



Australian Government
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International Agricultural Research

Coconut Value Chain Review



Secretariat of the Pacific Community



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Why Coconut?

- Hundreds of millions of people consume coconut and coconut products every day (Foale, 2003)
- Coconut trees are native to the Pacific and better suited to local conditions than many other food crops
- Coconut in the Pacific is a crop with high economic, subsistence and cultural importance and it produces a wide range of products from various parts of the tree and nut.
- Copra and coconut oil are traded as commodities from many Pacific Island countries.
- Deregulation of marketing and product innovations like virgin coconut oil and coconut water are improving industry profitability by offering better market opportunities for smallholders.
- A concept of “whole nut processing” with optimal utilization of all components of the coconut tree can potentially maximize its value and improve returns (Ministry of Primary Industries, Fiji). One example of this is copra meal which can be used as a source of protein for cattle, sheep and deer, because it does not break down in the rumen.
- Coconut oil as biofuel/biodiesel provides a petroleum substitute in remote regions with high inbound freight costs.

Background

The coconut palm (*Cocos nucifera*) grows throughout the tropics and is widely called the “tree of life” for its important role in smallholders’ livelihoods as a direct source of cash income, nutrition and materials (Warner, 2007). In the Pacific those benefits include shade for other crops, land stabilisation, food and drink, and material for construction, weaving, containers, fuel and other uses.

However, the greatest economic benefit to coconut producers has come from drying the coconuts into copra for further processing into copra oil. Coconut harvesting and primary processing is dominated by smallholders, as large coconut estates turn to more profitable crops. Papua New Guinea, Fiji, Solomon Islands, Marshall Islands, Vanuatu and Kiribati have substantial exports of copra and copra oil for further refining. In contrast, India, Indonesia and the Philippines produce three quarters of the world’s coconuts, much of this in plantations, and fully process it locally.

The world copra trade has matured as canola, palm, peanut, soybean and sunflower oils have overtaken coconut oil as the world’s leading edible oils. Copra and copra coconut oil are traded as commodities, with world prices driven by large Asian coconut processors, forcing Pacific producers to be price takers in the marketplace. Declining and fluctuating copra and coconut oil prices and rising market standards around quality and consumer safety have severely affected the viability and competitiveness of all Pacific Island copra producers, and many coconuts are not being harvested. The current situation provides little or no incentive for further investment or replanting.

However, the emergence of innovative and well packaged coconut food and skincare products from Asia and the Pacific Islands, produced using modern processing techniques and led by cold-pressed virgin coconut oil (VCO), is reviving consumer and producer interest in coconut, with processing shifting from large central mills to smallholders. Coconut shell and coconut wood products are also proliferating in retail outlets. A Fiji women’s group has substantially increased its returns per coconut through switching from copra production to making VCO for local use and external sales.

However, markets for the infant VCO industry are already maturing due to increasing competition without market development. Market research is needed to identify new market sectors and assist producers to access supportive supply chains that will deliver a fair return to them.

Fiji, Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu belong to the 17 member Asia and Pacific Coconut Community (APCC), an inter-governmental alliance of Asia Pacific coconut producing countries. It represents 90 per cent of world production of coconuts and exports of coconut products, and is engaged in new product development and replanting programs.

<http://www.apccsec.org/>

Fig 1: Production and trade 2009 and five-year growth trend 2005-9

2009		Production (t)	Production area (ha)	Imports(t)	Exports (t)
Fiji	Coconuts	150,000 (-20%)	60,000 (0%)	9 (27%)	167 (+109%)
	Copra oil	13,000 (+36%)		1 (-98%)	3,788 (-40%)
Kiribati	Coconuts	131,351 (+2%)	30,395 (+13%)	0	0
	Copra oil	6,825 (+500%)		119	0 (-100%)
Samoa	Coconuts	155,060 (+1%)	27,173 (+9%)	0	987 (-2%)
	Copra oil	5,100 (+13%)			2,500 (-4%)
Solomon Islands	Coconuts	384,000 (+7%)	51,000 (+6%)	0	0
	Copra oil	5,100 (+31%)			705
Tonga	Coconuts	59,200 (+2%)	8,379 (+14%)	0	1,020 (+1720%)
	Copra oil	1,200 (-3%)		4	
Vanuatu	Coconuts	309,000 (+3%)	79,654 (+8%)	9	0
	Copra oil	12,825 (-6%)		1	5,316 (-59%)

Sources: Food and Agriculture Organisation of the United Nations, Pacific Trade Statistics database

Note: Growth trend % for last five years is in brackets

Process Flow & Industry Structure

Fig 2: Pacific Coconut Industry Chain Map

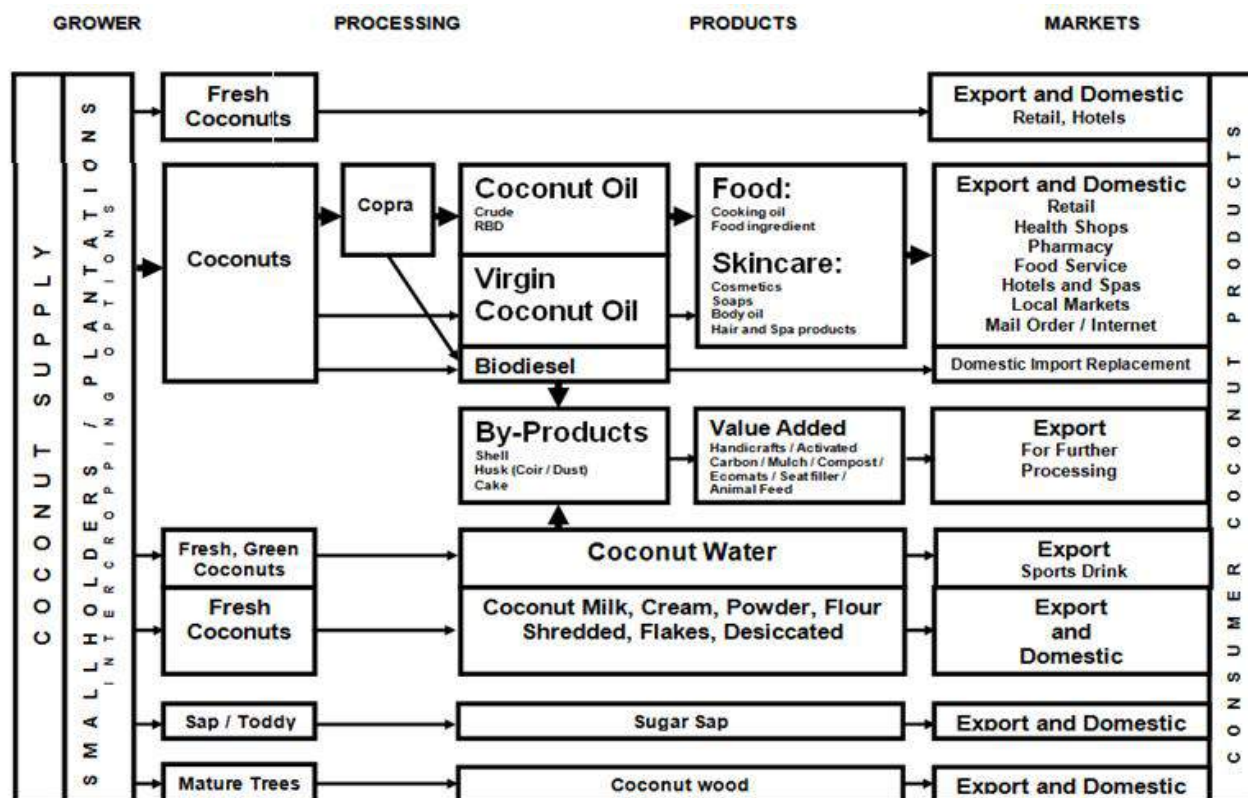


Fig. 2 shows more direct distribution channels forming for major Pacific coconut products as small producers shift from preliminary to final processing and distribute to emerging higher value regional markets such as overseas visitors, bringing producers and buyers closer. It indicates those points at which improved skills, technology, transport and other factors can deliver higher value (through quality, convenience, suitability for end use etc) to the consumer.

Coconut products and by-products

Fresh coconut flesh is an everyday food across all Pacific islands, providing dried copra and coconut cream and milk. Large volumes of fresh mature coconuts are shipped from Fiji, Samoa and Tonga for the Australian and New Zealand mass markets. However, sprouting of nuts is impeding market access and variable shelf life is affecting retail sales.

Coconut water from the immature nut is a traditional fresh drink for Pacific Islanders and visitors, and a new micro filtered and cold-processed packaged drink positioned as a premium priced sports and health drink is developing rapidly in international markets and stimulating consumer interest in coconut

and its nutritional benefits. Large global drink manufacturers are sponsoring new plantations of dwarf varieties so the immature nuts can be picked, but processors of coconut water and distributors of fresh mature coconuts are competing for supply in the meantime.

Pacific coconut producers traditionally extract and dry coconut flesh as copra for the oil to be extracted by local copra mills or by large Asian mills via Pacific commodity copra traders. The crude copra oil is refined (refined, bleached and deodorised under high pressure in factories) to be a principal ingredient of culinary oil, soaps, shampoos and lotions, or used as a moisturiser. Coconut and palm oil remain important oils for soap-making due to their solidifying characteristics.

Small, medium and large coconut producers across the Asia-Pacific region are shifting to processing their own coconuts into VCO, and trialling various techniques to improve quality and efficiency – from pressing lightly dried grated flesh to cold-settling (“fermentation”) to separate the oil and water – and using rotary and drum drying, centrifugal extraction, and commercial copra-making machinery. Benefits to producer/processors include higher prices and income, consumer and manufacturer ready products, employment suiting men and women, new small business opportunities, reduced freight costs by transporting only the key product; nutritious local cooking oil; and a local fuel. Most VCO is used locally for skincare (moisturisers, lotions, massage oils and soaps), cooking and fuel, enabling import replacement and local retail. In Solomon Islands villages, (and other countries), VCO has made a significant contribution to raising the standard of living at the community level (Shashi, 2008).

While specialist distributors have developed niches in health product stores in Australia and New Zealand, most VCO is distributed through commodity oil traders, resulting in little if any new market development or market feedback. The APCC’s new quality standard for food grade VCO, which is achievable by Pacific Island producers, is likely to open new consumer markets and attract a price premium over commodity copra oil. Claims that VCO is safe to consume regularly, and a functional food oil and skin treatment (Marina, 2009) with antioxidant, anti-inflammatory and other properties, require further research before consumer claims can be made, but reveal the potential of this product (Intahphuak, 2010; Rohman, 2009; and Marina, 2009). Constraints to value-adding include the need for quality assurance, testing that is affordable and readily available, product consistency, reliable shelf life, commercial and affordable packaging, costly organic certification if for skincare products, and identification of accessible markets and their requirements and supply chains to support market entry.

Pacific Island government and private energy suppliers are trialling copra oil, including VCO, for biodiesel to replace imported petroleum for vehicle and household fuel and power generation. However, low prices relative to prices for alternative uses, and the need for costly modification of equipment to accommodate coconut fuel indicates that viability is limited to outer areas producing their own coconut biofuel at a lower cost to importing petroleum.

In the Pacific Islands freshly shredded copra is widely produced in the home and innovative supermarkets. Dried copra in the form of desiccated, shredded, flaked and coconut flour is imported from Asia. However, frozen shredded coconut in Pacific Island stores in Australia and a shelf stable moist shredded coconut pouch in Australian supermarkets herald some shift to minimally transformed and higher value products.

Fresh and canned coconut milk and cream pressed from copra are basic ingredients in Pacific Island cuisine. While canned coconut cream is produced in Samoa, most packaged coconut cream and milk is from large south-east Asian processors. There are opportunities to improve product quality and reduce packaging costs through innovations such as pouches.

Kiribati's traditional coconut sugar (from flower or palm stems) has commercial potential for packaged and regionally branded gifts, souvenirs, grocery and catering packs across the Pacific Islands. Market

positioning will need to avoid competing directly with low priced south-east Asian coconut toddy and palm sugar (which is made from both coconut and other palms).

Coconut by-products are widely used for construction, household items and fuel. Coconut husk yields a fibre (coir) for local woven goods, geotextile mats, insulation filler for car upholstery and plant mulch. The 'dust' can be used as mulch and for compost preparation. The coconut shell is used mostly to fire coconut dryers, but is in demand for bowls, jewellery, ornaments and other handicrafts, and for high value activated carbon used for filters. Copra meal and copra cake (expeller) from copra oil production are in demand for cattle feed, both locally and exported (if the quality is adequate and consistent), and food grade meal is used in bakery goods. Accessing higher value markets for all by-products would improve profitability for all copra processors and provide an alternative to disposal or low-cost local applications.

The distinctively patterned timber "cocowood" is used widely in craft, utensils, furniture and other household items. The timber trunks are used in construction and the high density wood component of mature trees has been trialled successfully as a flooring material to encourage the clearing of senescent plantations and replanting.

Swot Analysis on the coconut sector in the Pacific

Strengths	Weaknesses	Opportunities	Threats
Abundance of established trees suited to local conditions	Poor market understanding across the industry	Target higher value buyers with more valuable and convenient products	Domination of natural oil markets by lower cost nut and vegetable oils from large scale production
Subsistence and famine food with cultural importance	Reliant on mature markets for commodity products	Improve quality and food safety to meet growing world quality standards	Aging trees, declining supply
Low maintenance, suites intercropping	Regions lack infrastructure for manufacture and transport	Add value across entire product line to motivate replanting	Poor tree management promoting pests and disease
Multiple products and uses.	Lack of finance	Harvest senile palms for flooring and other timber uses	Changes in government policy
	Lack of incentive to replant for future supply	Coconut oil is high in lauric acid which offers health benefits	Rising quality standards of markets and competing countries
	An unproven image of being unhealthy to consume, being high in saturated fats	Research the nutritional and beneficial properties of coconut consumption	

Opportunities in Research for Development

Opportunities for Research for Development in the coconut industry in the Pacific can really be categorised into four major areas:

1) Market focus

Trade and consumer research are required to understand current and potential market opportunities, requirements and potential supply chains for major coconut products and by-products. Particular emphasis should be placed on VCO, coconut water, coconut milk and by-products made from the shell, husk and cake.

2) Value adding product opportunities and processes

Research should assess opportunities to increase value to the end user including quality assurance, minimising processing losses and product downgrades, supporting product development and innovation, sharing improved profits equitably amongst all supply chain members, and developing economic models for a small plantation and a small processing operation to evaluate the impact of value adding options for all products and by-products across the tree.

3) Smallholder engagement

Research is needed to understand smallholder producers' capability and constraints in participating in such supply chains; to take up the research, technical improvements and other support effectively; and to identify extension processes to expand such improvements to the wider industry.

4) Medicinal uses of coconut oil and the effect of lauric acid

Clinical tests are required to understand the benefits of consuming virgin coconut oil and the recommended intake levels required.

References

#	Title	Author, year	Publication	Comments
1	Whole nut processing concept	Ministry of primary industry and Agriculture Dpt Fiji, 2010	PPT presentation	This presentation outlines a different way of processing the coconut making use of the whole nut and maximizing returns, it explains the two levels at which it can be done with examples and benefits.
2	The coconut odyssey	Mike Foale, 2003	ACIAR	This publication summarizes the case for coconut. It describes the way in which the full potential of coconut and its benefits can be realized for better health, food and the environment.
3	A review of the future prospects for the world coconut industry and past research in coconut production and product	Bob Warner, 2007	ACIAR	This study critically reviews the coconut industry going through past research problems. Also, it uses the value chain framework, in order to identify future opportunities for research and development.
4	Strategic Review of the Coconut Industry and Commodities Marketing in Vanuatu	Andrew McGregor, 2007	AusAID report	This report talks about the sustainability of the coconut industry in Vanuatu and how it can be improved in order to achieve a stronger, better and more competitive sector.
5	Species Profiles for Pacific Island Agroforestry, <i>Cocos nucifera</i> (Coconut)	Edward Chan, 2006	Traditionaltree.org	This is a comprehensive guide to the coconut, botanical aspects and distribution throughout the world is described, along with agro climatic and soil conditions for its development. Uses, products and other characteristics relevant to the tree are also explained in detail.
6	Virgin coconut oil: emerging functional food oil	A.M. Marina, 2009	Trends in Food Science & Technology	This paper mainly discusses on some of the findings associated with VCO up to date. Physicochemical properties, antioxidant activity, clinical and authentication studies of VCO were some of the topics addressed in this review.
7	Quantitative analysis of virgin coconut oil in cream cosmetics preparations using Fourier Transform Infrared (FTIR) Spectroscopy	A Rohman, 2009	Pak. J. Pharm. Sci	In cosmetics industry, VCO is excellent material which functions as a skin moisturizer and softener. Therefore, it is important to develop a quantitative analytical method offering a fast and reliable technique.
8	Anti-inflammatory, analgesic, and antipyretic activities of virgin coconut oil.	S. Intahphuak, 2010	Pharmaceutical Biology	This paper's interest was to investigate the anti-inflammatory action of virgin coconut oil in both acute and chronic phases of inflammation as well as the analgesic and antipyretic activities in rats.
9	Virgin coconut oil as a tool for sustainable development in outer islands	Shashi Kad, 2008	Pacific Economic Bulletin, The Australian National University	This paper first outlines the social and economic potential of virgin coconut oil production and describes the DME technology. We then evaluate its progress to date in Solomon Islands and briefly compare experiences with other Pacific islands, particularly Samoa and Fiji.