Central Pacific: the Solomon Islands and Vanuatu, followed by Fiji, Tonga, and Samoa. Once reaching Tonga and Samoa in 800 BCE, they waited for 1200 years before pushing thousands of kilometers into the open ocean to Hawaii, Rapa Nui, and finally New Zealand. Noni has traditional uses in all regions where they settled.

Noni reached Europe in the 1760s, brought by prominent Swedish botanist Carl Linneaus, who was known to collect and catalog unusual plants of the Pacific (Nelson & Elevitch, 2006, p. 2). Linneaus gave it the botanical name *Morinda citrifolia*; “*Morinda*” derived from the Latin words *indicus* for Indian and *morus* for “mulberry” meant to describe its resemblance to the Indian mulberry (Nelson & Elevitch, 2006). It would be another two centuries before the plant and its uses became widely known outside of Polynesian culture.

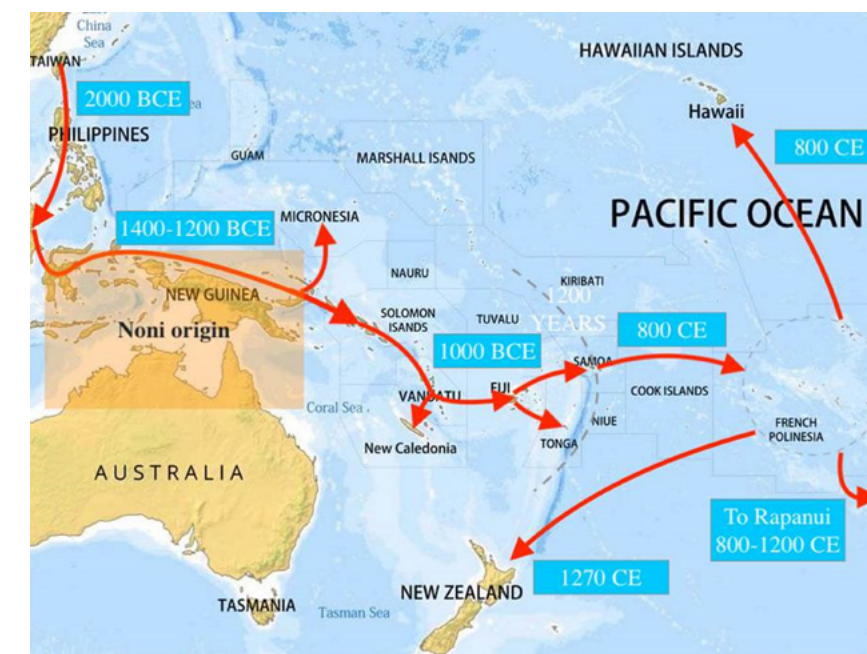


Figure 4. Noni origin, migration with Lapita peoples © Andrew Hetzel

¹² Assumes planting of 716 trees per ha, good drainage, integrated pest management, and organic fertilization; juice extracted at 50% though 60% may be possible.

¹³ It is not known what this civilization of people called themselves; the name “Lapita” hails from the local name of a beach in New Caledonia where first identified during modern times in 1917. Their migration is known by dating artifacts found at archeological sites.

4.2. Traditional Uses

Table 1 Traditional uses of noni, adapted from Noni: The Complete Guide (Nelson & Elevitch, 2006, p.8)

Part	Preparation	Traditional Use
Leaf	Extract or vapor	Treatment for bleeding, stomach ailments, hernias, hypertension, urinary tract ailments, sties, vitamin A deficiency
	Fresh	Livestock fodder; food wrap and flavoring; treatment for burns, headaches, fever; witchcraft
	Poultice	Treatment for bruising, fever, physical injuries, stings, rheumatism, tuberculosis
	Tea	Laxative; treatment for malaria, fever, and pain
Fruit	Extract or oil	Treatment for hypertension, ulcers
	Poultice	Treatment for boils, bruising, physical injury, rheumatism, tuberculosis
	Ripe	Famine food; laxative; treatment for appetite loss, sore throat, cracked skin, cuts or wounds, gum and mouth infection, intestinal worms, toothache; swine fodder
	Unripe	Mouth sores, witchcraft
Stem	Bark	Treatment for hypertension and jaundice
	Wood	Axe handles, canoe parts and paddles, firewood, red dye, shovels
Seed	Oil	Insecticides and insect repellent
Root		Carving; yellow pigment; treatment for infected cuts

4.3. Commercialization

Most consumers outside of Polynesia were unaware of the fruit until it was introduced to America in the 1990's by the makers of Tahitian Noni® who touted it as a mysterious French Polynesian superfood with healing abilities. Their effort was well-timed and executed, launching noni as a global health craze despite a lack of clinical evidence to support health claims. This puts noni in good company because despite widespread consumer belief otherwise, there is no evidence that fruit juice of any kind improves health (Cheng, Fiechtner, & Carroll, 2018). Some popular fruit juices like orange juice, may have a negative health impact due to high concentrations of natural sugars that contribute to obesity and other noncommunicable diseases (Braun, 2014).



Figure 5. FDA warning letter to Hawaiian Organic Noni for health claims in violation of drug label laws.

Noni is sold in many countries as a dietary supplement or home health remedy, including Australia and New Zealand, China, the United States and Europe as a prepared fruit juice or health supplement; often in juice form and diluted, sweetened, or blended with other fruit juices to mask the cheese-like and sour fermented flavor. Once ripened, noni fruit ferments rapidly. After juicing, producers adjust the degree of fermentation to meet product safety standards and the taste preference of destination markets. It is also consumed in the form of capsules containing fruit extractions, or sometimes as a dehydrated fruit leather or paste.

Some producers advertise noni products for general health improvement or more specifically as remedies for a large variety of ailments, including but not limited to: anxiety, bacterial infections, common colds, high blood pressure, hearing loss, depression, pain, and fatigue (“Noni: Uses, Side Effects, Interactions, Dosage, and Warning,” n.d.). This marketing practice is not recommended, as noni’s efficacy is not proven and claims often violate product label laws in consuming countries.

Published materials have explored potential health benefits of noni consumption, sometimes showing promising results in animal studies or the mechanisms by which noni’s chemistry acts (West, Deng, Isami, Uwaya, & Jensen, 2018). However, few clinical studies have been conducted with human participants to show conclusive benefit. Although generally agreed as being safe and widely approved for human consumption at low doses, it is not approved by government authorities as a medical treatment or as a pharmaceutical in any country. However, in 2011, China registered a noni and blueberry blended fruit juice product as a functional food for the general purpose of “enhancing immunity” (West et al., 2018).

Critics describe noni as a wellness fad of the early 2000’s with visibility propelled by multi-level marketers who sold the appealing story of a cure-all to would-be entrepreneurial distributors (Wanjek, 2006). This may be true, but the same may also be said of first American banana distributors in the 1800’s¹⁴, the first Italian or Portuguese orange traders of the Mediterranean arriving from China in the 15th century, or Muslim merchants selling apples along the Silk Road in the 8th century (Kurtz-Phelan, 2008; Morton, 1987; Spengler, 2019).

The most popular fruits sold worldwide today were once touted as exotic fruits with curative properties. What potentially beneficial minerals, fiber, and other compounds like antioxidants, phenolics, and alkaloids exist in popular fruit, noni offers the same or more (Nelson & Elevitch, 2006; Potterat & Hamburger, 2007). Noni may be a newer and less known by modern consumers, but it has begun on a trajectory similar to the most widely consumed fruits in human history and from the perspective of medical claims, has arguably superior chemistry.

Today, noni fruit products are a small part of the larger healthy lifestyle (natural products and nutritional supplements) consumer retail product category alongside other superfoods and natural remedies. Within that category, noni faces significant competition from other fruits deemed to be “superfoods” with properties that are similarly associated with good health. The category itself is large, estimated to be valued in the hundreds of billions if not trillions of dollars and growing (McGroarty, n.d.). One study found traditional medicines (US\$360b) and healthy eating (US\$702b) segments in which noni is sold to be valued more than a trillion dollars (McGroarty, n.d.). Within the United States, the natural products and supplement industry is valued at US\$158b (NFM Staff, 2019). Noni, however, remains a small participant in global commerce. Substantial opportunity exists within the global arena to increase the quantity and value of noni products traded.

¹⁴ The word “superfood” was coined by marketers at the United Fruit Company, not scientists, for the purpose of selling bananas around the time of World War I (“Superfoods or Superhype?”, n.d.).

4.4. Cultivation



Figure 6 Noni tree nursery in Samoa, photo credit: PHAMA Plus

There are a few organized noni estates in Samoa but much of the fruit is collected from plants growing wild (Rogers et al., 2009). Farming using traditional methods limits the productivity of smallholder agriculture and lack of active management may leave trees susceptible to future pests and disease.

There is no harvest season for noni. The trees fruit continuously year-round and may be harvested 2-3 times per month, so smallholder farmers collect fruit only as required by processors. Few to no fertilizer inputs are used and trees are not necessarily pruned to increase yield or reduce height¹⁵. Although these activities are not necessary for noni fruit production, active maintenance and integrated pest management increases productivity and efficiency of harvesting (Nelson & Elevitch, 2006). Trees growing on small family plots may not be ideally spaced for efficiency (3-4.5m x 3-4.5m) and most families lack farming equipment like ladders and tractors for harvesting and collection.

Demand for fruit is inconsistent due to unpredictable downstream sales volumes, which cause the farm gate price paid at collection stations to rise and fall dramatically. In times of market oversupply, farm gate price has been known to fall to as little as SAT\$.20 per kg for conventional fruit, far less than minimum wage for labor required (Rogers et al., 2009). In prolonged times of low demand, some trees have been replaced entirely with other crops. This has created supply shortages when foreign market demand rebounds.

Reliable sales forecasting by exporters will help flatten demand and farm gate price extremes. However, improvements in productivity will help to increase yield potential while also lowering the cost burden on labor, a large percentage of whom are women who pick noni part time around other household work and family obligations.

Organic mulch or worm composting is an easy and inexpensive way to produce organic fertilizer that can be implemented on small scale farms or developed as a larger entrepreneurial business supplying others. Although not strictly necessary for noni production, fertilizer will increase output and consequently potential earnings per

tree. Routine pruning helps make fruit more easily accessible¹⁶ and increases canopy airflow, reducing the severity of pest and disease outbreaks (Nelson & Elevitch, 2006, p. 58). Promotion and education of the two practices combined will increase yield and harvest productivity which make noni farming a more valuable activity.



Figure 7. Productive noni plant at a drip-irrigated, pruned, and organic fertilized estate farm on Kauai, Hawaii. Photo credit: Andrew Hetzel

¹⁵ Noni trees are not self-pruning and most farmers remove lower branches to reduce pest damage from insects and rats (Nelson & Elevitch, 2006).

¹⁶ Noni trees can grow up to 10m in height.

4.5. Pests and Disease

There is a widespread belief among Samoa's noni industry that noni trees are impervious to pests and diseases, which is not entirely true. Noni is "susceptible to attack by a range of pests and disease-causing pathogens"¹⁷ but there has not been a significant outbreak in Samoa yet (Nelson & Elevitch, 2006). There are no "plant-pathogenic bacteria, viruses (aside from one report of Tobacco Mosaic Virus infecting noni in Fiji), viroids, or phytoplasmas, which are destructive to some other crops," that attack noni but nematodes and fungi remain a threat (Nelson & Elevitch, 2006). Pruning, mulching and intercropping are all practices that can mitigate the incidence of potentially harmful pests and diseases. Pruning, in addition to increasing plant productivity from new growth, improves canopy airflow that reduces the change of fungal growth that is often found in wetter locations. Mulching, or adding a nutrient-rich layer of decaying organic matter



Figure 8 Noni trees affected by black flag disease in Hawaii, photo credit: Scot Nelson

increases plant well-being and subsequent pest and disease resistance "as compared to bare soil culture" (Nelson & Elevitch, 2006). Intercropping is likely already practiced with traditional subsistence farming, but can be adapted to commercial agriculture, providing additional streams of farming revenue and pest or disease resistance. Papaya, coconut, and kava are good potential intercropping options (Nelson & Elevitch, 2006).

4.6. Processing

Noni has an unusual savory fruit flavor that can be described as being similar to cheese that many find unappetizing. It is sometimes compared to the durian fruit for its pungent odor (Karp, 2017). Ripe noni contains the same chemical ingredient (butyric or butanoic acid) found in rancid butter or parmesan cheese that contributes to its unappealing smell (Almeida et al., 2019). The flavor of noni will not be appealing to all consumers but it will be to some, and other methods can be employed to manipulate its flavor to be palatable for more.

Traditionally, juice is allowed to slowly drip-extract or seep from the fruit in a sealed container over 2-8 weeks, during which time the juice ferments as bacteria convert sugars into acetic acid and other chemical compounds, adding an astringency and slight sensation of sourness. The slower the fermentation process, the more sugars are

converted in increasingly complex chemical reactions causing the beverage to sour further. In commercial production, juice is pressed from the fruit and then pasteurized and either maintained in holding tanks for fermentation or refrigerated prior to sale (Nelson & Elevitch, 2006). The fermentation process tends to soften the harsh flavor of noni juice, making it more palatable to consumers but also risks introducing an unpleasant sourness and small concentration of ethanol (Nelson & Elevitch, 2006). In Samoa, producers store noni juice for between a few weeks to six months to achieve a desired degree of fermentation.

Perception of sourness¹⁸ is highly variable due to individual biology, age, gender, and cultural association (Trachootham et al., 2018). Biologically, the same food or beverage perceived as sweet and fruity by one person may be perceived inedible and sour by another. From a cultural perspective, one consumer may associate the taste of sourness with a pleasant experience, like

eating malt vinegar on fish and chips, while another will be reminded of rotting trash on a warm day.

Sour products have become increasingly popular in recent years, and a particularly strong category among millennial consumers¹⁹ ("Fermented Foods Still on Top, but Superfood List Sees Some Changes," 2018). Fermented foods and beverages like sourdough bread, kimchi, miso, sauerkraut, and kombucha juice are a fast-growing segment of the functional food category in America. One study estimated a 149% increase in U.S. retail sales during 2018 alone, in part driven by consumer perception that fermented foods are healthier than non-fermented products (Nielson-Stowell, 2020; Saxe, 2019). Commenting on the trend, the U.S.-based Fermentation Association reports "Consumers are purchasing products with ancient wisdom, a trend defining the nutrient-dense, time-honored food that is made of simple, clean ingredients" (Nielson-Stowell, 2020).



Figure 9 Noni juice fermented 2 months (left) and 2 years (right). Photo credit: Scot Nelson

Technically distinct from fermented foods²⁰, pickled foods with similar sourness are also trendy. Mainstream American food manufacturers have recently introduced an array of pickled and pickle-flavored foods, including pickled soft drinks, snack foods, and even a pickle-flavored milkshake (O. Harrison, 2018). In Asian consumer markets, fermented and pickled flavors are well known and already widely consumed in traditional cuisine.

Consumer taste preferences are not static. Repeated exposure to a flavor profile is known to increase desirability so any trend toward fermented food potentially increases desirability of fermented noni products (Appleton, Hemingway, Rajska, & Hartwell, 2018). Further opportunities exist to adapt the taste of noni products to better suite widespread desirability, for example through selective breeding of noni trees for improved flavor, experimental processing techniques that mitigate or remove unwanted flavor compounds, or the development of new retail products like nutritional supplements that modify or circumvent taste (e.g. capsules).

¹⁷ See list in Appendix I.

¹⁸ In this case due to the presence of acetic acid as the result of fermentation.

¹⁹ Interest in exotic fruit is also on the rise, which may offer an opportunity for noni producers.

²⁰ The pickling process requires the addition of an acid whereas fermentation results from bacterial activity.

5.

MARKET

5.1. Discussion

When discussing the scope and scale of the market for noni and noni products, it is important to take into consideration how new the product is to world trade. Despite being consumed for thousands of years in Polynesian culture, widespread commercialization of noni began just thirty years ago, escalating rapidly like a gold rush among exporting nations and retail product manufacturers to satisfy consumer demand.

Unlike an established commodity in a market that has matured over hundreds or thousands of years, however, few institutions, systems, and standards exist for noni. There is little public data available on noni trade outside of key Pacific exporting countries. Some public companies operating in this space are required to disclose financial results, risks, and information about markets where they operate. Where possible, that information has been used to make assessments about market size and strategy. However, most companies engaged in noni production are private smaller businesses that are unwilling to share market information, which they view as proprietary company secrets²¹.

Customs data cannot be relied upon for a clear picture of trade. Pure noni juice exports (most common form of export) are classified

under the tariff code 200989-19xxxx, which is a catchall category shared with “other” or NESOI pure juice products. Despite a presumption that the majority of exports from the Pacific in this category are noni juice, re-exports become indistinguishable from other fruit juices when passing through an intermediary country like the United States. Other noni-producing countries such as China, India, and Vietnam also produce a variety of other fruit juices that may join the same category, making trade statistics in this category inconclusive. Similarly, once noni juice is blended with other fruit juices or sugar added as a packaged retail product, it is no longer possible to distinguish noni juice from most other packaged beverages.

This report uses four indicators to identify potential market direction and trends:

1. A survey of key noni-producing companies, their business models and products,
2. Samoa’s exports as the presumptive leading raw ingredient exporter,
3. All noni exports from Polynesia, as the presumptive leading region of world production, and
4. Market growth for all a) exotic fruit juices and b) natural food supplements, the key markets in which noni trades.

5.2. Noni Product Manufacturer/Distributors

Noni products were introduced to the world as a commercial product in 1996 by Morinda, Inc.²², the Utah-based multi-level marketing company that makes Tahitian Noni^{®23}. The

product and company’s business model were an instant success, generating US\$6m in revenues during its first year and nearly doubling the second year (Advameg Inc., n.d.). By 2001, the company “was ranked No. 26 by Inc. magazine’s list of the 500 fastest growing private companies in the United States” (Advameg Inc., n.d.).

²¹ More than twenty companies engaged in retail noni production manufacturing and retailing in the USA, Australia, New Zealand, Europe and Korea were contacted to provide guidance for this report; the few that responded were unwilling to provide company data, buying preferences, or any market outlook that may benefit Samoa. This corroborates information provided in stakeholder consultations that noni buyers and sellers have weak relationships of transactional convenience.

²² Originally Tahitian Noni International, the company changed Morinda Inc. in 2012.

²³ Utah has the highest concentration of MLM companies in America (Lindsey, 2016). It is the second largest industry in the state behind tourism. Several major MLM companies are headquartered or maintain significant operations there, including LipSense, dōTERRA, Nu Skin, Young Living, Nature’s Sunshine, Tahitian Noni/Morinda, Melaleuca, Newways, Thrive, Xango/Zija, Younique, Jamberry, and Unicity (M. Harrison, 2017). A combination of favorable legal structure and alignment with Mormon interests are cited as possible reasons (M. Harrison, 2017; Lindsey, 2016; Risk, 2018).

Others were drawn to the noni market by the excitement generated about the new product and its perceived health benefits, launching a gold rush of noni production. During these early years, global noni exports grew quickly and experts predicted lofty billion-dollar retail noni product market valuations by the decade's end. That vision stalled during the Great Recession of 2007-2009. Morinda Inc.'s sales recovered soon after, as did Samoa and other producing nations' noni export volumes but the initial boom was over. The novel fad had been replaced by others of the day, including the pomegranate, acai, and goji berry, which became leading superfruit trends ("Whats New in Superfruits?," 2007).

The road ahead saw noni fruit join the mainstream of the global natural foods and nutritional supplement market in a minor role among numerous others. While a few companies like Morinda Inc. focus on noni entirely, most others in the trade do not, with the exception of some small vertically integrated noni estates like those found in Hawaii. Instead, noni is more often one flavor sold among dozens or hundreds of product formulations offered by juice or nutritional supplement companies. Much of that business appears to be focused at distribution within Asia, and some of the biggest players are also multi-level marketing companies.

Natural products and supplements are sold to consumers in the healthy lifestyle market through various channels including MLM, natural product stores, health food stores, dedicated supplement stores, direct internet sales, and increasingly through conventional grocery stores (NFM Staff, 2019). This market is valued at US\$158b in the United States alone and may exceed \$US1t worldwide (McGroarty, n.d.; NFM Staff, 2019). Despite noni's prevalence in multi-level marketing companies, MLM represents a relatively small share of overall trade of healthy lifestyle products in the U.S. market. This indicates a potential opportunity where noni is presently underrepresented in larger traditional outlets like natural products and grocery stores.

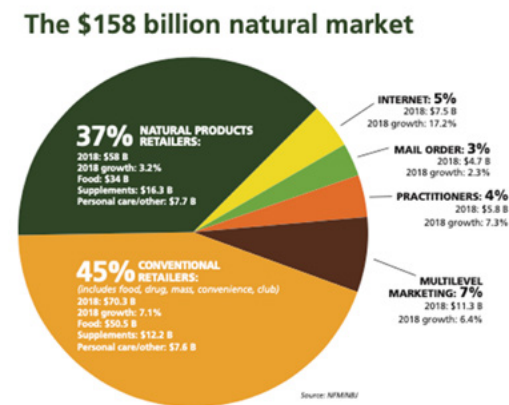


Figure 10. Source: 2019 National Food Merchandiser Market Overview Report

There are three primary categories of noni product manufacturer/distributors:

- **Multi-level marketers** – Product manufacturers and distributors engaged in sales through a pyramid of independent sales consultants.
- **Healthy lifestyle products manufacturers** – Companies that manufacture juice and nutritional supplement products not limited to noni through wholesale channels to traditional retailers or online retail directly to consumers.
- **Vertically integrated estates and niche products** – Farming estates and small consumer products companies focused on noni-based health products.

There are dozens and possibly hundreds of other wholesale producers and remarketers of unbranded or regionally branded noni juice products operating in China, India, Indonesia, the Philippines, Vietnam and elsewhere that are not listed in this report. The market for noni juice and supplement products is opaque, with little information available outside of trade statistics from the Pacific or public company financial statements. Business is often conducted through e-commerce matchmaking platforms like Alibaba, where sellers' identities are not easily verified. Few companies using these services have websites or other substantiating materials available to establish credibility. It is unclear what role each plays (producer of noni juice and extracts, importer from foreign sources, wholesale reseller, or fraudulent scheme) or their prevalence within the industry.

5.3. Multi-level Marketing

The vast majority of noni product trade volume appears to come from multi-level marketing companies. MLM is a legal²⁴ form of pyramid scheme where independent self-employed product distributors recruit others to do the same, each receiving some percentage of downstream sales from their recruits. New recruits generally buy inventory, which is a main source of upstream commissions and overall company revenue.

An analysis of data published by Morinda shows that less than 0.5% of 300,000 active distributors earn a profit from noni product sales (Taylor, 2011). While Tahitian Noni® used noni juice as a vehicle to collect revenue, the real product being purchased by distributors was a dream of financial independence. It is unclear how much Tahitian Noni® juice was ever consumed by paying customers and how much remains in the unsold inventory of aspiring sales recruits. In 1998 the company settled a false advertising lawsuit by the Attorneys General of Arizona, California, New Jersey, and Texas over unproven health claims about noni but has not been accused of legal infringement relating to its business model.

Both noni and multi-level marketing (also known as direct selling or network selling) are popular in Asia, and China in particular, making it a good market for noni products and distribution model that helped launched Tahitian Noni® decades earlier in America (Mcmorrow & Myers, 2018). Although regulations in China technically restrict commissions paid in multi-level marketing schemes, they are not always enforced. A quickly developing economy in the past decade where direct selling is responsible for 47% of all Chinese medical product sales has allowed MLM companies like Amway, Herbalife, and Usana Health to turn China into a multi-billion dollar market (Mcmorrow & Myers, 2018; Price, 2019). Some of these same MLM companies have faced investigations and penalties for violation of the U.S. Foreign Corrupt Practices Act that forbids bribing foreign government officials (Mcmorrow & Myers, 2018). Eleven of the twenty largest MLM companies are devoted to nutritional supplements, representing 35% of the US\$183 billion dollar MLM trade (Cardenas & Fuchs-Tarlovsky, 2018).

The appeal of MLM is in its perceived business opportunity for independent distributors. The product, whether cosmetics, housewares, vacuums, nutritional supplements, CBD or noni juice, is substitutable. This business structure faces increased regulation. Although presently offering opportunities for noni product sales, MLM should not be relied on for stable future trade.

²⁴ Though technically legal, MLM is accused by critics as being unethical (Cardenas & Fuchs-Tarlovsky, 2018).

Morinda Inc.

noninewage.com



Figure 11. New Age Beverages Noni+CBD
Image credit: company press release.

Tahitian Noni® remains the world's best-known noni brand and Morinda, the largest manufacturer dedicated to noni products. In 2019, the company was sold to an American publicly traded CBD-infused product maker New Age Beverages. At the time of the transaction, it maintained "operations in more than 60 countries around the world, and manufacturing operations in Tahiti, Germany, Japan, the US, and China" (New Age Beverages, 2019a). More than 70% of its business is reported to be generated in the "key Asia Pacific markets of Japan, China, Korea, Taiwan, and Indonesia" (New Age Beverages, 2019a). Morinda is vertically integrated, owning its own farms and processing facilities, as well as most of its own manufacturing facilities.

Nature's Sunshine

naturessunshine.com

Like Morinda, Nature's Sunshine is also a large publicly traded²⁵ MLM company based in Utah. The company sells over 700 Stock Keeping Units (SKUs) designed for immune, cardiovascular, digestive, personal care, weight management and other general health applications. Only two SKUs include noni, both juice blends containing noni puree with other fruit concentrates. Hawaii and Samoa are referenced as sources²⁶. The company candidly describes itself in SEC disclosures as selling "products to a sales

The company reports to have sold US\$7.5 billion in noni products "over the past twenty years" (New Age Beverages, 2019b). It earned US\$20m on \$240m in revenue and had no long-term debt the year it was sold. The sale price was \$85m or about four times earnings, but mostly in cash, which led some to question the motivation and timing of the sale (Martin, 2019). The EBITDA multiplier for private food and beverage businesses sold around the same time was roughly eight times earnings (SDR Ventures Inc., 2019). The transaction has nonetheless yielded a successful marriage of ideas: in 2020, Morinda introduced a line of CBD-infused noni juices and New Age Beverages is now selling other CBD products through MLM distribution (Vetter, 2019).

Today, the company sells a variety of noni juice blends under the Tahitian Noni® and TruAge brands, noni extract supplement blends under the Morinda and 'Nanced brands, and noni-extract bath and beauty products containing noni seed oil under the TeMana brand. Weight loss products are sold under the Shape brand, and fitness products under the Hiro brand. Most products sold by Morinda are a blend of noni juice, puree, oils, and tea leaf extracts with other fruit juices and supplement ingredients. Retail prices range from US\$40-\$77 per liter for juice blend products, \$18 per 30mL of juice concentrates, and \$.20 - \$1.20 per capsule for supplements.

force of independent distributors who use the products themselves or resell[s] them to consumers" (Nature's Sunshine Products, 2019). The company reported \$360m annual sales with approximately 242,700 active independent distributors and 834 employees in 2019 (Nature's Sunshine Products, 2019). It operates in North America, Latin America, Europe and Asia. North America and Asia markets are of equal size for the company, together representing the majority of the company's revenue. Prices range from \$49/32oz²⁷ (non-member) and \$33/oz (member) for blended juice, and \$1.47 (non-member) to \$.99 (member) per supplement blend capsule.

²⁵ U.S. public companies are highly regulated by the U.S. Securities and Exchange Commission (SEC) and are required by law to disclose financial performance and factors materially affecting business

²⁶ Nature's Sunshine is the only noni juice maker of all those surveyed mentioning Samoa by name on its consumer label

²⁷ 32oz = 946ml

Calivita

calivita.com

Calivita is a European-based²⁸ MLM, seller of plant-based nutritional supplements, plant-based cleaners, and electronic health devices. The company offers noni juice and noni extract supplements for sale through its website and network of independent contractors. Both the healthy lifestyle market and MLM model attracts opportunists who seek to profit from medicinal products with unproven efficacy (Cardenas & Fuchs-

Tarlovsky, 2018). Founder Gerry Hargitai was an early MLM vitamin and health-products tycoon that previously operated the same company under the name California Fitness. In 1992, Hargitai was banned from executive management or trading of public companies in Canada for 25 years due to "fraud, stock manipulation, and failure to act honestly, in good faith, and in the best interests of the client" ("Disciplined Person: Hargitai, G. Gerry," 1992). Product prices were not immediately available.

5.4. Wholesale Product Manufacturers

Natural products manufacturers are wholesale producers of fruit juice products and nutraceuticals, like plant-based extracts, powders and other ingredients used to augment foods and beverages. A small number of companies are dedicated to noni, but most serve noni as one offering among many. Products made by these companies are sold by natural products retail, health or supplement stores, and conventional

grocery stores. Some are also sold direct to consumer through internet sites.

While not necessarily producing the largest volume of current Samoa export sales, some companies operating in this segment are good short-term sales prospects for noni producers. Many, however, have domestic suppliers, which may present a significant competitive challenge to overcome. Some manufacturers in this category indicate a country of ingredient origin, the most frequent being Hawaii, India, and Tahiti. No mention of Samoa was recorded of any seller in this category.

Apollo Noni

apollononi.com

Apollo Noni is a small noni juice, supplement, bath and beauty products company based in Gujarat, India. Apollo distributes products under its own brand, as well as offers private label manufacturing services. The company sells domestically within India and exports to 25 countries, mostly in Southeast Asia, Africa, and Eastern Europe. No country of origin information is provided for its noni ingredients; however, Gujarat is an area of India where noni fruit is grown. Local sourcing is presumed but has not been confirmed by the company. No reference to organic, HACCP, or other certifications are made by the company in marketing materials.

Dave's Noni

davesnoni.com

Founded by Malik Dave, Dave's Noni is a part of the Dave's Group of Companies also based in Gujarat, India. In addition to noni juice production, affiliated companies contract bottling and consulting services (Project Turnkey), manufacturer of liquid packaging equipment (Harikrushna), and also manufacturer of grass-growing machines that produce animal fodder. Internet sources estimate the company's annual revenue at approximately US\$5m ("Dave's NONI & Juice Pvt. Ltd - Overview, News & Competitors," n.d.).

²⁸ The legal domicile of Calivita is unclear. The company claims to operate a world headquarters in "Farmington" USA (no state indicated) but shows a U.S. office mailing address in Rotterdam. It has trademarks registered to an address on the Isle of Man, and separate address in Budapest. The organization's parent company Elka Investments is registered in the British Virgin Islands, which was only made public in a leak of offshore holding accounts ("Secret files reveal more Canadians using offshore tax havens," 2013).

Earth's Bounty

earthsbounty.com

Matrix Health Products Inc. is Washington State producer and distributor of a small portfolio of natural supplements since 1991. Products made by the company are sold under the trade name Earth's Bounty, many of which include noni as a primary ingredient. The company advertises Tahiti or Hawaii as sources. In 2013, the FDA cited Matrix Health for unsubstantiated health claims about its noni and colloidal silver products ("Matrix Health Products," 2019).

Flora Health

florahealth.com

Flora Health is a Canadian natural health supplement products manufacturer with operations in the United States and wholesale distribution in numerous countries abroad. The company sells more than 100 SKUs of juice, herbal supplement, and tea products, lotions, toothpaste, soaps, pet supplements, various oils and extracts, bubble bath, massage oil, deodorant, shampoo and conditioners. It offers one bottled noni juice product in addition to many others featuring fish oil, manuka honey, apple cider vinegar, red beetroot, spirulina, chlorella, wheat grass, flax, artichoke, radish, dandelion, echinacea, hawthorn juice, celery, nettle, fig, acerola, valerian root, coconut, chamomile, alafia (CBD), neem, coffee, lemongrass, shea butter, vanilla, lavender, mint, fennel, licorice, ginkgo boloba, milk thistle, basil, and a wide range of teas.

Formula 1 Noni

formula1noni.com

Formula 1 Noni is a maker of a noni-focused equine nutritional supplements that was founded by the former director of operations for Moninda Inc.'s agricultural products division. The global market for equine nutritional supplements was estimated to

be US\$73m in 2018 by a private research study, which is a small part of the much larger market for all livestock and home pet care (Verified Market Research, 2018). A significant portion of this market is dedicated to therapeutic and performance supplements (iHealthcareAnalyst Inc., 2020). Since 2015, Formula 1 Noni has sold noni juice intended to aid horses, other livestock, and pets with inflammation, stress, gut health, and healthy skin. On its website, the company claims to source noni from Hawaii. Products are sold online, as well as through a network of livestock feed, veterinary supply, and pet stores within the United States.

Lakewood Juices

lakewoodorganic.com

Lakewood is a mid-sized natural juice products company based in Florida that began in 1935. It remains a family-owned business, selling over 30 varieties of pure natural fruit juice in self-branded glass bottles to over 25,000 retailer locations worldwide, on Amazon.com and its own website. Most of its products are certified organic and Kosher, including a 100% pressed noni juice product without sweeteners. A 32oz (946 ml) bottle sells at the retail price of US\$28 in a package of six. The product is additionally advertised as being gluten free, allergy free, and non-GMO certified.

Noni Biotech International

nonimaui.com

Noni Biotech is a Hawaii producer of noni juice, powder, capsule, and bath products (soaps and lotions) under the name Noni Maui, and additionally promotes wholesale concentrated noni juice. The company's website claims it is the "worlds [sic] largest supplier of Hawaiian noni," (Noni Biotech International, n.d.) but the operating status of this company is unclear. Its U.S. federal trademarks for "noni maui" products have

been canceled, Hawaii domestic company registrations and tradenames lapsed or terminated, and website last updated in 2012 (no posts to social media since 2013). Noni Biotech International is presently organized as a Delaware entity. The owner declined to provide any information when contacted for this study.

NP Nutra

npnutra.com

NP Nutra is a California supplier of exotic plant-based extracts to functional food and beverage, dietary supplement, cosmetic and pet food manufacturers that was founded in 1998. The company produces 80 exotic organic powder products and concentrates (including noni) that are manufactured in partner facilities in the USA, Brazil, Chile, China, Hungary, India, Indonesia, Peru, Philippines, Poland, and Thailand. The company describes itself as a supplier of "emerging new and trending ingredients such as Baobab and Turmeric" (NP Nutra, n.d.). The origin source of noni products offered by the company is from the U.S.A. (most powders) or India (5:1 powder). All products listed are Kosher certified; all but one originating from the U.S.A. are organic certified.



Figure 12. NP Nutra website product catalog displaying noni among others

True Health Australia

nonijuice.com.au, wildnoni.com.au

True Health Australia is a Brisbane-based promoter of noni products that began operation in 2016. The business sells pure certified organic noni juice, noni leaf tea, and dried fruit chips in retail packaging under the Golden Noni brand. In 2019 it registered the trade name Wild Noni, a range of noni juice products blended with other flavors including berries, stone fruit, tropical fruits, and spices. No country of origin information is specified for the company's ingredients.

Tahitian Gold Noni (Australia)

tahitiangold.com

Queensland's Tahitian Gold Noni boasts the title "Australia's No 1 Selling Organic Noni" ("Tahitian Organic Noni Juice," n.d.). The company's founder also claims on its website that noni cured him of cancer in a few weeks, among other health benefit claims and customer testimonials of noni's curative properties (Elston, 2015). Its website promotes this product is bottled in Tahiti and sold only in Australia. This brand is not to be confused with Tahitian Gold Noni sold in the United States by the Tahitian Gold company²⁹.

ZXChem - Hainan Zhongxin Wangou Chemical Co., LTD

zxchem.com.cn

ZXCHEM is an industrial producer of personal care products, agrochemicals, livestock feed additives, water treatment chemicals, fire retardants and other chemical ingredients. The noni products division of this company is promoted under the WGLife Noni or Hainan Virgin Noni banner, which is a sophisticated producer of private label products and bespoke customized noni ingredient formulations.

²⁹ The Tahitian Gold (U.S.) company's website does not mention noni products, focusing instead on vanilla products from Tahiti. It is unclear if Tahitian Gold Noni (U.S.) is currently available for sale.

WFLife maintains a processing facility on Hainan island with pressing equipment, filtering and pasteurization equipment, fermentation tanks, and high-speed bottling and packaging lines claimed to be capable of supplying 600 tons per month (“WGLIFE Product Details from Hainan WGLIFE Biological Co., Ltd.,” n.d.). The company additionally offers noni powder, dried fruit slices, seed oil, and concentrate. Fruit is advertised to be sourced locally from Hainan and also from Hawaii. No mention of the subsidiary and noni products is made on the ZXCHEM parent company website, but WGLIFE maintains a comprehensive and organized profile on Alibaba with photos, videos, and information about private label production and packaging options. The company is also a regular exhibitor at industry trade events, including the U.S. Natural Products Expo, Vitafoods Europe, and the Health Ingredients (HI) Japan Expo.

Estate Products

Samoa’s noni producers can apply ideas from the business model and market approach of vertically integrated noni estates, agricultural cooperatives, and origin-focused noni product makers. In most cases these businesses are small and sell consumer retail products. By doing so, they capture much or all of the value of each retail sale while concurrently building strong brand name recognition among buying consumers that cannot be easily substituted. Although likely leading to lower production quantities than high volume wholesale juice suppliers, this style of business makes each transaction more valuable and the market for future business more durable.

Hawaiian Ola

hawaiianola.com

Hawaiian Ola is a Certified B Corporation, a relatively new sustainable form of certification for legal entities that is for-profit but requires consideration of social and environmental performance in addition to economic performance. The voluntary program is popular among companies who visibly advocate sustainability as a part of their brand, such as Ben & Jerry’s ice cream, Patagonia clothing, and Klean Kanteen water bottles (“About B Corps,” n.d.). At the time of publication there is no legal framework permitting entities organized in Samoa to join but it is available for companies domiciled in Australia, various countries of the EU, Korea, Japan, New Zealand, North America, and Taiwan, any of which are viable consumer markets for noni products³⁰.



Figure 13. Hawaiian Ola noni shot (74ml) packaging

The company produces consumer RTD juice products (noni juice shot, sparkling noni fruit blends, and coffee leaf tea), and dry coffee leaf teas under the Hawaiian Ola name, and hemp products (oils, supplements) as Mana Artisan Botanics. All products are made in Hawaii and use Hawaii-sourced ingredients and sold through a network of conventional grocery and natural food stores, as well as online through the company’s website. Noni used by the business is produced by Healing Noni, a noni farming estate also located on the Big Island of Hawaii. In 2018, the company’s founders opened a complimentary beer and cider brewery in Hawaii under the name “Ola Brew,” which was paid for in part with US\$800,000 in online crowdsourced investment funding (“Ola Brew Co.: Producing world-class beers and ciders using local ingredients in Hawai’i County,” n.d.).



Figure 14. Notice the organic, non-GMO, vegan, B Corp, and Fair Trade certifications displayed. Only 1 of 8 fruit ingredients added is Fair Trade certified (mango)

The company’s branding is sophisticated, connecting its sustainable benefit structure with Hawaii lifestyle activities like surfing, and images of young and active models using its products. They are active on social media, maintain an attractive and informative website, issue press releases for achievements, and also market to wholesale buyers through industry trade events like the Natural Products Expo. Product packaging is also attractive and sophisticated, taking visual cues from stylized Hawaii scenery in addition to numerous eye-catching certification labels supporting the image of health. Bottling is reported by the company to occur outside of the State of Hawaii on the U.S. Mainland (Whidden, 2016). Noni product formulations are designed for consumer taste desirability above noni content. While advertising their “Noni Immunity” shot as containing “93% fruit juice,” product labeling discloses a blend of noni juice with mango, pear, apple, date, lilikoi (passion fruit), pineapple, and goji juice reconstituted concentrates plus pineapple flavoring. Consumers may be purchasing the name “noni” but are enjoying the flavor of a unique fruit blend where noni is just 1 component among 8 or more.

There are many lessons to be learned from this organization and its approach: 1) branding that integrates sustainability, origin designation, and health through associated sport activities (not medicinal claims), 2) product design that is flavor-focused, original, attractive, and carries certifications, and 3) market visibility through transparent online information provided by a company website and press releases, frequent social media activity that also reinforces lifestyle branding³¹, and a commercial presence at industry events to sell through conventional retail product channels.

³⁰ Limitations exist that may restrict wholly owned subsidiaries of foreign entities from participating, see Certified B Corporation rules at bcorporation.net for complete details.

³¹ Social media marketing that is so successful, they raised nearly US\$1 million dollars from individual consumers to build a new affiliated business

Hawaiian Organic Noni

realnoni.com

Hawaiian Organic Noni is a family-owned and run business situated on a 70 acre (28.33 ha) certified organic estate founded in 1982 by Steve Frailey and his wife on Kauai, Hawaii. The company has a unique business model within the noni industry, as it is a noni farm that sells no juice, instead focusing entirely on products created from dehydrated noni concentrates and dried fruit. Hawaiian Organic Noni's offerings include dried fruit leather (for human and pet consumption), lotions (with lavender or lavender and menthol), and a paste "bandage" (with aloe), which are sold through a network of retail health stores and naturopathy doctors, directly through the company's website, and on the premises.



Figure 15. Tour of the Hawaiian Organic Noni farm. Photo credit: Andrew Hetzel.

The farm itself is a highly productive and thoroughly maintained estate that produces its own organic vermicompost fertilizer. Approximately 18 acres (7.2a) are currently farming noni, all of which is drip irrigated. The family plus two or three additional workers routinely pick approximately 1,000 pounds (450 kg) of ripe fruit per day to supply production (Steve Frailey, personal communication, February 2020). Trees are topped every six months to increase productivity and allow for more convenient harvesting.

Agritourism is central to the company's business model; Frailey and family hold personally guided tours 3 times weekly for an often-sold-out group of 20 visitors each³². The tour is free and lasts between 3-4 hours. Attendees are first given a lecture about the history of noni and the farm, followed by a tour of the grounds to see the entire production process. Upon conclusion, the group returns to the lecture hall, which doubles as a gift shop where tourists purchase products.



Figure 16. The farm is powered by wind turbines and solar energy supporting the image of an environmentally sustainable business, photo credit: Andrew Hetzel.

The experience is nothing like the high-pressure sales environment one may expect from a free tour. Instead, the Fraileys put on an informative and thoroughly entertaining science lesson, nature stroll, and variety show all-in-one, complete with amusing stories and farm animals that perform tricks. While leading the group, Frailey tells about the history of the farm and surrounding nature, including a visit to see rare nesting albatross seabirds that return each spring. The investment in time made by the Fraileys in developing a customer relationship is extraordinary, which builds a strong emotional attachment to the business as a brand. It's not surprising that the Hawaiian Organic Noni tour is consistently voted one of the top attractions for the entire Island of Kauai on the travel review site TripAdvisor. Contact is maintained through frequent email newsletters sent to visitors that includes updates on the farm, family, and other local events.

A 2oz (57g) dried patch of fruit leather is sold by the company for \$35, 8oz (236 mL) noni and lavender lotion for \$33, and 1.75 oz (51.75 mL) concentrated "bio bandage" paste for \$27.50. Other sizes are available at different price points and discounts are applied for larger quantities.

Healing Noni

healingnoni.com

Healing Noni is a 450-acre (182 ha) noni farm on the Island of Hawaii situated near the active Kilauea volcano. Founded in 1998, the company is the largest noni farm in all of Hawaii, producing up-to 50,000 gal (189,000L) per month when operating at full capacity. In 2018, the Kilauea volcano saw its largest eruption since 1980, causing widespread damage to the surrounding area from lava flows and toxic gas emissions. Processing of noni juice ceased for several months and significant damage was recorded to surrounding farms but there was no loss of life. The company is a wholesale supplier that provides the majority of Hawaii-origin noni juice and other products traded worldwide. In addition to bulk supplies, the company sells products under its own Healing Noni brand, including both unfermented and fermented juice lines, powder, and capsules. They additionally sell honey harvested from bees on the property as "noni honey" and a blend of noni juice with goji berry concentrate.

The company sells conventional noni juice in 16 and 32oz bottles on its website for \$19.85 and \$24.50 each, with discounts for higher quantities. Organic juice is sold at a premium: \$24.50 for 16oz and \$29.50 for 32oz. Noni powder capsules are sold at \$.30 per capsule, and powder in bulk at \$68 per kg.

Peruvian Nature

peruviannature.com

Peruvian Nature is a Lima-based producer of medicinal herbs, dried fruit, extracts, and powders made from produce sourced in Peru. In addition to various roots, grains, seeds, and pods, it exports a number of fruit and vegetable products, including noni powder sourced from trees in the indigenous Amazonas region bordering Ecuador. Several of its products, like *chuchuhuasi*³³ or maca root³⁴ are rare ingredients used in traditional Peruvian medicine or found only in Latin America. The company was founded in 2001 and maintains a thorough and attractive web presence in both English and Spanish, is a frequent participant at food ingredient industry trade events and an active user of social media. As seen in the brand positioning and business model of other companies in this category, Peruvian Nature emphasizes social and environmental sustainability with many products offering organic, kosher, and other certifications.

Noni Connection Inc.

punanoni.com

Puna Noni, founded in 1999, is a small Hawaii-based producer of noni products including pure fruit juice, capsules, noni and acai fruit powder, and body and bath items (soap, lotions, lip balm, bath salts, and shampoos in various tropical fruit scents). The company offers pure juice sourced from Hawaii in glass bottles and 1-gallon (3.79L) plastic jugs, which along with other products are sold on its website or through natural products retailers across the United States, including Whole Foods. The company has exhibited at the Natural Products Expo event. In response to COVID-19, Puna Noni cleverly introduced a series of noni-oil based hand sanitizers and cloth facemasks with Hawaii designs. Juice products sold by the company retail from between \$14.50 per 16 oz³⁵ bottle to \$44.75 per 1 gal jug³⁶, supplement capsules from \$.21 (60 ct) - \$.42 (100 ct) each.

³² The author attended a sold-out tour in February 2020. Other attendees were upper-middle class 40-60 year-old tourist couples from the U.S. Mainland, with one couple each from Canada and Germany.

³³ Bark of a large rainforest canopy tree used in traditional medicine to alleviate pain or as a general health tonic

³⁴ Root of a cruciferous vegetable native to the Andes used as medicine and food

³⁵ 16 oz = 473ml

³⁶ 1 gal = 3.78l

Pura Vitta

puravitta.com

Pura Vitta is a Panamanian fruit juice exporter that distributes retail products in Latin America, Bahamas, Europe and the Middle East but has the capability of selling worldwide. It uses locally grown noni and borojo³⁷ fruit that is processed on-site at its own HACCP accredited facility from fresh pulp. “Started in 1999, the company’s objective is to study, research and develop new and useful natural products using the finest tropical fruits and herbs, must [sic] of them hard to find” (Earthly Products Inc., n.d.).

The company is not organic certified but claims no pesticides are used in the vicinity, thus making their offerings organic by default. Offerings include noni juice, borojo juice, noni capsules, spirulina, propolis, maca, and a proprietary energy drink sold

under the name Euphoria that contains borojo, passion fruit, and guarana. Products are marketed through appearances at food industry tradeshows in Europe, South America, Panama, and also the United States. Private label production is available upon request.

Royal Noni Fiji

royalnonifiji.com

Royal Noni Fiji is a family owned and operated business established in 2000. The company operates its own 80ha farm, buys fruit from contract farmers, and maintains a central bottling and juice processing facility. Royal Noni Fiji juice, extract, soap, body lotion and shampoo products are sold in Australia, New Zealand, Japan, Korea, Taiwan and Europe. The company claims to be a leading brand within China.

5.5. Samoa’s Noni Exports

The current market for noni juice³⁸ from Samoa is split between the United States and Asia. A significant portion of shipments sent to the United States are also presumed to be re-exported to Korea and Japan for the purpose of sidestepping import tariffs, which may reach 50% (IWG-Nonu stakeholder interviews, personal communication, February 2020; ITC, n.d.).

The value of exports to all destinations has increased in the past five years but at an uneven pace, seeing significant spikes and export declines³⁹ in some years due to inconsistent world demand. The key theme identified from an analysis of export trends during this time period is the emergence of Korea as a major wholesale market. In 2015, exports to Korea were valued at only US\$350k but ballooned to as high as \$1.1m in 2018, only softening slightly in 2019 to \$964k. The value of exports to the US

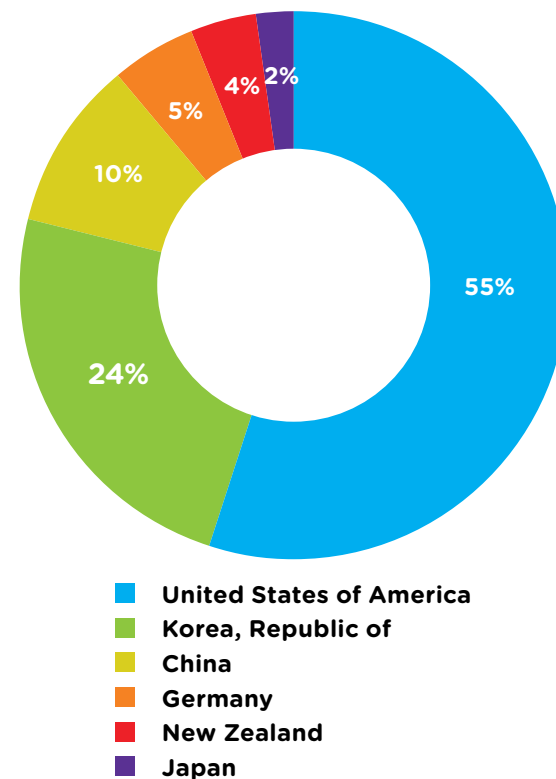


Figure 17. Samoa 2019 noni fruit juice exports to all destinations.

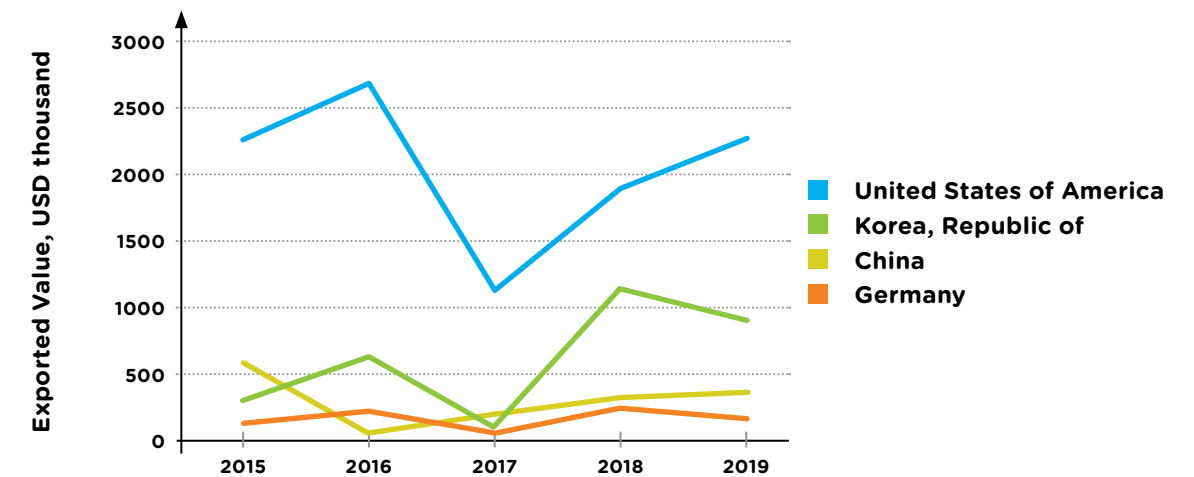
increased in 2016, then dropped significantly in 2017 before slowly recovering to the same 2015 value of \$2.26m in 2019.

China has emerged as a significant market, outpacing exports to Europe and Oceania combined in just five years. Continued growth is expected as popularity of noni juice products and multi-level marketing

opportunities increase in China, sustained by development of an affluent middle class of consumers. In addition, direct shipments to China are expected to increase due to new trade relationships recently established between the two countries resulting in an import tariff reduction to 5% (ITC, n.d.; Mayron, 2019b).

List of importing markets for a product exported by Samoa (Mirror)

Product: 200989 Juice of fruit or vegetables, unfermented, whether or not containing added sugar or other sweetening matter (excluding containing spirit, mixtures, and juice of citrus fruit, pineapples, tomatoes, grapes incl. grape must, apples and cranberries)



5.6. Polynesia’s Noni Exports

As of 2019, Samoa (\$4.12m) is the largest exporter of noni juice to all destinations but has been surpassed by French Polynesia in 2017 and 2018. Samoa’s total export value grew by 16% from 2015 to 2019, but this is the lowest increase of any of the Polynesian island nations except Niue⁴⁰.

The data shows that competition for noni juice exports from Polynesia is increasing. French Polynesia saw an increase in export value of 182% (to \$3.67m) during the same time period; the Cook Islands increased 239% to \$830k. Fiji’s exports grew 171% to \$1.27m or third behind Samoa and French Polynesia. Since 2015, Samoa’s market share of exports from Polynesia has dropped from 60% of total market share in 2015 to

40% in 2019, while at the same time French Polynesia (22% to 36%), Fiji (8% to 12%), and the Cook Islands (4% to 8%) have all grown. Within the next few years ceteris paribus, French Polynesia is expected to consistently overtake Samoa as the most valuable noni juice exporter in the region, while Fiji and the Cook Islands will threaten increasing competition.

Key concepts:

- The value of all noni exports from Polynesia doubled in five years
- French Polynesia, Fiji, and the Cook Islands have dramatically increased output
- Samoa’s market share has dropped by one third in five years
- Samoa, presently the export leader in Polynesia, will be overtaken soon.

³⁷ Rainforest fruit found in Latin America similar to a passion fruit.

³⁸ Noni juice was selected as being the most reliable way to illustrate all noni product demand, including dried fruit and powder.

³⁹ Particularly in 2017, where export values dropped by half for reasons that are not known.

⁴⁰ Niue experienced a decrease in export values from 2015 - 2019

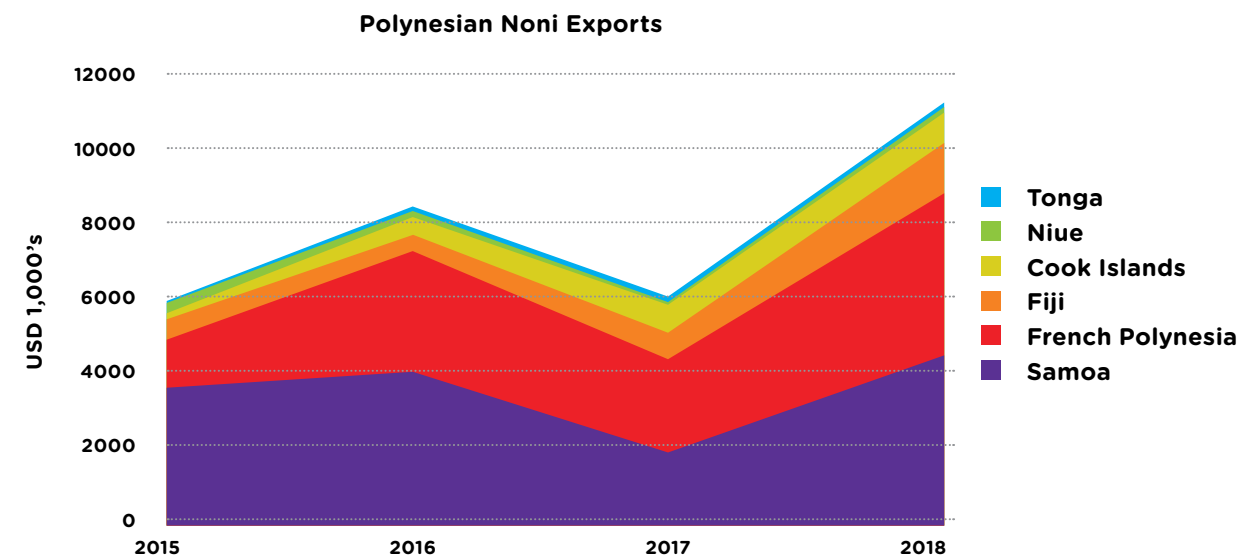


Figure 18. Noni juice exports from Polynesia to all destinations

5.7. Imports from Polynesia

Destination markets for all noni juice imported from Polynesia in 2019 were the United States (30%), China (28%), Korea (27%), followed by the EU (5%), New Zealand (4.8%), Japan (3.6%), and Australia (1.6%).

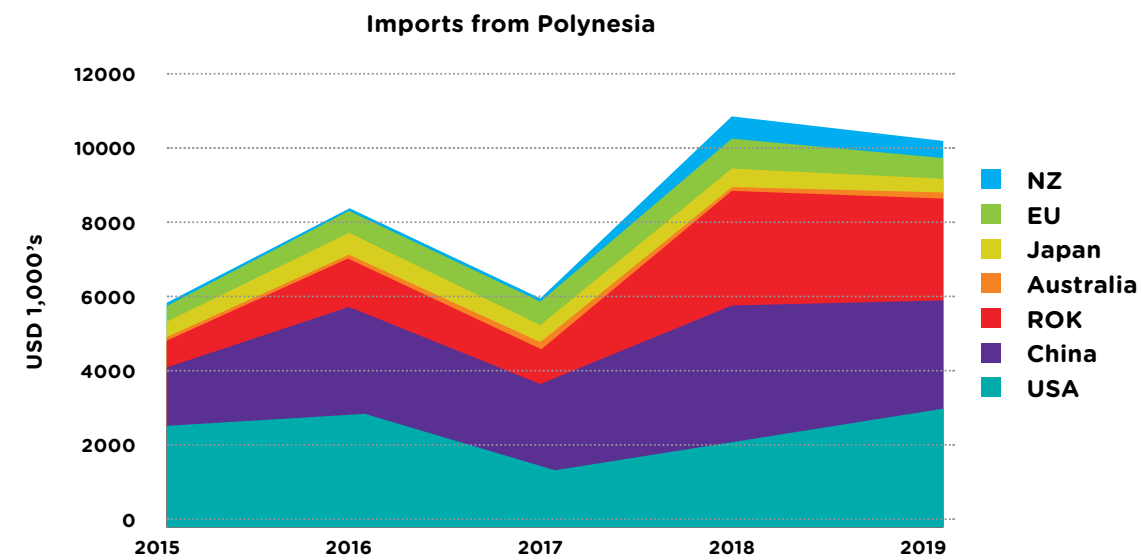


Figure 19. All destinations for noni juice from Polynesia⁴¹.

⁴¹ Source: ITC Trademap data. Significant destinations for exports listed under tariff code 2009-8900. China totals include Hong Kong and Chinese Taipei. Other trace amounts exported to Canada, the Middle East, Central America, and Central America.

From 2015 to 2019 imports to the United States grew modestly by 17% (to \$3m) from 2015-2019; however, there are more significant gains seen in other markets. While still the second largest destination market of all countries, China's imports increased by 89% (to \$2.9m) during the same time period. Korea's imports from Polynesia increased 263% (to \$2.7m) and New Zealand rocketed 486% (to \$486k⁴²). The value of exports also increased to all EU markets by 21% (to \$537k) but were higher from 2016-2018, signaling that 2019's retraction may be an anomaly. The only market that declined in value during the period examined was Japan, which shrunk by 4% to \$368k.

Three conclusions may be reached from available import market data:

1. The total market demand for noni juice products from Polynesia alone has doubled in five years and seems likely to continue growing.
2. Korea and China are expected to replace the United States as primary importing markets within the next two or three years.
3. New and even small consumer markets like New Zealand can quickly emerge to become significant trading partners for this product.

5.8. Exotic Natural Fruit Juices



Figure 20. 2019 value of juice imports in the same category shared by noni, by market data source: ITC Trademap

Noni is an ingredient that contributes as a part of the larger world market trend of increased demand for exotic or novel natural fruit juices not specified elsewhere by tariff code (NESOI). Growth observed in this market demonstrates potential for noni

fruit to capture additional market share in an expanding market. Worldwide, the category grew 17% from 2015 to 2019, valued at \$2.6b.

The United States is the world's most valuable market in the category, growing

⁴² % gain over five years is coincidentally the same numerical result as total value in 2019

69% over five years to \$563m. The U.S. is followed by the Netherlands (\$240m) and Germany (\$196m), both of which have grown slowly (12% and 1% respectively), and Japan (\$135m) which contracted during the time period by 9%. However, two key markets for noni trade have seen rapid growth across the category: Korea, rising in value by 160% over five years to \$104m in 2019 and China, increasing 335% to \$87m.

The significant and consistently rising value of products in this category indicate increasing market demand that may potentially include noni fruit juices in:

- the United States (top market, third fastest growing),
- Korea (sixth largest market, second fastest growing), and
- China (seventh largest market, fastest growing).

5.9. Nutritional Supplements

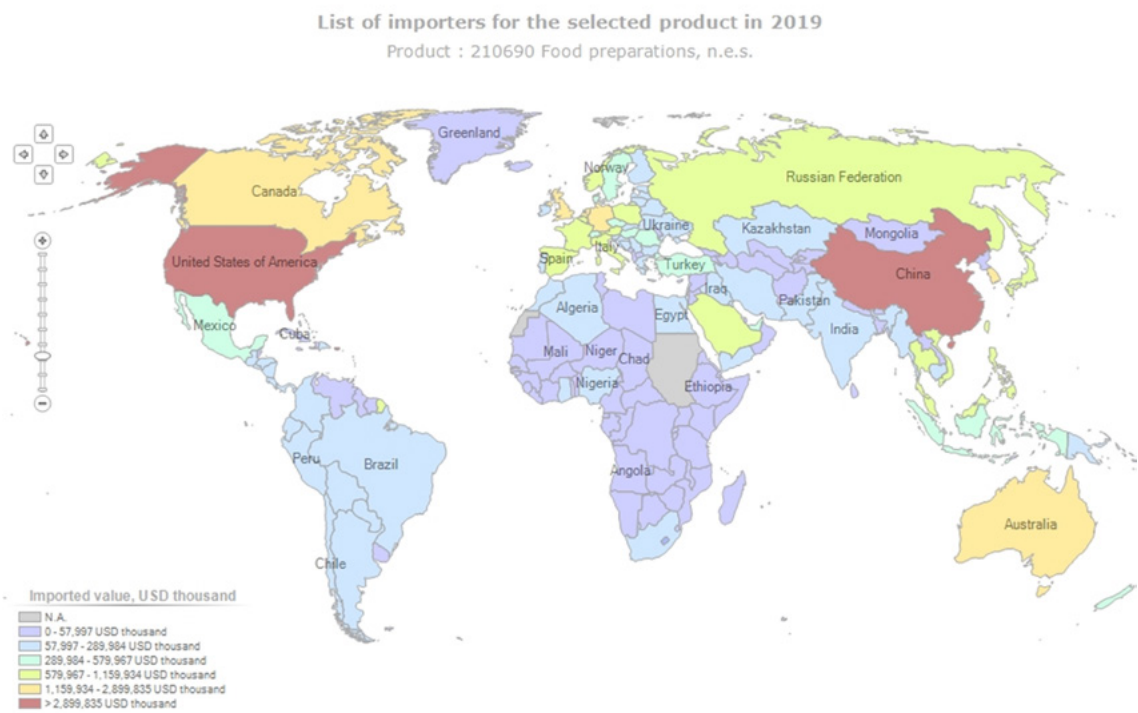


Figure 21. value of imports for nutritional supplements in 2019 data source: ITC Trademap.

Natural foods and medicines are a growing trillion dollar global industry (McGroarty, n.d.). Noni participates in this segment as a minor ingredient in direct competition among other supplements like superfruits, herbs, vitamins, amino acids, and other nutritional substances. Products in the nutritional supplement category are often consumed as capsules, tablets, powders, or in liquid form. Collectively, these ingredients are traded in the 2016-90xx category as food products NESOI⁴³. The value of the

world market is estimated at \$45b, which has grown 32% in the past five years.

A similar pattern is seen in this market as in natural juices but with more dramatic growth. Here too, the United States is the world's leading import market, valued at \$5.8b. The rate of increasing value is much greater, however, with U.S. imports rising 176% in just five years (versus 69% in juice). The second largest market, China, has experienced a similar rate of growth, to

\$3.13b or 141% during the same time period. Korea has also grown in value, by 88% to \$1.7b.

Western Europe is a major destination for these products, with large and established markets in Germany (\$1.7b, up 21%), the Netherlands (\$1.6b, up 60%), and United Kingdom (\$1.8b, down 8.3%⁴⁴). Australia (\$1.46b, up 22%) and Canada (\$1.46b, up 20%) also make an appearance in the top ten markets for trade. Japan, which recorded a slight decline in natural juice trade shows a slight increase (\$969m, up 3%).

The key trends observed from this data indicate:

- The global market for nutritional supplement products is growing at approximately 6.4% annually, or almost double the rate of growth seen in natural juices during the same time period
- The U.S. joins China posting triple-digit gains in market value over five years; Korea almost doubles in value
- Established markets exist both in Europe and Australia that offer potential opportunities for Samoa products



Figure 22. Natural Products Expo West draws 86,000 industry professionals from 136 countries photo credit: New Hope Network press release

⁴³ Powdered dairy products and dairy substitutes trade in this same category, which may be a significant portion of value

⁴⁴ An assumption is made that the decreased value of the U.K. market is due to BREXIT, which occurred during this time period restricting trade and weakening currency value; nevertheless, the U.K. remains the world's third largest market for these products behind China

6.

SAMOA'S NONI INDUSTRY

6.1. Economic Contribution

Noni is a crop of economic and cultural importance to Samoa. The country is small with a nominal GDP of US\$844 million. Agriculture accounts for 90% of the country's exports, with noni as its main export crop (Central Bank of Samoa, 2020; "Samoa," 2020). Over the past 19 years, noni products have seen a strong upward trend in production and value (Central Bank of Samoa, 2020). Starting as a new commercial crop in 2000, it now contributes more than SAT\$10m dollars annually to the nation's economy with the potential to do significantly more. It is also a cash crop supporting a large portion of the country's rural smallholder farmer population, including a disproportionately high number of economically disadvantaged.

More than 17,000 households in Samoa grow noni, 84% of which are located in rural areas of Upolu and on Savaii where few employment opportunities exist (Samoa Bureau of Stastics, 2015). Nationally, 40% of women working in agriculture are living

The nonu product market and value chain has provided accessible income earning opportunities to families in the remote rural areas
(Rogers et al., 2009)

below the basic needs poverty line, with a larger percentage in rural Northwest Upolu where noni is grown (Samoa Bureau of Statistics & UNDP Pacific Centre, 2013). Agriculture is also the most common occupation for Samoa's disabled (60.9%) compared to 40.1% of those employed without disabilities (Samoa Bureau of Statistics, Ministry of Women, Community and Social Development, Pacific Community, & UNICEF Pacific, 2018). A case study conducted by FAO observed "The nonu product market and value chain has provided accessible income earning opportunities to families in the remote rural areas," (Rogers et al., 2009) making it an important driver of poverty reduction for 70% of the country's population.

6.2. Value Chain

The plant grows wild across the island and is densely distributed in rural areas of Upolu and across Savaii, where most semi-subsistence household farmers cultivate crops on shared community plots. Others work the fields of larger farms owned by downstream processors (Rogers et al., 2009). Village agents are sometimes employed by processors to organize fruit purchases in rural communities at spot prices. Other farmers transport fruit directly to processor factories in Apia.

There are six processing companies, all in Apia, which also export (mostly) bulk wholesale fermented noni juice to export markets as an ingredient used in later stages of product manufacturing. At least one of

these companies is vertically integrated with trade representatives within the foreign destination market (IWG-Nonu stakeholder interviews, personal communication, February 2020). In addition to pressed juice, some of these companies also sell wholesale dried fruit or fruit powder and have begun production of finished retail products including noni juice packs and retail chocolates with added fruit. Some processors provide extension services for the communities from whom they buy fruit and provide simple visual guidelines for best practices.

Inefficiencies are caused by a lack of information necessary for future planning for most of the country's producers⁴⁵, which has a ripple effect upstream causing financial instability for farming households.

⁴⁵ Skyline Samoa maintains affiliated offices in China and may be less impacted by this issue due to their direct market presence

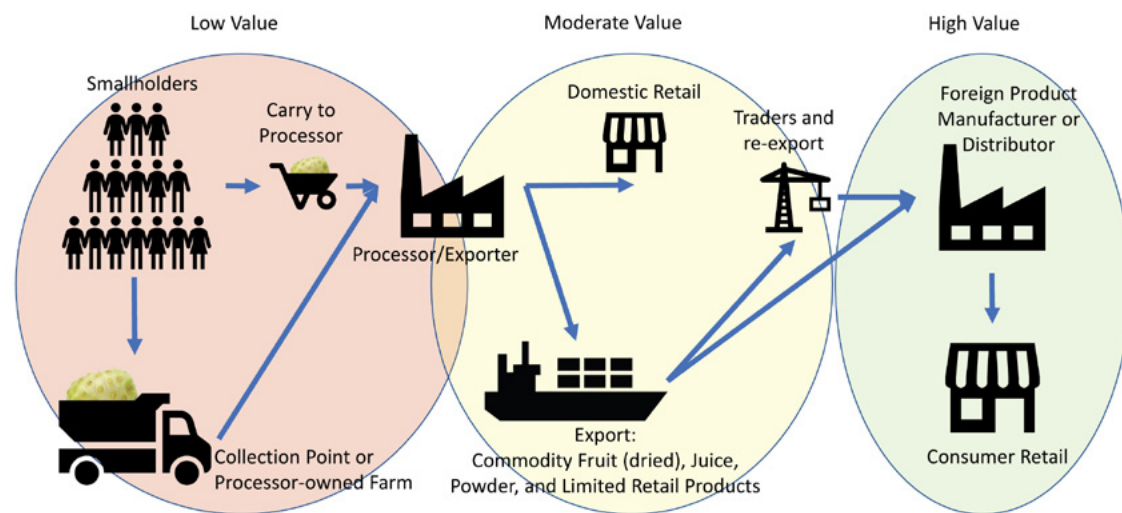


Figure 23. Present noni value chain. Samoa's farmers and producers perform low-value tasks, such as commodity ingredient production, and are often isolated from communication with end-user buyers

Producers have weak relationships with their wholesale customers and do not engage in collaborative long-term planning, nor do they regularly draft long-term contracts with steady supply volumes (IWG-Nonu stakeholder interviews, personal communication, February 2020). As in other markets for agroforestry products, little is known by Samoa's producers exporting noni about the ultimate destination markets in which their products are sold (Gold et al., 2004). Part of the challenge in collecting information is the structure of distribution where products sold from Samoa are wholesale goods that sometimes travel through an intermediary trader or re-export agent⁴⁶ before reaching a final destination. There is very little transparency in the process. Producers may not know the ultimate destination market or client for the noni products they sell and end-clients may not know the source of supply. It is in the middleman's best interest to keep that information confidential to avoid being circumvented. For the same reason, few prices are disclosed and there is no benchmark of industry pricing outside of offers made through opaque third-party business matching and trading websites like Alibaba. This puts producers at a disadvantage when marketing products, and limits the capture of more profitable downstream sales of specialty products (Gold et al., 2004). In the absence of ordinary market, competitive price, and trade

data, Samoa's noni producers have done a remarkable job navigating their way through this industry.

Selling is largely transactional, where noni juice (mostly) and other fruit products are ordered by overseas clients only as immediately needed. Producers must therefore continue to finance fruit purchased from farming communities in order to encourage continuous production while also maintaining some level of juice inventory for when orders are received. The situation is further complicated by juice fermentation and with dried products, which may take several months to complete causing supply bottlenecks (Rogers et al., 2009). The pace of orders is unpredictable and sales forecasts are not reliable, as there is little communication between buyer and seller other than about immediate transactional details.



Figure 24. Samoa-produced retail noni juice bottle

⁴⁶ Samoa noni may be re-exported to destinations like Japan and Korea from the USA for the purpose of avoiding tariffs

6.3. Five Forces Market Analysis

The Five Forces model by Michael Porter may be applied as a framework to evaluate the Samoa noni industry's relative strengths and weaknesses to identify a potential path forward (Porter, 1979). In essence, the model examines five key traits and analyzes them separately as weak or strong. It may be applied on either a macro- or micro-scale, evaluating an industry faced by foreign competition as is done here or individual company participants within an industry. The forces are:

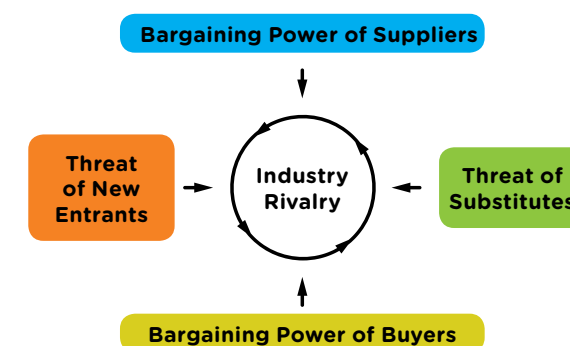


Figure 25. Porter Five Forces model. Credit: Fadeev, Wikimedia Commons

1) Threat from potential entrants to competition. How easy or difficult is it for new competitors to enter the space? When barriers to entry are low, then the threat of new competition is high. More competition leads a potential reduction of market share and less market power.

Because of noni's position as an ingredient trading in the larger health and wellness market, there are two types of competition to consider here: competition for wholesale noni supplies and also competition for other ingredients that trade in the same market. **This makes the industry's current threat from new competition high.** Any new noni growing origin, as we have seen emerge recently in South America, South or Southeast Asia is a potential new competitor. Noni trees are relatively easy to grow; they're hardy and can be planted anywhere in the tropics. Juice,

puree, and dried powder production from noni fruit absent of the costs necessary for differentiation (certifications, branding, standards, quality scheme, etc.) is relatively easy and inexpensive to reproduce. The threat of new entrants to competition may also include any other ingredient that can potentially be viewed as a substitute offering nonspecific health benefits. Any producer of a new superfruit or novel health trend is a potential new competitive threat to Samoa's noni industry. Samoa's position here is very weak and in need of protection from differentiation.

2) Threat of industry competition. How many producers are supplying the same or a similar product? This factor has the most direct impact on price, as buyers consider similar products directly substitutable.

Samoa's noni industry faces widespread competition from noni producers in other nations. Commercial farming and juice or extract suppliers are known to exist in Australia (Queensland), parts of the Caribbean, China (Hainan), Ghana, India (multiple states), Indonesia, Japan (Okinawa), Myanmar (Shan state), Panama, Papua New Guinea, Peru, Thailand, Vietnam (south, mostly), and most of Polynesia (including Hawaii, a large and productive supplier)⁴⁷. There are many potential suppliers of comparable wholesale noni ingredients, so prices remain low in the absence of a substantial increase in demand or disruption in supply⁴⁸. This makes the **industry's threat from existing industry competition high.** A buyer in Asia, Europe, or North America has many choices when shopping for ingredient supplier aside from Samoa, so despite being a market leader, its position here is weak.

3) Bargaining power of (domestic) suppliers. The bargaining power of suppliers is determined by their ability to raise prices that increase profits. For this evaluation, consider smallholder farmers to be the source of raw ingredient supply.

⁴⁷ Author's research. Possibly also including Cambodia; unclear if supplies are available for export. Small-scale subsistence production occurs in many other tropical nations.

⁴⁸ Disruptions are not uncommon, as many tropical nations face threat from extreme storms, volcanic activity, earthquakes, tsunamis, and political or economic instability.

Each individual farming household has little bargaining power, as producer/exporters have multiple domestic sources. However, working as a collective unit, Samoa's farming households wield considerable power. If all farmers were to suddenly stop work and demand a 50% increase in payment, how would processors respond? Only a few producers are vertically integrated to supply their own fruit and importing noni juice from other countries would be cost prohibitive. This scenario is unlikely to occur; however, a similar pattern is observed when farm gate buying prices drop below the market rate for minimum wage labor. Supply elasticity is demonstrated as farmers decide to not pick noni fruit, in favor of more profitable activities. Therefore, as a collective unit, farmers wield substantial power: processors are heavily dependent on their supply, yet few individual farmers are totally dependent on noni fruit for income. The resulting evaluation of **this component is mixed with suppliers maintaining balanced power with producers**. Since this market study seeks to achieve improvements for all industry participants and particularly farming households, what is observed as a weak position for producers here may be a strong position for households.

4) Bargaining power of (foreign) buyers.

Buyers have bargaining power when there are numerous suppliers, substitutes, or when business dependence on particular supply is low.

Although some buyers are dedicated to noni juice products, many buyers offer multiple product varieties (various juices, nutritional supplements) and are not committed to the fruit as being critical to their business model. There are other sources of noni supply from Pacific islands and Asia (mostly), and other exotic fruit and vegetable juice or supplement products that may serve a similar benefit like pomegranate, acai, beetroot, dragon fruit, mangosteen, or many others that may serve a similar purpose. This makes the **bargaining power of buyers moderate to high**. Samoa's position when negotiating with buyers is moderate to weak.

5) Threat of substitutes. Substitutes viewed as equal decrease overall demand for a good and the price sellers may charge in a marketplace. As mentioned in sections above, practically any product sold as an exotic superfruit in the healthy lifestyle market is a potential substitute. Noni has no clinical application, poor taste appeal, and little consumer loyalty. **The threat of substitutes is high**, which places Samoa's noni industry in a weak position.

6.4. Assessment

This limited assessment shows the fragile position of Samoa's noni industry. Although it is a valuable component of Samoa's economy today supporting thousands of households, future growth is threatened by increased competition by other noni producers and other substitute products. In a position as a wholesale supplier, Samoa's noni industry has limited market power and will be subservient to buyers with unequal market power. In order to secure a future position in noni production, Samoa must change its business model from supplier of bulk commodities to brand name of niche specialty.

A two-pronged approach is suggested to maximize the industry's gains:

- Create value for existing exports, and
- Capture value from downstream industry participation.



Figure 26. The Noni Loa brand of products by Wilex is designed to capture retail value
Photo credit: Andrew Hetzel

7. MARKET STRATEGY

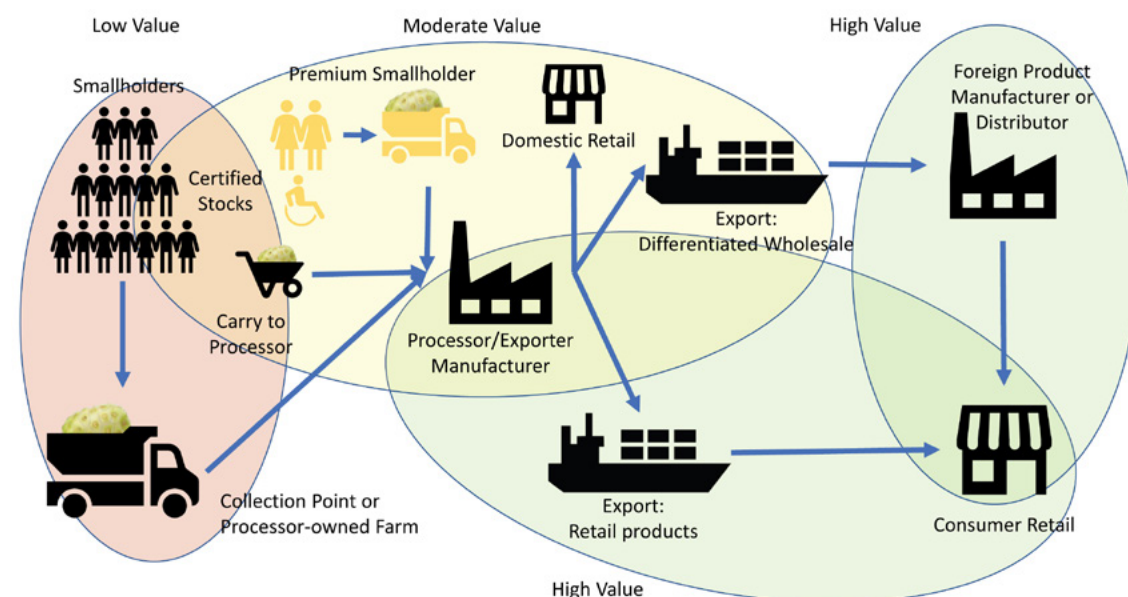


Figure 27. Proposed shift in Samoa's noni value chain.

This study recommends production of specialty products (branded, quality differentiated, and women-produced) and participation in end-user markets with retail consumer products as the way forward to Samoa's noni industry as a whole. Within the industry strategy, a wide range of options and configurations exist for each producer/exporter. The product mix may vary substantially between producers with some continuing bulk juice shipments but with greater product differentiation and Samoa origin brand value. Others may

develop a line of private label consumer products for wholesale buyers but without retail marketing. Others still may become vertically integrated from farm to retail. There is no wrong answer, nor is there an ideal configuration. Each entrepreneur should pursue the business model that aligns best with his or her skills, available resources, and tolerance for risk. The goal should be to capture as much revenue from across the value chain as possible from business activities.

7.1. Creating Value

Creating value comes from the addition of actual or perceived benefits within an existing market. The objective is to add value where none existed before from enhancements like product characteristics, desirable certifications, marketing awareness, branding, and preservation of identity (Parcell, Brees, & Giddens, 2010). Higher prices resulting from increased

demand and reduced competition result from these activities. Enhancements that create value are generally low risk activities (Parcell et al., 2010). Although significant capital investment may be required depending on the complexity of the activity, any of the suggestions below may be implemented without substantial disruptions to normal business. At the same time, expected returns are lower than when capturing new business.

7.1.1 Enhanced Market Presence

The internet is a valuable resource that is underutilized by Samoa's noni industry. There are several noni health articles and consumer noni product websites, which makes locating Samoa's wholesale exporters challenging. Improvements in website interface design and content for Samoa's exporters will improve visibility in searches and subsequent accessibility to potential buyers. This has the potential to eliminate some unnecessary middlemen.



Figure 28. The Avocados from Mexico website draws consumer and professional audiences for maximum engagement.

A collaborative website designed for the purpose of promoting all of Samoa's noni industry to the outside world would do more, by increasing visibility among commercial buyers and retail consumers searching for noni products. The Avocados from Mexico (AFM) website is a good example of an agricultural group marketing initiative. It ranks highly for avocado-related searches on Google and allows producers to engage the public directly to promote its message in addition to providing commercial information. AFM additionally maintains a significant social media presence with more than 1.5 million likes on Facebook, 100,000 followers on Instagram and Twitter⁴⁹ and a comprehensive database with dozens of avocado-related cooking and entertainment videos on YouTube, one of which has more than one million views. The lesson provided

by AFM's activities is a valuable one. In the 1990's the average American consumer ate just .68 kg (1.51 lbs) per year. At the time, avocados were viewed as an unhealthy food that is high in fat and calories (Carman, 2019). By 2018 the fruit was repositioned as a healthy superfood largely due to producer industry marketing, leading to a rise in annual consumption to 3.64 kg (8 lbs) per capita (Carman, 2019).



Figure 29. The same site has sections dedicated to wholesale trade information.

No organization is providing this type of central information resource for noni. In the absence of an online presence representing Samoa's noni industry (and the broader noni trade), consumer searches for the noni products yield a number of unsavory or confusing resources such as health warnings, MLM distribution schemes, and fringe health websites making dubious claims. The information provided by these sources may negatively impact consumer perceptions of noni.

⁴⁹ Estimate of subscribers when combined

7.1.2 Trade Promotion



Figure 30 Natural Products Expo West 2019 (Anaheim, California) drew 86,000 industry professionals from 136 countries to see healthy lifestyle products from 3,600 exhibitors. Photo credit: New Hope Network press release

Samoa's noni exporters acquire new business through word of mouth and from maintaining a basic internet presence. Some have participated in Australian consumer food expos, but the industry has not been represented at commercial trade events drawing participants from the healthy lifestyle (natural products and nutritional supplements) or specialty food markets. There are a number of food and natural products events hosted each year that draw multinational or regional commercial participants who may be wholesale buyers of ingredients, distributors of consumer retail products, or direct buying representatives of retailers. Visibility at events in the industries where noni trades is crucial to maintain market awareness and demand, when faced with competition from other novel trends like turmeric, kombucha, coconut water, spirulina, cannabidiol (CBD) oil, and more. Trade event participation is not, however, solely about meeting buyers as an exhibitor. Noni exporters participating at industry trade shows can also⁵⁰:

- **Build noni and Samoa geographic origin brand awareness.** Building awareness is a valuable contribution to an organizational sales effort. It is a foundation for all other sales and marketing effort. Set expectations realistically, however, as sales cycles in the retail are slow and most business opportunities identified

are not transacted at the event. It may take months or years to complete new business with sales prospects.

- **Hold customer meetings.** Industry events provide an opportunity to meet with a large number of existing trade partners in one forum. Use the time to discuss ongoing or new business matters and socialize with customers. In addition to formal business meetings, social activities build trust, which is of critical importance in the specialty coffee niche.
- **Gather intelligence.** Use shows to learn about competitive products from other noni product manufacturers or other natural ingredients. Visit competitor displays to gauge their effectiveness. Taste samples from noni exporters or product manufacturers to better understand the competition. Adapt good ideas discovered for your own market plan.
- **Learn.** A better understanding of the industry where noni products are sold will improve selling effectiveness. Learn more about the industries in which you trade, see new innovations in healthy lifestyle and specialty products, or how to conduct export business better. Everyone can learn something new from attending lectures or skill-building workshops frequently offered in combination with trade events.
- **Develop strategic partnerships.** Consider joining or aligning with regional trade groups, distributors or manufacturers' representatives with specialty expertise. Banding together with others increases social networks and can improve the effectiveness of sales activity.
- **Meet the press.** Trade press attend events to cover stories generated within the industry. Form relationships with editors or other media representatives to improve the potential of future exposure for your business or region. Invite and involve trade media in your activities

at shows. Making media impressions a key metric for evaluating success of the activity. There are dozens of potentially relevant shows hosted each year around the globe that may be suitable to market noni-based products, but participating as an attendee or exhibitor at any event can cost substantial amounts of money. In addition to the direct costs associated with travel and display-related

costs for an exhibitor, one must also not forget lost time while away from the office. Since so much is at risk, it is important to select each event carefully as part of a coordinated marketing and communications plan to achieve a positive return on investment. When done right, trade shows can be a profitable investment.

7.1.3 Improved Food Safety

Few regional and no global standards exist for noni fruit and leaf product safety, which leads to a wide variation in quality of production and potential international trade barriers. In the European Union, noni was approved as a pasteurized fruit juice ingredient in 2003⁵¹ with conservative daily consumption limits following a product ban over safety concerns that began in the 1990's. In most countries, noni products fall under general safety regulatory guidelines for all foods, natural fruit juices, or nutritional supplements. Noni's biochemistry is complex and contains controversial compounds that are not fully understood by medical science with potential toxicity like *anthraquinones* and *scopoletin*. This is further complicated by the process of fermentation.

Noni juice is often fermented prior to shipment for the purpose of obtaining additional flavor and increasing shelf life with lowered pH resulting from increased acidity. The natural fermentation process creates ethanol, which raises additional product safety concerns. Samoa's noni exporters have reported that some export shipments have been rejected in recent years by consuming countries for exceeding minimum ethanol safety levels. Others have received noncompliance warnings from the U.S. Food and Drug Administration threatening revocation of U.S. import privileges.

HACCP is a safety standard used in manufacturing of juice and other food products that ensures safety during production rather than evaluation of finished products. The process is required to export

juices to the United States and many other consumer markets (U.S. Food and Drug Administration (FDA), 2017). At a minimum, all of Samoa's noni juice producers should achieve HACCP certification.

Development of a Pacific regional standard for fermented noni juice in the FAO Codex Alimentarius is ongoing and expected to be published within the next few years. The Codex is a collection of internationally adopted food standards and related texts designed to protect consumer health and facilitate international trade. A proposal to develop standards for noni juice began formally in 2012 and is expected to be submitted for final approval in 2021. At the time of this study, the Codex committee has recently set forth analysis procedures for identification of *scopoletin* for endorsement, overcoming a substantial barrier that has prolonged the process since 2016. Samoa participates in the committee designing the standards, led by the Ministry of Commerce, Industry and Labour (MCIL) and a delegation including noni exporters (Mayron, 2019a).

Considering the potential trade benefits from this effort, continued involvement in this process is recommended leading to the world's first generally accepted standard for fermented noni juice. In addition, Samoa should take action to publish national standards for product safety for noni juice and other related products, then implement testing prior to shipment to ensure that minimum safety levels are met.

⁵⁰ The following section is adapted from "Successful Tradeshow Participation Guide for Coffee Exporters" (Hetzl, 2019)

⁵¹ The EU approved noni leaf products in 2008, purees and concentrates in 2010.

7.1.4 New Certifications

A small number of farming groups have obtained USDA Organic certification and are paid an additional premium for organic certified fruit by certified exporters. USDA Organic is considered the most effective certification standard for sales of products, like noni, that trade in the health and wellness industry as natural foods and nutritional supplements (Runestad, 2020; Turner, 2013). A study conducted by the Pew Research Center found that 45% of U.S. adults believe organic certified produce to be healthier than conventional produce (Strauss, 2018). That figure is higher among younger American consumers, where 60% believe organic produce to be healthier (Hefferon & Anderson, 2016). Increased support for organic certification of farming areas and processing facilities should be considered. Ultimately, the entirety of Samoa's noni crop may benefit from being certified organic, as non-certified products are more likely to compete in low-value markets where Samoa faces low-cost competition from inferior suppliers.

Additional price premiums and other social benefits may be achieved by applying additional certification labeling schemes, including but not limited to Fairtrade, non-GMO, Kosher⁵², and perhaps more surprisingly, gluten free. Some, like organic and Fairtrade certifications offer positive upstream benefits for Samoa. Systems offered by Fairtrade International or Fairtrade USA provide guidelines for transparency, farmworker safety, and distribution of price premiums paid to workers for label use. In addition to contributing to better welfare for smallholder farmers, it may also increase consumer perception of value and demand. A 2014 study conducted by researchers at Stanford, Harvard, and the London School of Economics found that coffee consumers were willing to pay a 10% premium for unknown coffee bearing a Fairtrade label⁵³ (Hainmueller, Hiscox, & Sequeira, 2015).



Figure 31. Retail cayenne pepper package displaying organic, non-GMO, and Kosher certifications plus additional “non-irradiated” and “non-EDO” (chemical additive) assurance. Purchased at US\$6.49 for 48g (US\$135/kg).

Other certification schemes are less relevant to noni production and Samoa's farmers but may add consumer appeal. Consumers have a positive association with many labeling schemes but have little understanding of what they mean. Gluten free is a perfect example. According to one recent consumer food survey, 26-30% of adults are actively limiting gluten⁵⁴ intake, “despite not being diagnosed with any form of gluten sensitivity” because they believe it supports a healthier lifestyle than traditional diets (Dwyer, 2018). There is no clinical evidence supporting this claim. The category is estimated to have grown to US\$4.26b in 2018, including foods with no relation to wheat like ketchup, fruits and vegetables, and even bottled water, “proving not only the buying power of the gluten-free consumer, but also that those participating in

the diet are swayed by consumer marketing rather than an intolerance” (Dwyer, 2018). Similarly, Kosher labeling has obtained widespread appeal that “transcends religious beliefs,” because of an association with food production laws that emphasize cleanliness, purity, and quality (Runestad, 2020). Although originally intended to identify products suitable for consumption within the Jewish faith, it has become a favorable mainstream symbol of quality extended to non-food products, including nutritional supplements and hemp (Runestad, 2020).

7.1.5 Women's Participation and Products

All of Samoa's noni exporting companies are owned by and are largely operated by men as the head of family business households. This limits women's participation in high-value downstream activity, such as retail product development and sales.

Women smallholder farmers in Samoa face a number of gendered obstacles, including land access and tenure, unequal decision-making power, unequal access to financial resources, domestic violence, and a double burden of work. They are responsible not only for field labor, but are also expected by cultural norms to perform domestic duties, such as housework, cooking, and child rearing in the household. The labor provided by women is often in harvesting of noni fruit, which is a low-value task (Hetzl & Sipani, 2019). A 2009 NZAID social impact study of a women's noni farming program headed by Samoa Women in Business Development Incorporated (WIBDI) found that the leading barrier faced by women for income generation is “lack of time”⁵⁵ (Giera, Fraser, & Leilua, 2009).

Men are typically responsible for the transportation, sale, and export of noni fruit and products. Men from farming households often collect income from fruit collected at the farm gate, meaning that women have little control over how proceeds

The same is true for non-GMO labeled products, particularly among younger consumers. Nearly half of consumers aged 18 to 29 believe foods with GMO ingredients are worse for health than those not including GMO ingredients; 21% believe the existence of GMO foods will lead to negative health consequences for the world population (Hefferon & Anderson, 2016). Although no past GMO research involving noni trees is known to exist and future GMO noni production is unlikely, noni producers are nonetheless entitled to take advantage of non-GMO status in consumer labeling for additional perceived value.

Samoa's noni industry will benefit from the ascension of women into ownership and management roles

are spent. Studies have shown that while women use almost all earnings to support household needs, including food, clothing, education, and healthcare, men typically spend 25% or more of their income for other purposes (FAO, 2002). Women's economic empowerment in rural agriculture therefore has positive outcomes for the entire communities, as well as families (Hetzl & Sipani, 2019).

Innovation and creativity in agricultural industries come from diversity (Heim, 2019). Diversity of leadership is an asset for many companies and Samoa's noni industry will benefit from the ascension of women into ownership and management roles. From a simple market perspective, women control over USD\$12 trillion in worldwide spending, including responsibility for 85% of all consumer purchases. That figure is even higher in the markets where noni products trade where women control 93% of both food and beverage and over the counter pharmaceutical buying (Shafer, 2019; “The Purchasing Power of Women: Statistics,” 2019). It is unlikely that the industry can respond effectively to the needs of consumer

⁵² Kosher and Halal standards are similar, and in many cases considered interchangeable. In produce, the main stipulation relevant to noni juice products is that ethanol content must be through natural fermentation and less than 1% by volume (Alzeer & Abou Hadeed, 2016).

⁵³ Consumers in the study also demonstrated greater price demand elasticity, where a 9% increase in price caused a 30% reduction of purchases.

⁵⁴ Gluten is a protein found in wheat and related grains. About 1% of people have celiac disease and suffer gastrointestinal illness when consuming foods containing gluten; larger numbers report non-celiac gluten sensitivity, with a wide spectrum of symptoms (“Celiac Disease Foundation,” n.d.).

⁵⁵ “Lack of access to foreign markets” was a close second in the same study

markets without management diversity adequately reflecting that of its customer base. “A room of only men cannot design for women” (Harris, 2019).

This presents two immediate opportunities for Samoa’s noni industry: 1) developing women’s programs to support their farming needs coupled with traceable women-produced goods marketed and

7.1.6 Quality Language and Standards

The discussion of standards involving noni products has historically focused largely on food safety criteria. However, grading food products with the only goal of avoiding toxicity sets a low bar for achieving consumer desirability from quality achievement. Several (arguably most) noni product producers and retailers describe their products as being “high quality,” but no criteria exists for quality evaluation beyond physical inspection and chemical analysis. Little thought is given to the flavor and sensory experience of consuming noni products, which is the single largest factor driving consumption of a food or beverage. As a result, any noni product today may claim to be high quality, as the definition of quality shifts for each supplier. This causes substantial market confusion and limits

sold at a premium price, and 2) support the development of a women-owned or cooperative business exporter. Either or both may benefit from collaboration with the WIBDI organization, which has overseen past efforts to encourage women’s organic farming in a venture with producer/exporter Nonu Samoa (Giera et al., 2009).

potential for producers to differentiate products reliably in a way that is relatable to consumers. For credibility when making quality claims, noni producers must be able to authoritatively answer the question “what is good noni juice?” and later pursue, “how can we make it better?” Noni therefore needs a sensory lexicon in order to define the subtle elements of its taste, and an objective system of evaluation that helps to separate good noni taste from bad.

A sensory lexicon is a “set of standardized vocabularies developed by highly trained panelists for describing a wide array of sensory attributes present in a product” (Suwonsichon, 2019). It is the set of terminology developed for a product like noni used to describe a complex sensory experience like taste and texture. Lexicons exist for many different food and beverage products, including fruits and vegetables, grains and nuts, beverages, even meats and dairy products. Once developed, a lexicon may be used to guide noni quality evaluation, new noni product development or plant breeding selection, and even better articulate flavors and sensations to consumers (Suwonsichon, 2019).



Figure 32 Taster’s wheel grouping the lexicon of terms for honey produced by the University of California at Davis

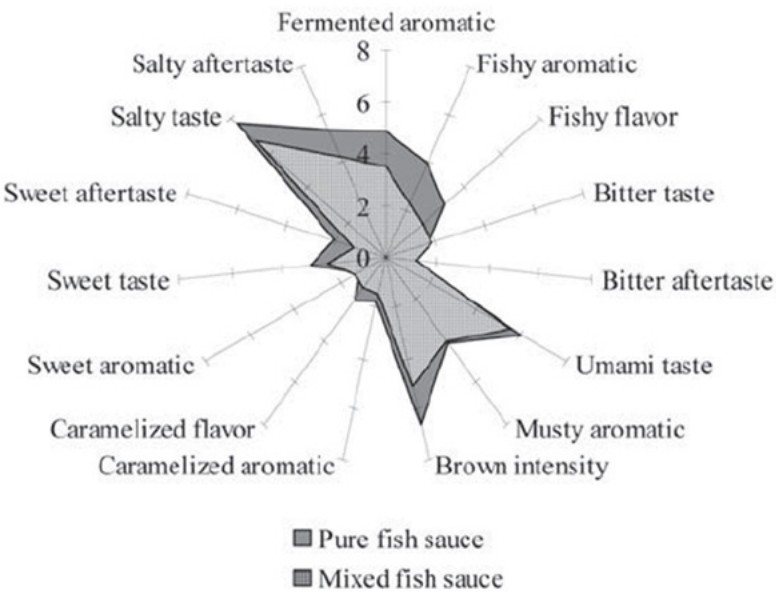


Figure 33 Graph of scores from a sensory panel evaluation of popular Thai fish sauces (Ritthiruangdej & Suwonsichon, 2006).

The flavor of noni is intense, complex, and unfamiliar to most consumers with the potential to overstimulate the senses similar to soft cheeses, fish sauce and other fermented foods like kimchi. Food preference is an acquired taste that comes from repetition, it can take 10 to 15 experiences with a new flavor or texture before consumers begin to develop the feeling of appreciation or fondness (Platkin, 2005). Lacking confidence in the quality of a product, consumers may be unwilling to repeat use of noni products to cross that threshold.

An evaluation system, or noni quality scoresheet, should be developed in combination with a sensory lexicon that allows for a minimally subjective rating of quality. This may be part of a larger quality standards rating system where superior noni juice (or other preparations) receive an “A” grade, lesser quality “B” and “C,” with each tier sold at a predetermined premium price. Other nomenclature or visual devices may be selected to communicate the same approximate information, as determined by the industry⁵⁶; however, the goal remains the same: have an objective bases of determining what is good, then communicating premium quality to buyers and consumers.

7.2. Capturing Value

Capturing value comes from changes to value chain structure, so that fewer downstream activities are provided by other providers. Reconfiguration is often required to produce and distribute retail goods that obtain a greater share of end-user value (Parcell et al., 2010). There is risk involved, as these changes will put Samoa’s noni industry in competition with current customers for share of retail market value. However, these

customer relationships are already at risk from inaction resulting in erosion of current market share to substitute goods and increasing competition. Although requiring capital investment and adaptation of skills from upstream wholesale noni bulk supplier to specialty niche product makers, the move will ultimately place Samoa’s industry in a more stable market position with better market information, and the ability to command significantly higher value from goods produced (Gold et al., 2004).

56 For the purpose of communicating quality to consumers simple and recognizable scales used in other applications work best, e.g. (A,B,C,) (1,2,3), (bronze, silver, gold) (% from 1-100 or # from 1-10), etc.

7.3. Product Areas

Although an analysis of consumer product trends is not within the scope of this study and much more research is necessary to

7.3.1 Healthy Lifestyle

The natural products and nutritional supplement markets are substantial, estimated to be valued in the hundreds of billions if not trillions of dollars and growing (McGroarty, n.d.). One study found traditional medicines (US\$360b) and healthy eating (US\$702b) segments in which noni is sold to be valued more than a trillion dollars alone (McGroarty, n.d.). Within the United States, the natural products and supplement industry is valued at US\$158b (NFM Staff, 2019).

determine the costs, benefits and strategy recommended to pursue each product category or regional market, the following are suggested as leading candidates for consideration.

Potential exists to create a line of Samoa-branded or private label products serving this market that feature noni as a primary ingredient. Some private companies are already doing the same, but with no allegiance to Samoa as a supplier. Furthermore, as the maker and seller of these products, Samoa's noni producers will benefit from additional downstream value captured. Although consumer market research and product research and development (perhaps in collaboration with SROS) will be necessary to select the specific market(s) and product(s) of entry, some reasonable assumptions can be made based on information contained within the scope of this study.

7.3.2 Ready-to-drink (RTD) Functional Beverages and Nutritional Supplements

The RTD beverage market was estimated to be valued at US\$72.25 billion in 2016 (Doyle, 2018). Many of Samoa's producers are already capable of producing bottled noni juice products, making entry into the RTD functional beverage market an opportune starting point. Existing pure juice products may improve sales with new branding and certifications (like organic, Fair Trade, non-GMO, etc.) obtained in upstream value chain enhancements. In addition to branding and labeling, producers may consider alternative formulations utilizing other fruit juices or nutritional supplements sourced from Samoa that improve overall taste for consumer enjoyment.

Multiple product formats may be considered:

- 500 mL **glass or plastic bottles** or smaller allow products to be sold at an affordable price point for mass consumers
- **Cans and drink boxes** are increasing in popularity as packaging for juices, spirits



Figure 34. Boxed Water photo: BevNet 2012

and even water, as they are recognized as being more environmentally friendly than plastic and weigh less than glass (Onstad, 2018). Some municipalities in Australia, Canada, and the United States have already banned use of plastic bottles, a trend that is likely to expand.

- **Juice shots** are a popular wellness trend, as demonstrated by Hawaiian Ola's market entrance (White, 2019)
- **Stick and packet products** containing noni powder pure or blended with other proprietary superfruit and nutritional supplement recipes, even with coffee
- Ready-to-drink and ready-to-blend **superfruit smoothies** are a popular

category, offering high vitamin content in a single pack that is more substantial than juice products and can be consumed as a snack or meal (Blumberg, 2019)

- **Noni leaf RTD iced tea** products are becoming increasingly popular. The market is projected to grow at 5.6% annually through 2024, presently

representing three quarters of world RTD sales (Doyle, 2018)

- **Caffeine** remains a popular ingredient additive in beverages, particularly modern sports drinks, with potential health and performance benefits but few drawbacks (Savage, 2020)
- **The best format** is one that advances credibility of the brand image.

7.3.3 RTD and Supplement Concepts



Figure 35. Vive Organic orange juice shot with caffeine photo: Vive Organic, PRNewswire March 4, 2020



Figure 36. Sparkling Botanicals by Rishi Tea & Botanicals. Photo: Rishi Tea & Botanicals, PRNewswire March 10, 2020



Figure 37. Fiji Water to transition away from plastic. Photo: Fiji Water, Beverage Industry December 2019



Figure 38. Prima Botanical Elixer Collection photo: Prima, PRNewswire September 2019



Figure 39. Blueprint Kombucha. Photo: BevNet 2016



Figure 40. Noka superfood smoothie (shelf stable). Photo: Noka Organics press 2020

7.3.4 Bath, body, and Skincare

Mintel research estimated the global market for soap, bath, and shower retail markets would reach US\$30.5b in 2019 (Twincraft Skincare, 2019). The largest national markets identified by the study are the United States (\$6.3b, 20.1%), China (\$3.7b, 12.1%), India (\$3.3b, 10.8%), Brazil (\$2.6b, 8%), and Japan (\$1.8b, 5.9%), who collectively represent 58% of worldwide market value.



Figure 41. Mintel Research Soap, Bath, and Shower Products 2019

Important global trends include:

- Natural and “free-from” claims that provide consumers with a sense of authenticity and product safety
- Functional claims like skin moisturizing and anti-bacterial properties that provide some health benefit
- Social and environmental sustainability claims, giving indication of some positive sustainable benefit from use of the product (Twincraft Skincare, 2019)
- Self-care products that relieve stress by introducing a spa-like atmosphere to the home
- Products with perceived health benefits, such as “post-workout treatments to help relieve sore muscles” and “aromatherapy products for those who are feeling under the weather” (Twincraft Skincare, 2019)



Figure 42. Kora Organics “Noni Night” skin treatment (Australia), photo: Trendhunter.com

- Personalized products by culture, age, and gender; particularly men’s products, which have been historically underrepresented by the category
- All parts of the noni plant can be used for these products, including leaf extractions, fruit paste, and seed oil

The U.S., China, and Japan are high-value consumer markets already purchasing noni products from Polynesia, making them a good point of potential entry.



Figure 43. Beard Buddy Beard Wash (U.S.), photo: Trendhunter.com



Figure 44. Coffee Shampoo bar (U.S.), photo: Trendhunter.com



Figure 45. The Beauty Co Apple Cider Vinegar Shampoo (India), photo: Zen Lifestyle Pvt. Ltd.



Figure 46. Yuzu Soap Aromatherapy Tablets (U.S.), photo: Yuzu Soap



Figure 47. Province Apothecary Make up Remover (Canada), photo: Province Apothecary



Figure 48. BeYou CBD Muscle Balm (U.K.), photo: Trendhunter.com

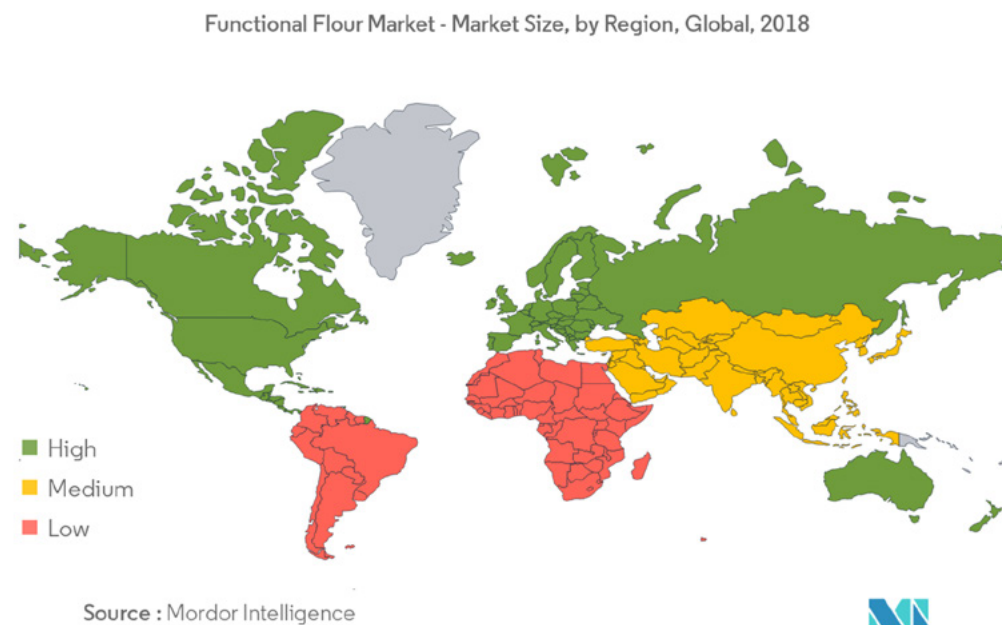
7.3.5 Functional and Alternative Flours

Whole Foods Market, Amazon.com subsidiary that dominates the U.S. natural foods market, calls alternative flour one of its top trends for 2020 (Crowe, 2020). “The term alternative flour implies a foodstuff other than traditional milled cereal or seed that has been ground into a fine consistency” (Berry, 2019). Technological improvements in recent years have allowed a wide variety of products to enter the flour market, including fruits and vegetables (bananas, coconuts, yams, cauliflower, cabbage, even coffee), legumes, seeds, and even insects (as in cricket flour) (Berry, 2019). Demand for alternative flours developed initially with the gluten free movement but continues, fueled by new trends like paleo and keto diets that avoid high carbohydrate foods, and larger natural food trend embracing foods with perceived health function.

The global gluten free foods market is expected to reach \$15b in value within the next six years (Berry, 2019). “Alternative flours are gaining interest in the culinary world to offset negatives of traditional wheat

flour, to improve the nutritional value of prepared foods and because of the interest of chefs and consumers to explore new textures, flavors and aromas,” Anastasia Tkacheva, co-founder and chief technology officer of Planetarians told Food Business News” in an recent interview (Berry, 2019). Consumers are additionally interested in sustainability, knowing that products can be sourced from byproducts, or from climate resilient crops that require little water (Berry, 2019).

North America presently dominates the market for premium foods, but the influence of western culture has increased demand for high protein and high nutrient foods in Asia-Pacific (Mordor Intelligence, 2019). “Present day consumers are less interested in mid-market products. A trend is emerging among these consumers, in which they are seen to be minimizing their expenditures on basic groceries and are instead trying out new premium products available in the market” (Mordor Intelligence, 2019). The market for functional and alternative flour is expected to grow at 4.9% annually over the next five years (Mordor Intelligence, 2019).



7.3.6 Animal Supplements

Supplements are not limited to consumption by humans. Significant markets exist in pet and livestock applications for nutritional supplements, much in the same way that it does for people, but with less regulatory oversight and users who are less sensitive to the unusual flavor of noni (Pet Nutrition Alliance, n.d.).

Pet Products

A \$636m global pet nutritional supplements market has emerged in recent years, 78% of which is spent on dogs, and much of which is in the United States. The overall American pet products industry is reportedly valued at \$95b dollars, driven by millennial consumer (age 25-34) demand to pamper their “humanized” dogs and cats (American Pet Products Association (APPA), n.d.; Chapman, 2019). “Most people think of pets as their children... as consumers become educated on human supplement products, that knowledge naturally extends to animal supplements” Bill Bookout, CEO, National Animal Supplement Council (Reed, 2017). A large variety of pet supplement products are now available, from CBD chew toys, to animal gut health supplements, strength and endurance products, and other pet vitamins targeting other specific health conditions like obesity (Packaged Facts, 2019).



Figure 49. Millennial imagery used in pet supplement marketing. Photo credit: Goodboy, LLC press kit

What was once considered a luxury, is often considered a necessity by modern young pet owners (Chapman, 2019). Animal nutritional supplements are not regulated in the U.S. by the FDA but require that products meet minimum safety standards and avoid specific health benefit claims. The market for new pet products is so popular that it has attracted a new market for venture capitalists who specialize exclusively in pet product companies (Kisaco Research, 2019). Market researchers estimate that the market is growing at 5.26% compounded annually (Reed, 2017).



Figure 50. Mully Muriel vegan pet shampoo with pest resistant neem oil, photo credit: Trendhunter.com



Figure 51. Mac+Maya dog supplements by Nature's Bounty, photo PRNewswire March 2019

Equine and Livestock Products

A similar opportunity exists in the animal nutritional supplements market for horses and livestock. An estimated 1.6 million households in America own a pet horse (APPA, n.d.) Despite a much smaller number of households owning and caring for horses, the National Animal Supplement Council estimates that total supplement market value is split equally between horses and dogs, due to the animal's large size (Reed, 2017).

In recent years, the number of U.S. equine births has been in decline, but marketers of products serving the segment "remain optimistic and appear to believe that the worst is behind them." According to Assistant Professor Lissa Tsutsumi, equine specialist at the University of Hawaii at Hilo, the equine market for products like nutritional supplements can be compared "more to dog owners than as livestock owners. Some are complete minimalist and wouldn't spend money on nutraceuticals or any supplementation of their animals while others have no financial end as to what they will spend so long as it may improve their

horse's athletic performance" (Tsutsumi, personal communication, April 20, 2020). As for the taste of noni, Prof. Tsutsumi comments, "...[horses] do find it palatable" (Tsutsumi, personal communication, April 20, 2020).

Commercial livestock owners are likely to invest only in supplements that offer some proven health benefit. Noni may offer one of increasing importance through years of global warming: reduced heat stress. The world market for livestock is facing challenges from the combination of increased demand for animal protein and reduced livestock production from extreme heat waves. A 2017 study of poultry found that noni supplement "significantly delayed (-30min) and reduced BT [body temperature]-induced by HS [heat stress]" and concluding "data indicated that Noni supplementation might modulate HS response in [poultry]" (Rajaei-Sharifabadi et al., 2017). With further study and development, noni may become a leading supplement for commercial livestock threatened by climate change.



Figure 52. Cur-Ost EQ noni fruit blend supplement



Figure 53. Formula 1 Noni equine and livestock supplement

7.4. Further Innovation

Other concepts merit further investigation as potentially creating new value within the industry, including:

- a noni-focused agritourism business model
- noni juice bar concept that capitalize on the worldwide craze for natural juice bars
- nitrogen-infused kegs that serve noni juice as a carbonated non-alcoholic draught beverage
- alcoholic beverages, like distilled noni whisky, gin, or Chinese baijiu, and fermented noni cider

8.

COVID-19 CONSIDERATIONS

This study was conducted during the first half of 2020 at the time of the COVID-19 outbreak and global pandemic. The outbreak is ongoing, and due to its dynamic nature is causing unprecedented market uncertainty. Most crops worldwide have been disrupted in some way, whether from restricted access to labor, difficulty accessing credit, delayed transportation of goods, consumers observing stay-at-home orders, or closed retail outlets where products are normally sold.

The Government of Samoa was early to act and impose restrictions on travelers entering the country. At the time of publication, it has among the strictest quarantine provisions anywhere worldwide and there are no cases of the disease presently reported within its borders. A COVID-19 outbreak in Samoa would be crippling to the country's health system and cause widespread damage,

including but not limited to the noni industry (Buhre, 2020).

The future is always unknown but the next few months and years ahead promise to be particularly unpredictable as COVID-19 spreads, and economies cautiously attempt to reopen and recover months of lost business and millions of jobs. Export data reported by the Central Bank of Samoa indicates that business for the exporters has thus far been mostly unaffected (Central Bank of Samoa, 2020). Indeed, products associated with health and wellness may outperform other sectors as consumers seek home remedies perceived to offer immunity enhancement, alleviation of symptoms, or accelerated recovery from the disease. This potentially gives Samoa's noni sector a resiliency to weather this trying economic time not found in other crops.

8.1. Healthy Lifestyle Products During COVID-19

New Hope Network, a trade media group serving healthy lifestyle⁵⁷ industry recently conducted an analysis of COVID-19 impact on the markets they serve, reporting spikes in demand for immunity supplements as "consumers empty shelves," and that "demand could spread to other additional supplement categories" (Polito, 2020a). The same report suggests that the "supplement industry could weather pandemic recession well," recalling the industry's solid performance during the Great Recession of 2007-2009 and its unique position in wellness, but only for so long "as disposable income[s] will allow" (Polito, 2020b). Google search trend data shows a similar increase in consumer interest for noni products and demonstrates a rise in consumer interest correlating to COVID-19.

8.2. COVID-19 Search Trends

Search data from Google Trends⁵⁸ yields information that may forecast future consumer interest in noni during times of global health crisis. This study analyzed worldwide Google search data⁵⁹ for several terms relating to noni and noni juice products, as well as other keyword topics⁶⁰.

The graph below shows the interest over time for the broad topic "immunity supplement" in consumer searches for the one-year period preceding May 23, 2020. A surge in search traffic is shown during the week of March 22-28, corresponding to the rapidly escalating pandemic across Europe and North America.

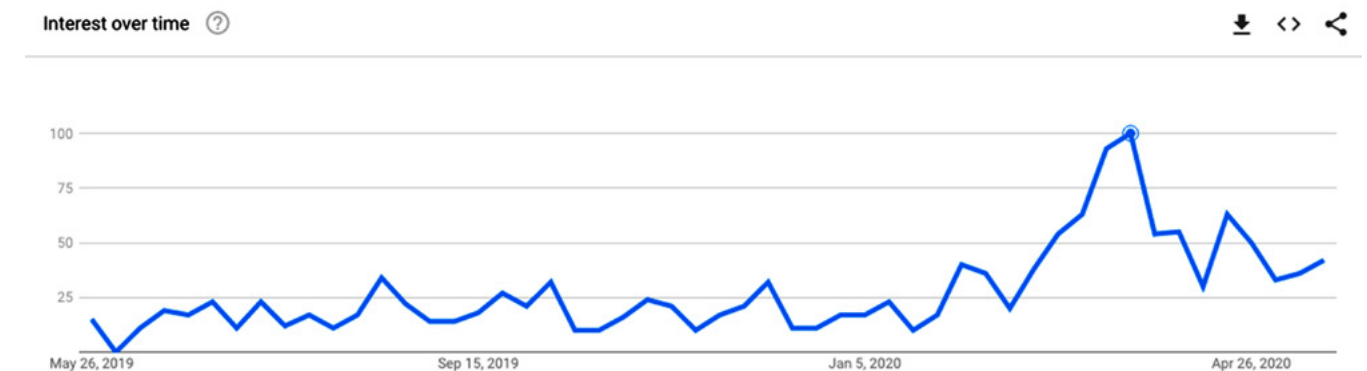


Figure 54 Google Trends worldwide searches for topic "immunity supplement" May 23, 2020. 12-Month peak at Mar. 22-28

Similar behavior is observed for the topic "vaccine" one week earlier, March 15-21, a few days after COVID-19 was declared a pandemic by the World Health Organization.



Figure 55 Google Trends worldwide searches for topic "vaccine" May 23, 2020. 12-Month peak at Mar. 15-21

Notice the similarity in these two previous visualizations to "noni juice." Curiously, it follows the same pattern of surging consumer interest, though one week earlier from March 8-14.

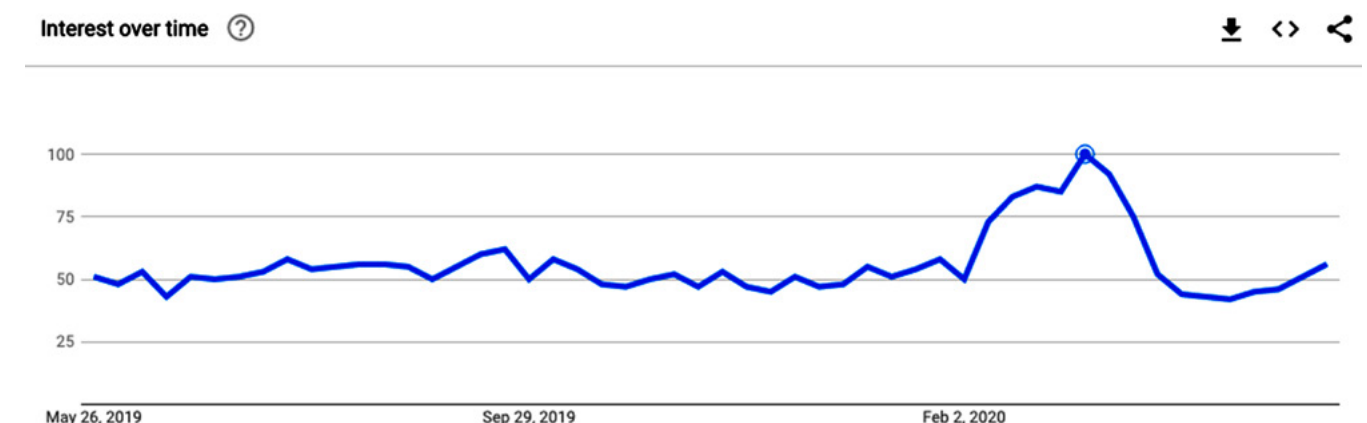


Figure 56 Google Trends worldwide searches for topic "noni juice" May 23, 2020. 12-Month peak at Mar. 8-14

Theorizing that the same pattern may exist among other similar healthy lifestyle food and beverage products, visualizations were examined for popular health products like orange juice, cranberry juice, turmeric, cannabidiol (CBD), and more. No strong correlation was found in these products between the COVID-19 outbreak and consumer interest, as it was with noni juice. The graph below visualizes worldwide searches for the topic “cranberry juice” during the same 12-month period. Interest peaked over the New Year’s Day holiday but dropped as the world’s attention was drawn to COVID-19, later returning to normal levels.

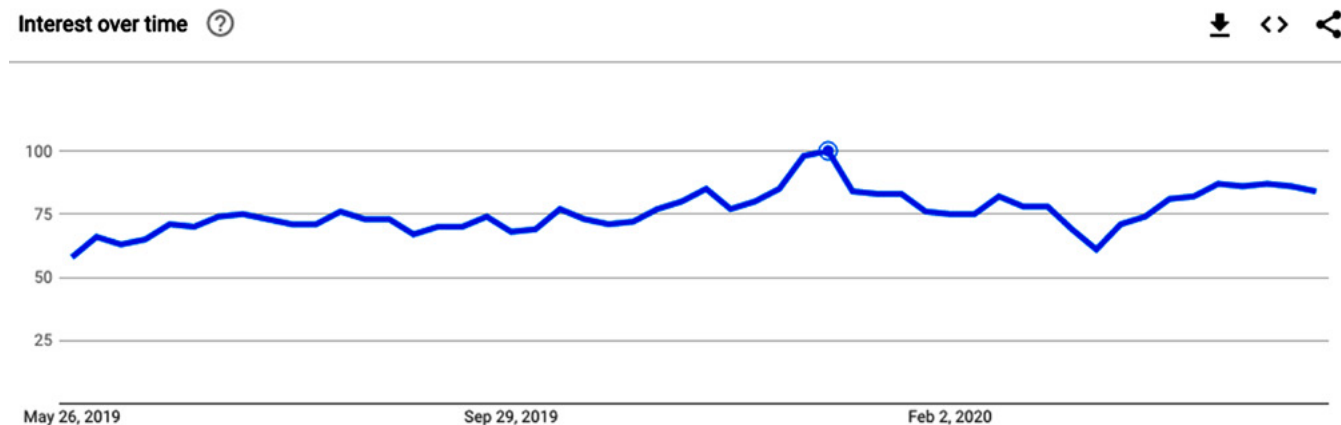


Figure 57 Google Trends worldwide searches for “cranberry juice” May 23, 2020. 12-Month peak at Dec. 29 - Jan 4

Although far from conclusive scientific proof that noni production is immune from possible downturn resulting from COVID-19 and its economic impact, this data does suggest that consumers may consider noni a health-related product, which they seek to learn more about in times of pandemic distress. The association is a positive one that may be explored and developed into a durable product brand image.

8.3. COVID-19 Threats

Despite a relatively stable business position supplying health supplements during a health crisis, significant threats remain for Samoa’s noni industry due to COVID-19 that may disrupt both supply and demand. These should be carefully considered and a plan developed for maintaining operations during times of crisis.

8.3.1 Supply disruptions

Noni product production relies on a steady supply of fresh noni fruit, collected by approximately 17,000 farming families. In response to a COVID-19 outbreak, Samoa’s government may enact a stay at home order, quarantine, curfew, and mandatory social distancing practices. Agriculture sectors worldwide have been largely exempted from government-imposed shutdowns as essential services, but smallholder productivity and mobility may still be impacted. Industry representatives should remain in close contact with government authorities to ensure that smallholders farmers can continue to work while following reasonable safety procedures. Modifications to existing fruit harvesting or collection procedures may be necessary, such as the addition of mobile fruit collections states that minimize travel distances.

8.3.2 Freight disruption

Freight forwarders are reporting cargo transportation delays worldwide. Ports and shipping lines are dependent on the availability and transportability of labor, which is threatened by border closings, docking restrictions, and the reduction of airline service. As many as 40,000 Indian national merchant crew alone were thought to be stranded at sea and unable to return home in April of 2020 (Teoh, 2020). Some countries, including Australia, have enacted restrictions that require a minimum number of days at sea before docking (“COVID-19 latest updates,” 2020). At port, restricted movement and economic downturn has led to an increase in uncollected cargo, which increases congestion (Teoh, 2020). Air cargo capacity has been reduced significantly by the reduction of available passenger flights, which also frequently carry cargo. In some cases emergency medical supplies are receiving priority over other commercial goods in an effort to fight the pandemic, leading to further delays (Duncan, 2020).

Samoa’s noni exporters can expect freight disruption and delays over the next several months, potentially causing financial losses due to customer claims or product spoilage. New insurance products covering COVID-19 claims may mitigate some financial losses. The development of nonperishable retail products will allow for regional or localized warehousing of stock near customer buying centers to reduce sporadic future disruptions, but at the cost of financing inventory. The value added by developing retail products instead of wholesale juice as an ingredient, however, may more than account for the overhead cost of maintaining inventory.

8.3.3 Global economic downturn

A recession of global economic activity caused by COVID-19 is likely to impact every industry, but particularly those viewed as a luxury. Market analysts are calling for drastic reductions in luxury goods spending during the pandemic and predicted economic slowdown, as much as “65-80% for March and April 2020” compared to one year earlier (Chaboud, 2020). Noni products trade in the healthy lifestyle category, which has less elastic consumer price demand than luxury goods (e.g. jewelry, perfumes) but has competition from a large number of substitute products including other fruit juices, vitamin supplements, and alternative products with perceived immune benefits potentially at lower price points.

Perceived utility and relevance are keys to retaining customer demand in times of economic uncertainty. To maintain relevance, products must “focus on experiences, storytelling around purpose and values, [and] heritage” to maintain authenticity, particularly among a growing generation of millennial buyers (Girod, 2020). Samoa’s noni industry has an authentic and original story to tell and functionally unmatched by competition offered by other mainstream fruit. It is important that the Samoa noni industry achieve and maintain a visible position within the healthy lifestyle trade to promote these features in order to establish awareness and unwavering consumer demand when faced with adverse conditions.

REFERENCES

- About B Corps. (n.d.). Retrieved June 12, 2020, from Certified B Corporation website: <https://bcorporation.net/about-b-corps>
- Advameg Inc. (n.d.). Morinda Holdings, Inc. - Company Profile, Information, Business Description, History, Background Information on Morinda Holdings, Inc. Retrieved June 8, 2020, from [www.referenceforbusiness.com](http://www.referenceforbusiness.com/history2/56/Morinda-Holdings-Inc.html) website: <https://www.referenceforbusiness.com/history2/56/Morinda-Holdings-Inc.html>
- Almeida, É. S., Oliveira, D., & Hotza, D. (2019). Properties and Applications of *Morinda citrifolia* (Noni): A Review. *Comprehensive Reviews in Food Science and Food Safety*, 18(4), 883–909. <https://doi.org/10.1111/1541-4337.12456>
- Alzeer, J., & Abou Hadeed, K. (2016). Ethanol and its Halal status in food industries. *Trends in Food Science and Technology*, 58, 14–20. <https://doi.org/10.1016/j.tifs.2016.10.018>
- American Pet Products Association (APPA). (n.d.). Pet Industry Market Size & Ownership Statistics. Retrieved June 14, 2020, from americanpetproducts.org website: https://www.americanpetproducts.org/press_industrytrends.asp
- Appleton, K. M., Hemingway, A., Rajska, J., & Hartwell, H. (2018). Repeated exposure and conditioning strategies for increasing vegetable liking and intake: Systematic review and meta-analyses of the published literature. *American Journal of Clinical Nutrition*, 108(4), 842–856. <https://doi.org/10.1093/ajcn/nqy143>
- Berry, D. (2019). Harnessing the power of alternative flour. Retrieved June 14, 2020, from Food Business News website: <https://www.foodbusinessnews.net/articles/13414-harnessing-the-power-of-alternative-flour>
- Blumberg, P. O. (2019). 7 Best Store-Bought Smoothie Brands. Retrieved June 13, 2020, from Eat This Not That website: <https://www.eatthis.com/best-store-bought-smoothies/>
- Braun, A. (2014). Misunderstanding Orange Juice as a Health Drink. Retrieved April 15, 2020, from The Atlantic website: <https://www.theatlantic.com/health/archive/2014/02/misunderstanding-orange-juice-as-a-health-drink/283579/>
- Brown, A. C. (2012). Anticancer activity of *Morinda citrifolia* (noni) fruit: A review. *Phytotherapy Research*, 26(10), 1427–1440. <https://doi.org/10.1002/ptr.4595>
- Buhre, M. L. (2020). Many Pacific islands are untouched by COVID-19. Its arrival could be disastrous. Retrieved May 23, 2020, from PBS Newshour website: <https://www.pbs.org/newshour/world/many-pacific-islands-are-untouched-by-covid-19-its-arrival-could-be-disastrous>
- Cardenas, D., & Fuchs-Tarlovsky, V. (2018). Is multi-level marketing of nutrition supplements a legal and an ethical practice? *Clinical Nutrition ESPEN*, 25, 133–138. <https://doi.org/10.1016/j.clnesp.2018.03.118>
- Carman, H. F. (2019). The Story Behind Avocados' Rise to Prominence in the United States. *ARE Update*, 22(5), 9–11.
- Celiac Disease Foundation. (n.d.). Retrieved June 4, 2020, from <https://celiac.org/>
- Central Bank of Samoa. (2020). Exports by Commodity, May 20.

Chaboud, I. (2020). How the COVID-19 crisis could remodel the luxury industry. Retrieved May 24, 2020, from phys.org website: <https://phys.org/news/2020-05-covid-crisis-remodel-the-luxury-industry.html>

Chapman, G. (2019). Vitamins and supplements for dogs and cats are a huge business - Vox. Retrieved June 14, 2020, from Vox website: <https://www.vox.com/the-goods/2019/8/12/20799061/pet-supplement-industry-vitamins-dogs-cats>

Cheng, E. R., Fiechtner, L. G., & Carroll, A. E. (2018). Juice Is Not Healthy. Retrieved May 20, 2020, from New York Times website: <https://www.nytimes.com/2018/07/07/opinion/sunday/juice-is-not-healthy-sugar.html>

COVID-19 latest updates. (2020). Retrieved May 24, 2020, from Crane Worldwide Logistics website: <https://craneww.com/knowledge-center/covid-19-overview/covid-19-latest-updates/>

Crowe, E. (2020). Consumers, chefs increasingly turn to alternative flour. Retrieved June 14, 2020, from Smartbrief website: <https://www.smartbrief.com/original/2020/01/consumers-chefs-increasingly-turn-alternative-flour>

Dave's NONI & Juice Pvt. Ltd - Overview, News & Competitors. (n.d.). Retrieved June 9, 2020, from Zoom Info website: <https://www.zoominfo.com/c/Daves-noni-juice-pvt-ltd/357440472>

Disciplined Person: Hargitai, G. Gerry. (1992). Retrieved June 9, 2020, from British Columbia Securities Commission Disciplined Persons List website: https://www.bsc.bc.ca/Enforcement/Disciplined_Persons_List/Hargitai,_G__Gerry/

Doyle, J. (2018). Health Conscious Consumers Choose RTD Tea. Retrieved June 13, 2020, from STiR Coffee and Tea website: <https://stir-tea-coffee.com/features/health-conscious-consumers-choose-rtd-tea/>

Duncan, I. (2020). Drug industry warns that cuts to passenger airline service have put medical supplies at risk - The Washington Post. Retrieved May 24, 2020, from Washington Post website: https://www.washingtonpost.com/local/trafficandcommuting/drug-industry-warns-that-cuts-to-passenger-airline-service-has-put-medical-supplies-at-risk/2020/05/02/d34a7c96-83ff-11ea-ae26-989cfce1c7c7_story.html

Dwyer, A. (2018). Gluten-Free: An Inside Look. Retrieved June 3, 2020, from Safe Food Alliance website: <https://safefoodalliance.com/audits/gluten-free-an-inside-look/>

Earthly Products Inc. (n.d.). Pura Vitta Noni Juice. Retrieved June 13, 2020, from puravitta.com website: <https://puravitta.com/index.html>

Elston, M. (2015). The Founder's Story - Tahitian Gold. Retrieved June 11, 2020, from tahitiangold.com website: <https://www.tahitiangold.com/blog/a-word-from-the-founder/>

FAO. (2002). What is Land Tenure. *Land Tenure and Rural Development*. Retrieved from <http://www.fao.org/3/y4307e/y4307e05.htm>

Fermented Foods Still on Top, but Superfood List Sees Some Changes. (2018). Retrieved May 27, 2020, from Progressive Grocer website: <https://progressivegrocer.com/fermented-foods-still-top-superfood-list-sees-some-changes>

Gibbons, A. (2016, October 7). First Polynesians launched from East Asia to settle Pacific. *Science*, Vol. 354, pp. 24–25. <https://doi.org/10.1126/science.354.6308.24>

Giera, N., Fraser, J., & Leilua, L. (2009). *Samoa - Small Business Evaluation: Social and Economic Impact Assessment of Women in Business Development Incorporation*. (January), 1–88.

Girod, S. J. (2020). Five New Trends That Will Reshape Luxury After COVID-19. Retrieved May 24, 2020, from Forbes website: <https://www.forbes.com/sites/stephanegirod/2020/04/19/five-inflection-points-that-will-reshape-luxury-with-covid-19/#b24fb74eb110>

Gold, M. A., Godsey, L. D., & Josiah, S. J. (2004). *Markets and marketing strategies for agroforestry specialty products in North America*. (1994), 371–382. https://doi.org/10.1007/978-94-017-2424-1_26

Hainmueller, J., Hiscox, M. J., & Sequeira, S. (2015). Consumer demand for fair trade: Evidence from a multistore field experiment. *Review of Economics and Statistics*, 97(2), 242–256. https://doi.org/10.1162/REST_a_00467

Harris, L. (2019). Consumers Are Sick of Feeling Overlooked by Man-Made, Female-Targeted Products. Retrieved June 6, 2020, from Adweek website: <https://www.adweek.com/brand-marketing/consumers-are-sick-of-feeling-overlooked-by-man-made-female-targeted-products/>

Harrison, M. (2017). 10 reasons Mormons dominate multi-level marketing companies. Retrieved June 8, 2020, from Religion News Service website: <https://religionnews.com/2017/06/20/10-reasons-mormons-dominate-multi-level-marketing-companies/>

Harrison, O. (2018). How Pickle History Led To Newest Food Trend Of 2018. Retrieved May 27, 2020, from Refinery29 website: <https://www.refinery29.com/en-us/2018/04/194827/pickle-trend-explanation-history>

Hefferon, M., & Anderson, M. (2016). Younger generations stand out in beliefs about organic, GM foods. Retrieved June 3, 2020, from Pew Research Center website: <https://www.pewresearch.org/fact-tank/2016/12/07/younger-generations-stand-out-in-their-beliefs-about-organic-gm-foods/>

Heim, C. (2019). The Value of Diversity in Agriculture. Retrieved June 6, 2020, from Western Growers website: <https://www.wga.com/magazine/2019/05/08/value-diversity-agriculture>

Heinicke, R. (1985). The Pharmacologically Active Ingredient of Noni. *Pacific Tropical Botanical Garden Bulletin*, (15), 10–14.

Hetzel, A. (2019). *Successful Trade Show Participation: Guide for Coffee Exporters*. Kamuela, Hawaii.

Hetzel, A., & Sipani, S. (2019). *Papua New Guinea Coffee Market Study*.

iHealthcareAnalyst Inc. (2020). Global Equine Healthcare Products Market \$22.6 Billion by 2027. Retrieved June 12, 2020, from www.ihealthcareanalyst.com website: <https://www.ihealthcareanalyst.com/secondary-markets-drive-equine-healthcare-market/>

ITC. (n.d.). Market Access Map. Retrieved April 15, 2020, from <https://www.macmap.org/en//query/results?reporter=410&partner=882&product=2009891090&level=8>

Karp, M. (2017). An Ode to the Noni, the World's Most Disgusting Fruit. Retrieved May 27, 2020, from VICE website: https://www.vice.com/en_us/article/d38xz7/an-ode-to-the-noni-the-worlds-most-disgusting-fruit

Kisaco Research. (2019). Pets and Money 2019. Retrieved June 14, 2020, from Pets and Money Summit website: <https://www.petsandmoneysummit.com/events/pets-and-money-2019>

Kurtz-Phelan, D. (2008). Bananas: How the United Fruit Company Shaped the World. Retrieved May 21, 2020, from New York Times website: <https://www.nytimes.com/2008/03/02/books/review/Kurtz-Phelan-t.html>

Lindsey, D. (2016). Follow the profit: How Mormon culture made Utah a hotbed for Multi-level marketers. Retrieved June 8, 2020, from KUTV 2 website: <https://kutv.com/news/local/follow-the-profit-how-mormon-culture-made-utah-a-hotbed-for-multi-level-marketers>

Macpherson, H., Daniells, J., Wedding, B., & Davis, C. (2006). The Potential for a New Value Adding Industry for Noni Tropical Fruit Producers. *Australia Rural Industries Research and Development Corporation*, (07), 19–34.

Martin, V. (2019). Too Many Questions Surround New Age Beverages Stock. Retrieved June 9, 2020, from Investor Place website: <https://investorplace.com/2019/09/too-many-questions-surround-nbev-stock/>

Matrix Health Products. (2019). Retrieved June 11, 2020, from TruthInAdvertising.org website: <https://www.truthinadvertising.org/matrix-health-products/>

Mayron, S. (2019a). Kava and nonu one step closer to having internationally recognised safety standards. Retrieved June 3, 2020, from Samoa Observer website: <https://www.samoaoobserver.ws/category/samoa/50081>

Mayron, S. (2019b). Local companies ink \$12 million deal to supply noni. Retrieved June 13, 2020, from Samoa Observer website: <https://www.samoaoobserver.ws/category/article/51830>

McGroarty, B. (n.d.). Wellness Now a \$4.2 Trillion Global Economy. Retrieved June 8, 2020, from Global Wellness Institute website: <https://www.globalwellnesssummit.com/press/press-releases/wellness-multi-trillion-global-economy/>

Mcmorrow, R., & Myers, S. L. (2018). Amway Made China a Billion-Dollar Market. Now It Faces a Crackdown. Retrieved June 8, 2020, from New York Times website: <https://www.nytimes.com/2018/01/08/business/amway-china.html>

Mordor Intelligence. (2019). Global Functional Flour Market 2020-2025. Retrieved June 14, 2020, from MordorIntelligence.com website: <https://www.mordorintelligence.com/industry-reports/functional-flour-market>

Morton, J. F. (1987). *Fruits of Warm Climates*. Retrieved from <https://hort.purdue.edu/newcrop/morton/orange.html>

Nature's Sunshine Products. (2019). *Annual Report Form 10-K*. Retrieved from http://media.corporate-ir.net/media_files/irol/10/100529/nike2011ar/nike2011ar/docs/Nike_2011_10-K.pdf

Nelson, S. C. (2006). The Noni Website. Retrieved May 17, 2020, from UH CTAHR website: <https://www.ctahr.hawaii.edu/noni/>

Nelson, S. C., & Elevitch, C. R. (2006). *Noni : the complete guide for consumers and growers*.

New Age Beverages. (2019a). New Age Beverages Announces Merger With Morinda, Inc., Creating A Combined Company With \$300 Million In Revenue And \$20 Million In EBITDA. Retrieved June 8, 2020, from PR Newswire website: <https://www.prnewswire.com/news-releases/new-age-beverages-announces-merger-with-morinda-inc-creating-a-combined-company-with-300-million-in-revenue-and-20-million-in-ebitda-300758718.html>

New Age Beverages. (2019b). *Press Release: New Age Launches Noni+Collagen in China with >\$600,000 in Revenue in the 1st 3 Days*. Retrieved from <https://apnews.com/ACCESSWIRE/7551f4f1722aef7497e5c2bd893ba59a>

NFM Staff. (2019). 2019 Natural Foods Merchandiser Market Overview. *Natural Foods Merchandiser*, (August).

Nielson-Stowell, A. (2020). New Hope's Report: 5 Trends for Fermentation Industry. Retrieved May 27, 2020, from Fermentation Association website: <https://fermentationassociation.org/natural-products-expo-west-report-5-trends-for-fermentation-industry/>

Noni: Uses, Side Effects, Interactions, Dosage, and Warning. (n.d.). Retrieved April 5, 2020, from <https://www.webmd.com/vitamins/ai/ingredientmono-758/noni>

Noni Biotech International. (n.d.). About Our Company. Retrieved June 12, 2020, from nonimaui.com website: <https://nonimaui.com/about-our-company/>

NP Nutra. (n.d.). Our Story. Retrieved June 11, 2020, from npnutra.com website: https://npnutra.com/about_us/

Ola Brew Co.: Producing world-class beers and ciders using local ingredients in Hawai'i County. (n.d.). Retrieved June 12, 2020, from Wefunder.com website: <https://wefunder.com/olabrewco>

Onstad, E. (2018). Plastic bottles vs. aluminum cans: who'll win the global water fight? Retrieved June 13, 2020, from Reuters website: <https://www.reuters.com/article/us-environment-plastic-aluminium-insight/plastic-bottles-vs-aluminum-cans-wholl-win-the-global-water-fight-idUSKBN1WW0J5>

Packaged Facts. (2019). Pet Supplements in the U.S., 7th Edition. Retrieved June 14, 2020, from Packaged Facts website: <https://www.packagedfacts.com/Pet-Supplements-Edition-12373987/>

Parcell, J., Brees, M., & Giddens, N. (2010). Capturing vs. Creating Value. Retrieved June 7, 2020, from Ag Decision Maker website: <https://www.extension.iastate.edu/agdm/wholefarm/html/c5-05.html>

Pet Nutrition Alliance. (n.d.). How are dietary supplements for animals regulated? Retrieved June 14, 2020, from petnutritionalliance.org website: <https://petnutritionalliance.org/site/pnatool/how-are-dietary-supplements-for-animals-regulated/>

Platkin, C. S. (2005). Liking new, healthful foods takes repetition, variety. Retrieved June 4, 2020, from Seattle Times website: <https://www.seattletimes.com/life/food-drink/liking-new-healthful-foods-takes-repetition-variety/>

Polito, R. (2020a). Demand for dietary supplements rises as coronavirus spreads. Retrieved May 23, 2020, from New Hope Network website: <https://www.newhope.com/news/demand-dietary-supplements-spikes-coronavirus-spreads>

Polito, R. (2020b). Supplement industry could weather pandemic recession well. Retrieved May 23, 2020, from New Hope Network website: <https://www.newhope.com/news/supplement-industry-could-weather-pandemic-recession-well>

Porter, M. E. (1979). How Competitive Forces Shape Strategy. *Harvard Business Review*. Retrieved from <https://hbr.org/1979/03/how-competitive-forces-shape-strategy>

Potterat, O., & Hamburger, M. (2007). Morinda citrifolia (Noni) fruit - Phytochemistry, pharmacology, safety. *Planta Medica*, 73(3), 191–199. <https://doi.org/10.1055/s-2007-967115>

- Price, T. (2019). How Multi-Level Marketing Had to Change in China. Retrieved June 8, 2020, from TMO Group website: <https://www.tmogroup.asia/direct-selling-in-china-multi-level-marketing/>
- Rajaei-Sharifabadi, H., Ellestad, L., Porter, T., Donoghue, A., Bottje, W. G., & Dridi, S. (2017). Noni (*Morinda citrifolia*) modulates the hypothalamic expression of stress- and metabolic-related genes in broilers exposed to acute heat stress. *Frontiers in Genetics*, 8(DEC). <https://doi.org/10.3389/fgene.2017.00192>
- Reed, C. (2017). The Growing Pet-Supplements Market. Retrieved June 14, 2020, from Nutritional Outlook website: <https://www.nutritionaloutlook.com/weight-management-nutrition/growing-pet-supplements-market>
- Risk, M. (2018). Utah MLM explosion. Retrieved June 8, 2020, from BYU Daily Universe website: <https://universe.byu.edu/2018/05/15/utah-shows-more-multi-level-marketing-activity-than-any-other-state-1/>
- Rogers, T. S., Tuioti-Mariner, L., & Tuoro, M. (2009). *Samoa Morinda citrifolia (Nonu) Case Study*. 1–44.
- Runestad, T. (2020). 4 quality-centric seals that will help retailers sell hemp CBD. Retrieved June 3, 2020, from New Hope Network website: <https://www.newhope.com/branding-and-marketing/4-quality-centric-seals-will-help-retailers-sell-hemp-cbd>
- Samoa. (2020). Retrieved May 27, 2020, from CIA World Factbook website: <https://www.cia.gov/library/publications/the-world-factbook/geos/ws.html>
- Samoa Bureau of Stastics. (2015). *Agricultural Survey 2015 Report*. Apia, Samoa.
- Samoa Bureau of Statistics, Ministry of Women, Community and Social Development, Pacific Community, & UNICEF Pacific. (2018). *2018 Samoa Disability Report, An analysis of 2016 Census of Population and Housing*. Suva, Fiji.
- Samoa Bureau of Statistics, & UNDP Pacific Centre. (2013). *Samoa Hardship and Poverty Report*. Apia, Samoa.
- Savage, E. (2020). The 7 Best Sports Drinks, According to a Dietitian. Retrieved June 13, 2020, from Very Fit Well website: <https://www.verywellfit.com/best-sports-drinks-4160842>
- Saxe, L. (2019). Fermented Foods Are Up 149% - As Long As They're Unfamiliar. Retrieved May 27, 2020, from Forbes website: <https://www.forbes.com/sites/lizzysaxe/2019/02/06/fermented-foods-are-up-149-percent-as-long-as-theyre-unfamiliar/#20ce8b5d673f>
- SDR Ventures Inc. (2019). Food & Beverage Reports. Retrieved May 17, 2020, from sdrventures.com website: <https://sdrventures.com/newsletters/food-beverage-reports/>
- Secret files reveal more Canadians using offshore tax havens. (2013). Retrieved June 9, 2020, from CBC News website: <https://www.cbc.ca/news/canada/secret-files-reveal-more-canadians-using-offshore-tax-havens-1.1376407>
- Shafer, J. (2019). 36 Woman-Owned Companies to Champion at Expo East 2019. Retrieved June 6, 2020, from New Hope Network website: <https://www.newhope.com/people-and-company-profiles/36-woman-owned-companies-champion-natural-products-expo-east-2019>
- Smillie, D. (2004). Tale of the South Pacific. Retrieved May 19, 2020, from Forbes website: <https://www.forbes.com/forbes/2004/0524/178.html#4d0c4b097309>
- Spengler, R. N. (2019, May 31). Origins of the apple: The role of megafaunal mutualism in the domestication of *Malus* and rosaceous trees. *Frontiers in Plant Science*, Vol. 10. <https://doi.org/10.3389/fpls.2019.00617>
- Strauss, M. (2018). Is eating organic produce healthier? Americans are divided. Retrieved June 3, 2020, from Pew Research Center website: <https://www.pewresearch.org/fact-tank/2018/11/26/americans-are-divided-over-whether-eating-organic-foods-makes-for-better-health/>
- Superfoods or Superhype? (n.d.). Retrieved April 5, 2020, from Harvard T.H. Chan School of Public Health Nutrition Source website: <https://www.hsph.harvard.edu/nutritionsource/superfoods/>
- Suwonsichon, S. (2019). The importance of sensory lexicons for research and development of food products. *Foods*, Vol. 8. <https://doi.org/10.3390/foods8010027>
- Tahitian Organic Noni Juice. (n.d.). Retrieved June 11, 2020, from tahitiangold.com website: <https://www.tahitiangold.com/>
- Taylor, J. M. (2011). *The Case (for and) Against Multi-Level Marketing: The Complete Guide to Understanding the Flaws - and Proving and Countering the Effects - of Endless Chain "Opportunity" Recruitment, or Product-based Pyramid Schemes*.
- Teoh, P. (2020). The Impact of the Covid-19 Pandemic on Shipping. Retrieved May 24, 2020, from Maritime Executive website: <https://www.maritime-executive.com/editorials/the-impact-of-the-covid-19-pandemic-on-shipping>
- The Purchasing Power of Women: Statistics. (2019). Retrieved June 6, 2020, from Girl Power Marketing website: <https://girlpowermarketing.com/statistics-purchasing-power-women/>
- Trachootham, D., Satoh-Kuriwada, S., Lam-ubol, A., Promkam, C., Chotechuang, N., Sasano, T., & Shoji, N. (2018). Differences in taste perception and spicy preference: A thai-japanese cross-cultural study. *Chemical Senses*, 43(1), 65–74. <https://doi.org/10.1093/chemse/bjx071>
- Turner, L. (2013). A primer on natural products labels & certifications. Retrieved June 3, 2020, from New Hope Network website: <https://www.newhope.com/managing-your-business/primer-natural-products-labels-certifications>
- Twincraft Skincare. (2019). Looking Forward: The Future of Bath & Shower Products. Retrieved June 13, 2020, from Twincraft Skincare Blog website: <https://www.twincraft.com/twincraft-skincare-blog/2019-trends-bath-shower-products-bar-soap>
- U.S. Food and Drug Administration (FDA). (2017). *Juice HACCP and the FDA Food Safety Modernization Act : Guidance for Industry Table of Contents*. (August).
- Verified Market Research. (2018). Equine Supplement Products Market Size. Retrieved June 12, 2020, from verifiedmarketresearch.com website: <https://www.verifiedmarketresearch.com/product/equine-supplement-products-market/>
- Vetter, J. (2019). Morinda's Newest Product Line Offers a Promising Glimpse into the Future of CBD. Retrieved June 9, 2020, from CBD Snapshot website: <https://www.cbdsnapshot.com/future-nhanced/>

APPENDIX I: NONI PLANT PESTS AND DISEASES

Wanjek, C. (2006). Noni Nonsense: Miracle Juice or Scam in a Bottle? Retrieved April 5, 2020, from Live Science website: <https://www.livescience.com/4219-noni-nonsense-miracle-juice-scam-bottle.html>

West, B. J., Deng, S., Isami, F., Uwaya, A., & Jensen, C. J. (2018). The potential health benefits of noni juice: A review of human intervention studies. *Foods*, 7(4). <https://doi.org/10.3390/foods7040058>

WGLIFE Product Details from Hainan WGLIFE Biological Co., Ltd. (n.d.). Retrieved June 11, 2020, from Alibaba.com website: https://wglife.en.alibaba.com/product/1600051848805-810046335/High_quality_hawaiian_noni_fruit_juice_soft_drink_bulk.html?spm=a2700.icbuShop.61684.11.1a9c527ak8xqPJ

Whats New in Superfruits? (2007). Retrieved June 8, 2020, from Natural Products Insider website: <https://www.naturalproductsinsider.com/foods/whats-new-superfruits>

Whidden, C. (2016). Hawaiian Ola’s first Bottling Day. Retrieved June 12, 2020, from Hawaiian Ola Blog website: <https://www.hawaiianola.com/blog/2016/2/24/hawaiian-olas-first-bottling-day>

White, D. A. (2019). Do Juice Shots Work? Retrieved June 13, 2020, from Food Network website: <https://www.foodnetwork.com/healthyeats/healthy-tips/2019/03/do-juice-shots-actually-work->

Adapted from Noni: the complete guide for consumers and growers (Nelson, 2006, p. 98)

Pest/ Disease	Type	Root	Woody stem	Green stem	Petiole	Leaf	Fruit	Flower
Algal leaf spot	Algae					*		
Anthracnose	Fungus					*		
Aphids	Insect				*	*		
Beetles	Insect						*	
Black flag	Fungus-like			*	*	*	*	*
Caterpillar	Insect					*		
Fruit cracking	Defect						*	
Grazing injury	Animal damage			*	*	*	*	*
Leaf miner	Insect					*		
Mites	Insect					*		
Mealybug	Insect					*	*	
Nutrient deficiency	Defect					Chlorosis		
Parasitic weeds	Plant		*	*	*	*	*	
Premature or uneven ripening	Defect						*	
Rhizopus rot	Fungus						*	
Rodent, bird damage	Animal						*	
Root knot	Nematode	*	Cracking			Yellowing		
Scale	Insect			*	*	*	*	
Shot hole	Fungus					*		
Slugs, snails	Mollusk					*		
Sooty mold	Fungus			*	*	*	*	
Stem rot	Fungus		*			Yellowing		
Tafiagata	Fungus					*		
Thrips	Insect					*		
Whiteflies	Insect					*		
Yeasts	Fungus							*

APPENDIX II: STAKEHOLDERS CONSULTED

IWG-Nonu

- Samoa Nonu Delights
- R&L Keil
- Wilex
- Skyline
- Nonu Samoa

Government

- MAF
- MCIL
- STROS

External Resources

- University of Hawaii at Manoa CTAHR
- University of Hawaii at Hilo Veterinary School
- Agroforestry Net, Inc.
- Hawaiian Organic Noni, LLC
- Noni Biotech LLC (Noni Maui)
- Pacific Island Farmers Organisation Network

APPENDIX III: TRADE DATA

Samoa

Value of juice exports by country, 2015 - 2019

Importers	Exported value in 2015	Exported value in 2016	Exported value in 2017	Exported value in 2018	Exported value in 2019
Total	3,534	3,977	1,829	4,307	4,123
United States of America	2,262	2,685	1,161	1,889	2,261
Korea, Republic of	350	670	155	1,173	964
China	638	108	244	361	412
Germany	193	268	131	288	219
New Zealand	0	2	12	210	155
Japan	71	196	99	178	94
Poland	0	24	20	19	18
Australia	11	3	1	1	0

Figure 58 data source: ITC Trademap

Polynesia

Export value of noni juice from Polynesia to all destinations

	Export Value USD x 1,000				
	2015	2016	2017	2018	2019
Samoa	3534	3977	1829	4307	4123
French Polynesia	1301	3267	2500	4375	3674
Fiji	470	443	747	1172	1276
Cook Islands	245	462	779	941	830
Niue	287	176	34	182	195
Tonga	77	122	139	107	125
Total value	5914	8447	6028	11084	10223

Import value of noni juice from Polynesia to primary markets⁶¹

Import Value USD x 1,000 from above					
	2015	2016	2017	2018	2019
USA	2581	2922	1380	2304	3034
China	1534	2829	2335	3528	2902
ROK	752	1316	987	3061	2732
Australia	107	97	97	89	163
Japan	381	595	450	478	368
EU	443	631	643	801	537
NZ	83	39	108	631	486
Total	5881	8429	6000	10892	10222

Exotic Natural Fruit Juices

Value of imports in category 200989xx, top 20 markets

Importers	Imported value in 2015	Imported value in 2016	Imported value in 2017	Imported value in 2018	Imported value in 2019
World	2,250,483	2,301,420	2,402,873	2,655,111	2,639,403
United States of America	332,351	303,971	325,597	439,350	563,068
Netherlands	213,785	257,868	231,759	235,434	240,044
Germany	193,114	195,191	200,610	206,938	196,303
Japan	146,766	126,574	154,750	168,456	134,779
France	81,885	99,323	107,245	119,559	121,817
Korea, Republic of	40,235	44,094	51,156	76,502	104,186
Austria	80,374	88,680	102,751	97,046	92,336
China	20,463	24,251	31,648	56,963	87,152
United Kingdom	67,546	90,519	89,648	82,968	77,059
Canada	70,077	64,224	69,541	72,149	70,772
Italy	73,653	62,630	68,525	65,554	65,277
Russian Federation	29,936	32,934	48,935	58,587	49,367
Australia	47,314	55,147	56,105	53,265	49,125
Singapore	35,027	33,368	35,916	43,074	47,260
Yemen	39,567	17,282	17,227	39,156	43,499
Belgium	35,233	36,365	36,472	46,373	36,910
Spain	20,394	25,724	30,096	34,069	35,440
Saudi Arabia	89,233	72,002	64,301	52,857	34,937
Switzerland	26,226	32,488	32,731	38,309	29,469
Poland	19,047	19,630	28,870	28,822	26,079

61 Some data varies due to trace amounts exported to other countries

Nutritional Supplements

Value of nutritional supplements (210690xx) traded, top 20 markets

Importers	Imported value in 2015	Imported value in 2016	Imported value in 2017	Imported value in 2018	Imported value in 2019
World	33,907,611	35,444,997	37,207,097	43,842,052	45,103,357
United States of America	2,089,856	2,165,584	2,306,050	5,261,333	5,799,672
China	1,296,657	1,484,863	1,835,969	2,717,012	3,125,061
United Kingdom	1,933,794	1,992,973	1,812,991	1,940,950	1,773,061
Germany	1,427,257	1,534,808	1,648,789	1,766,190	1,730,553
Korea, Republic of	915,080	1,066,766	1,174,692	1,380,331	1,710,688
Netherlands	1,029,615	1,317,242	1,424,930	1,675,693	1,676,353
Australia	1,193,919	1,206,955	915,116	1,122,181	1,459,633
Canada	1,221,484	1,286,892	1,346,277	1,427,484	1,458,645
France	919,087	946,591	1,064,625	1,207,816	1,145,216
Hong Kong, China	621,667	877,418	903,281	1,143,004	999,137
Japan	934,971	952,833	982,272	1,021,330	969,208
Spain	616,438	689,667	738,869	810,744	869,234
Philippines	528,293	688,887	694,002	671,116	753,356
Viet Nam	476,915	509,664	526,542	586,243	721,006
Saudi Arabia	1,084,896	930,372	873,837	736,570	719,038
Malaysia	600,576	640,367	593,296	651,731	690,382
Belgium	537,508	587,518	656,705	712,483	689,861
Taipei, Chinese	559,427	586,656	593,092	669,946	688,011
Italy	613,068	657,295	692,435	720,882	683,489
Thailand	512,359	564,110	589,014	610,901	679,381



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