

Tradition, Trade and Technology: Virgin Coconut Oil in Samoa

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1 Background

Country context

Samoa has a population of around 170,000 people mostly located on the two major islands, Upolu and Savaii. The Samoan economy, based on a narrow range of activities linked to agriculture, tourism, small-scale manufacturing and fisheries, has achieved significant growth recently compared with most Pacific countries (Government of Samoa, 2001a). Its GDP per capita of US\$1,420 in 2002 compares with an average of US\$950 for the East Asia Pacific region (World Bank, 2003).

Within this overall picture, however, the rural economy has fared less well, with the share of GDP derived from agriculture and fishing declining from 21 per cent in 1997 to 14 per cent in 2001 (Government of Samoa, 2001a). While fishing has remained static over the period at around 8 per cent of GDP, agriculture as a percentage of GDP has fallen significantly.

Major factors in this decline have been the long-term damage to coconut and cocoa plantations from the 1990–91 cyclones, which destroyed 20 per cent of the trees, the fall in international copra and coconut oil prices (prices more than halved between 1998 and 2001) and the taro leaf blight which devastated a staple Samoan food supply in 1993. The Samoan economy is therefore highly vulnerable to external factors such as changes in commodity prices, crop disease and the weather – especially cyclones.

Around two-thirds of Samoan households rely on a mixture of subsistence agriculture and cash income, with subsistence agriculture contributing about half Samoa's total agricultural output.

Opposite: Pressing dried coconut to extract the oil on the island of Upolu, Samoa. PICTURE: JOHN CRETNEY

Most of the land (82 per cent) is held under customary title in the collective ownership of the Samoan people and cannot be used as collateral to access financing (Japan International Cooperation Agency, 2003).

Rural communities in Samoa have always experienced difficulty in finding opportunities to generate cash income. Many rural Samoan families rely solely on remittances from family overseas (especially from New Zealand or the US) for all their cash needs. Over recent years this income has amounted to around 18 per cent of GDP and therefore has a significant positive financial impact on the economy (Government of Samoa, 2001a).

Approximately 50 per cent of households were found to be living below the food poverty line in a 1997 survey, with poverty focused in rural areas, especially on Savaii but also on Upolu outside the Apia urban area (Government of Samoa, 2001a). However, as there were some methodological flaws in this survey, it was proposed that a new government survey should be carried out in 2001–2002 but this has yet to be undertaken.

Around 55 per cent of the Samoan population is in the 15–60 age group (1998 figures) and in that year it was estimated that only around 23 per cent of this group were formally employed. The rest were involved on an informal basis in various forms of subsistence or semi-commercial agriculture, fisheries or self-employment (Government of Samoa, 2002a).

Census figures for 2001 indicated a significant imbalance between male and female employment with 36,722 males (22 per cent of the population) and 16,226 females (10 per cent of the population) over 15 years of age being economically active (Government of Samoa, 2000; 2001b).

Employment opportunities at village level for both women and men are very limited, and because of the lack of income-earning activities many village dwellers have migrated to the urban areas of Samoa's capital Apia or overseas to find work. This migration trend has increased the burden on relatives who live in town, leaving families in the village with few workers for even daily subsistence tasks. Many of those who have moved to Apia have not been able to find employment, placing further stress on families.

A UNDP *Pacific Human Development Report* (UNDP, 1999) observed that the 'encompassing image of poverty in the Pacific is poverty of opportunity'. People's talents, skills and aspirations are frustrated and wasted, denying them the opportunity to lead productive and satisfying lives. 'Poverty of income is often the result, poverty of opportunity is often the cause.'

This lack of opportunity is due, in part, to problems inherent in the situation in Samoa: dependence on ill-defined foreign markets; the high cost of public utilities and infrastructure; and vulnerability to natural disaster. There is a heavy dependence on remittances and donor assistance, leading to an economy vulnerable to internal and external market fluctuations.

The government of Samoa has set out nine key strategic outcomes in its long-term strategy. These include enhancing agricultural opportunities and strengthening the social structure. This strategy is relevant to the theme of this chapter; it refers to the need to diversify commercial agriculture, to revitalize village agriculture and to encourage the active participation of women in economic and social development (Government of Samoa, 2002b).

The commodity context

Throughout the Pacific, coconut is a long-established crop providing a wide variety of products which help sustain the village way of life. The following are some of these products.

Copra: Copra is the dried kernel (meat) of the coconut and is produced mostly by sun-drying the coconut meat which often introduces insects or moulds. However, it can also be produced by kiln or smoke-drying. Its main use is as a source of coconut oil (see below); the residue left after the extraction of oil is often used as grain feed.

Coconut oil (or copra oil): Coconut oil is extracted from copra by heating or by solvent extraction processes. Unrefined oil is not usually suitable for human consumption because of the way in which copra is produced. The oil is therefore generally refined, bleached and deodorized to produce refined, bleached and deodorized (RDB) coconut oil. The oil retains some coconut taste but often has an unpleasant flavour. It can also be hydrogenated to form a more saturated and higher melting product.

Virgin coconut oil: Virgin coconut oil is extracted directly from fresh coconut meat without the use of high heating or chemicals. Either minimal heating is used to dry the meat before the oil is extracted by pressing, or the undried meat is pressed first and the mixture of oil and water which is obtained is allowed to separate to produce the virgin oil. This oil retains the characteristic scent and taste of coconut and is suitable for human consumption without any further processing.

Copra and coconut oil are the traditional products based on the coconut. Their production has generally required large-scale facilities with prices highly vulnerable to international supply and demand dictated by the output from countries such as the Philippines which produce a high proportion of world supply. As the following table indicates, coconut has been the dominant commodity crop for Samoa, although other countries have a higher output.

Table 1: Commodity Outputs, 2001 ('000 metric tonnes)

	Cocoa	Taro	Coffee	Coconut	Bananas	Mangos
Fiji	0.1	38	0.1	215	6.5	0.3
Papua New Guinea	42.5	172	84	1,032	710	0
Tonga	0	4	0	58	0.7	0
Samoa	0.4	15	0	140	20	2.5
Vanuatu	1.6	0	0.1	248	13	0
Cook Islands	0	0	0	5	0.2	2.7
Solomon Islands	3.0	34	0	330	0.3	0
Philippines	6.6	97	130	13,200	5,060	884
Indonesia	340	0	377	14,300	3,600	950
Malaysia	100	0	12.5	713	560	19

Table 1 provides an indication of the relative output (expressed in 1000 metric tonne units for 2001) of conventional produce for Pacific island and nearby Pacific rim countries (FAO, 2002). As these figures illustrate, the output from Pacific countries of most commodities is dwarfed by the output of Indonesia and the Philippines.

The overall output of coconut oil in terms of production and export of the top ten countries is set out in Table 2 (US Department of Agriculture).

Table 2: Production and Export of Coconut Oil, 2002–2003

Production ('000 metric tonnes)		Export ('000 metric tonnes)	
Country	Production	Country	Export
Philippines	1,295	Philippines	1,060
Indonesia	852	Indonesia	552
India	440	Malaysia	166
Vietnam	149	Papua New Guinea	35
Mexico	106	European Union	32
Sri Lanka	58	Côte d'Ivoire	15
Thailand	46	Singapore	11
Papua New Guinea	35	Western Samoa	8
European Union	30	Vietnam	6
Côte d'Ivoire	28	United States	5
Japan	25	India	4
Others	121	Others	3
Total	3,185	Total	1,897

The Philippines is the major world producer of coconut oil. Production doubled from 1999 to reach a peak of 1.7 million tonnes in 2000, mostly exported to Europe and the US. Since then production has fallen as shown

above, but as the source of the majority of the world's global supply of coconut oil, the Philippines industry is a powerful lobby in world terms with significant political clout. In contrast, small producers like the Pacific countries have little leverage. On 2002/2003 figures, Papua New Guinea and Samoa are the major producers in the Pacific region. Even so, Samoa accounted for just 0.4 per cent of world exports in 2002/2003 and since then production has fallen because of problems related to the large-scale mill responsible for oil production.

Coconut oil extracted from copra requires large-scale, high pressure, expensive, energy-intensive equipment; unhygienic copra produces oil of low quality which then requires refining, bleaching and deodorizing to create a commercially acceptable product. The refining process uses acid, solvents and steam to strip out the contamination, with some residual solvents remaining in the oil. The process also removes the natural volatiles and anti-oxidants that give pure coconut oil its unique flavour and aroma. In addition, the total process from farm to refined oil can take many months.

The coconut industry in Samoa and other Pacific island countries has nevertheless been a major earner of foreign exchange, contributing towards the livelihoods of many people. Given the processes described above, mechanized coconut oil production and sales have mostly benefited larger enterprises. The benefits of copra production have been more widespread, and when prices have been good, the income earned by villagers has made the effort worthwhile.

More recently, however, fluctuating world market prices for copra, combined with the labour-intensive nature of copra production, have dissuaded Samoan villagers from considering either copra or coconut oil production as viable activities at the village level. Prices are so low that many families have abandoned their plantations except to harvest coconuts for their own consumption.

Devastating cyclones in the past few decades have further damaged the coconut oil industry, forcing many copra producers to close down. As a result, many villagers now have a surplus of unused coconuts, and this abundant and available resource is often wasted.

In 2000, for example, coconut-based products (oil, cream, copra, dessicated coconut) provided exports valued at US\$7 million – 15 per cent of Samoa's total commodity exports of US\$45 million. In 2002 these products provided only US\$4.7 million of revenue out of a total of US\$47 million – 10 per cent of commodity revenue. In contrast, revenue from fishing rose from US\$24.7 million (55 per cent of commodity exports) to US\$29 million (62 per cent of exports) (Government of Samoa, 2003).

The trade policy context

Global integration has intensified the trade links between high-income and developing countries – over the past ten years, trade between these two groupings has increased by 11 per cent because of lower transport costs, lowered trade barriers, faster communications and greater mobility of both people and capital. Trade has increased, particularly with East Asia, the Pacific, Latin America, the Caribbean and sub-Saharan Africa. However, the volatility of the commodity products involved has had a significant impact on developing countries, and generally commodity and agricultural exports have been subject to higher tariffs than other products as high-income countries protect their own farmers and producers.

The average tariff level globally across all agricultural products is 62 per cent, but this varies considerably between regions and between products (US Department of Agriculture).

Vegetable oils such as coconut oil attract an average tariff internationally of 62 per cent compared with a high for tobacco of 90 per cent and a low for horticultural products of 50 per cent. For vegetable oils, regional rates vary from 134 per cent in South Asia to 17 per cent for North America and 13 per cent for EU countries. For vegetable oils and for agricultural products generally, the highest tariffs apply for countries outside North America and the EU. However, these two regions also deal with the highest volumes of products because of the size of their markets. Tariffs were reduced by one-third as a result of the GATT Uruguay Round in 1996, and the lowering of tariffs which especially disadvantage developing countries remains a key objective of future multilateral trade negotiations.

2 The Virgin Coconut Oil Project

History

The initiative to develop the organic virgin coconut oil industry in Samoa was undertaken by Women in Business Development Incorporated, a Samoan NGO established in 1991 with the objective of assisting Samoan women and youth to develop sustainable livelihoods. Until 2002 WIBDI was the only major NGO in Samoa involved in micro-financing activities directly linking a micro-finance facility to micro-enterprise development. It was also the only one focusing on the mobilization of savings.

WIBDI was established by a group of women who faced difficulties in securing loans for their economic activities. From modest beginnings, WIBDI has grown significantly and is now active in around 90 villages across Samoa supporting a range of income-generating activities including organic farming, coconut oil production, beekeeping, fine mat production and handicrafts.

The organization has an office in Apia and employs an Executive Director and ten staff (in 2003) involved in training and in monitoring projects.

WIBDI has been involved in developing community-based projects at the village level aimed at alleviating poverty and creating sustainable local village economies. It has attracted funding support for this from a number of agencies, including NZAID, AUSAID, Oxfam New Zealand, the Food and Agriculture Organization (FAO), UNDP and the Canada Fund.

The move to produce organic virgin coconut oil in Samoa was prompted by the decline in the price for copra, the traditional major product from coconut. Farmers were getting little income from this established resource, with many villages having no sustainable income. Many villages, therefore, had a surplus of unused coconuts, and WIBDI felt that something needed to be done to help villagers utilize and profit from this abundant and available resource.

Investigations revealed that as far back as the 1800s, coconut oil production for export had traditionally been the economic activity of village women. Penelope Schoeffel states: 'Until Theodore Weber introduced the innovation of exporting dried copra in the 1870s, a prime source of income for the Samoans was the manufacture of coconut oil for export. This was traditionally a woman's economic activity, though men took part in it when it became a major commercial product' (Carr, 2001). This revelation encouraged WIBDI to look for ways of reviving the practice of coconut oil production by women as a source of income through exports.

Finding an appropriate technology

After many frustrating months of searching for viable income-generating ideas, including the revival of coconut oil production by village women and youth, WIBDI learnt by chance about the direct micro expelling (DME) technology for the production of coconut oil. It was the subject of the monthly satellite meeting run by the University of the South Pacific regional satellite network for ECOWOMAN) in April 1995. ECOWOMAN is a NGO network of Pacific women promoting women's involvement in science and technology, and WIBDI is the Samoan focal point.

While the copra process yields a low quality oil product, investigations indicated that with the new DME technology, coconut could yield high quality virgin oil with potential uses in cooking, cosmetics and health products.

Direct micro expelling is a new small-scale technology developed by Dr Dan Etherington at the Australian National University which enables rural families on tropical coasts to produce virgin cold-pressed coconut oil within an hour of opening their coconuts.

The technology has its roots in Tuvalu, where oil is extracted from dried grated coconut. A freshly grated coconut is mixed with each batch of dried

Box 1: The Direct Micro Expelling Process

The DME system involves four basic steps:

- collecting and husking the coconuts;
- finely grating the fresh mature coconut kernel with small motorized (usually electric) graters. It is important to note that diesel powered generators to run these graters can be fuelled by the virgin oil produced by the DME process;
- drying the grated coconut to a specific moisture content in about one hour on an innovative, all-weather, solar-thermal dryer fuelled by the discarded coconut husks and shells;
- pressing out the oil with a specially designed robust hand-operated press, known as a SAM press, that uses interchangeable cylinders.

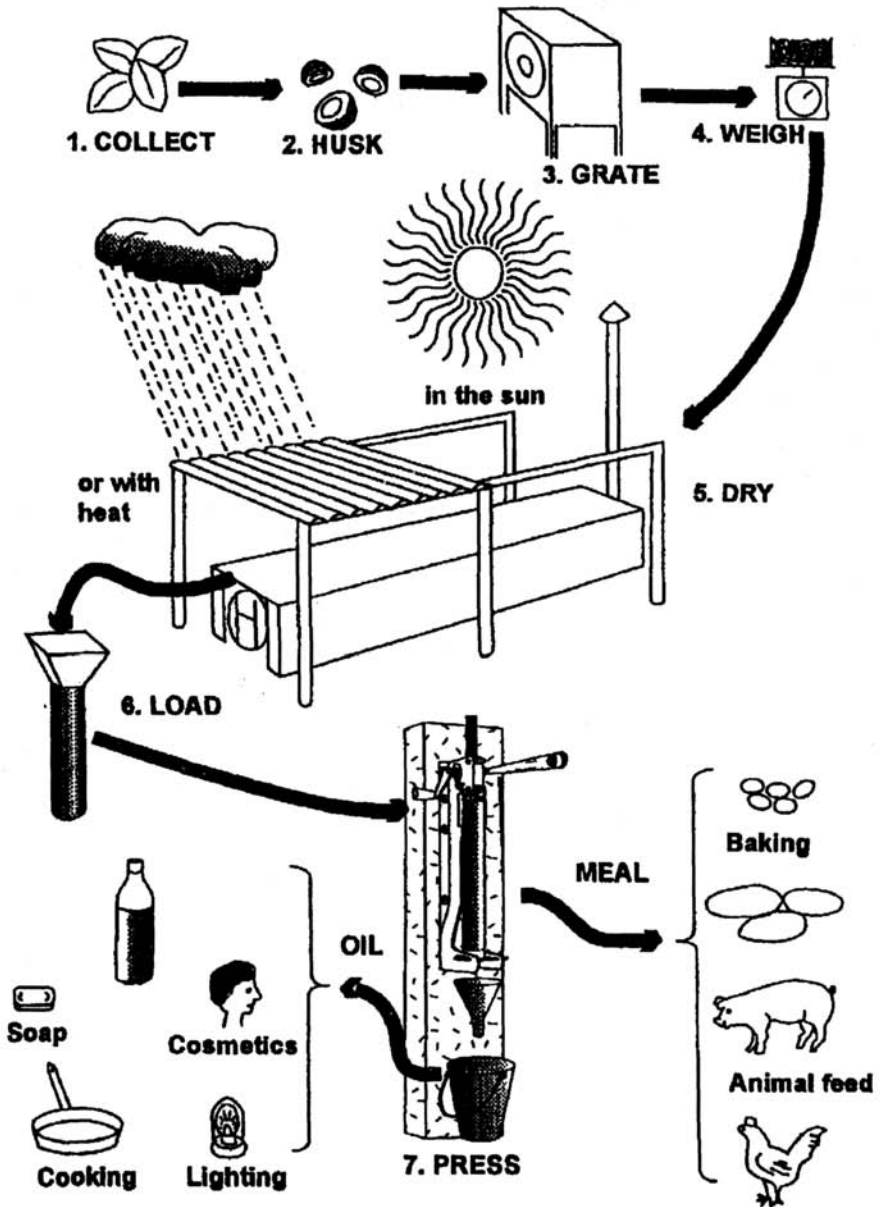
coconut immediately before pressing using the press. This ‘moisture-assisted’ expelling principle has been adapted and developed in DME.

At the family farm level, using one DME press, the DME system is generally able to process 300 to 500 coconuts per day, producing 25–45 litres of oil with an extraction efficiency (OEE) of over 85 per cent of the available oil. The DME technology is simple and easy to use, and bypasses the arduous process of making copra. The technology enables village families to enhance traditional Pacific oil-making practice without having to take coconuts to a mill elsewhere for pressing. The DME process is an appropriately small-scale technology which enables poor rural families to use existing village coconut resources to produce pure virgin coconut oil, at the same time recycling materials in a sustainable process.

WIBDI saw the DME technology as being perfect for use in rural villages. It was simple and required very little training in its use. Copra production had always been seen as a man’s job, and DME technology was seen as providing a pathway to involve women and youth in the viable production of coconut oil. The DME technology seemed ideal in that the final product – the coconut oil – would be produced in the rural areas and the technology could encourage rural people to remain in the villages where they lived because it provided them with much-needed work. It would be as if the process of village oil production in Samoa could come full circle, to again be produced by women in the village setting and exported to earn them an income.

In 1995 WIBDI contacted Dr Etherington in Australia and sought his permission to use the technology for a rural village project. The WIBDI Executive Director, Adimaimalaga Tafuna’i, then travelled to Fiji and

Figure 1: Direct Micro Expelling of Coconut Oil



participated in a United Nations Industrial Development Organisation (UNIDO) training programme on the use of the technology which had already been introduced into a few villages in Fiji where the projects were being managed by village communities.

The Fijian projects were not seen to be successful, because of reluctance by village leaders to take responsibility for the activities at community level – especially the financial aspect of the operations.

Finding an appropriate organizational structure

From this experience, the WIBDI Executive Director envisioned an opportunity for Samoan family groups to benefit from the DME technology, given that many rural families have access to the coconut plantations of traditionally owned lands, with acres of coconut trees not fully utilized.

A sub-sector analysis of the coconut industry in Samoa was then conducted to see if producing virgin coconut oil would be viable. The results of the study were made even more encouraging by the fact that copra prices at the time were very much in decline. The analysis indicated that a ton of copra from approximately 5,000 nuts, would bring in about ST\$1135 (US\$454). If the 5,000 nuts were instead processed with the DME technology into coconut oil, the returns would be approximately ST\$4400 (US\$1,760), using the price of the locally produced coconut oil as the price base.

Based on the Fiji experience, and from their own early project experience in Samoa, WIBDI decided that rather than work with whole village communities, they would offer the coconut oil project to village extended families. Extended families in Samoa comprise a community in themselves, with families having anything from a few members to very large groups of a hundred or more people in very large families. An average extended family living in one village could be made up of around 40 people.

Previous projects had proved to be most successful when there was a strong leader to take responsibility. Working with families would allow WIBDI to work through one head of family, rather than the many village elders in a communally based project. In a village or community setting, WIBDI had found that people were always willing to take part, but were reluctant to take responsibility when payment was needed for maintenance bills. After the beginning of the project, at the first sign of a problem, they would lose interest. By contrast, when a family was earning cash for themselves from a project, they tended to stick to it longer and to put money back into the project because of the direct benefits gained.

WIBDI based selection for the project on a number of key criteria. Families needed to have access to a substantial supply of coconuts, the villages chosen needed to be geographically representative and the families

needed to have the number of people needed to work on the project. Many families have since shown an interest in the technology and the project, but have been turned down because of lack of sufficient family members to make the project viable.

Finding appropriate markets

WIBDI provided the families selected with a DME press and assisted in providing technical plans to model a dryer and oven for the production of pure virgin coconut oil. The project produces organic, virgin, cold-pressed coconut oil – an extremely high grade product that is exportable to a growing niche market overseas. The families concerned are able to produce value-added products for local and overseas markets.



Husking coconut.

PICTURE: JOHN CRETNEY

When the idea of producing virgin coconut oil for export was first mooted, there were two main problems to overcome in marketing the oil overseas as a desirable alternative to other cooking oils.

Firstly, the oil would have to compete on overseas markets with cooking oils produced in other areas from vegetable extracts – soy, peanuts, etc. These oils are familiar to the consumer, are produced in great volumes and can be sold quite cheaply. WIBF realized they would be unable to compete on volume or price, so it was important that the product be marketed in a ‘value-added’ manner to attract buyers and organic certification which would provide an avenue for greater value.

The second problem was that coconut oil has been considered unhealthy because of its saturated fat content. However, it is now known that the unique form of saturated fat in coconut oil actually helps to prevent heart disease and hardening of the arteries.

It is identical to a special group of fats found in human breast milk, and it has now been clinically proven that these fats improve digestion, strengthen the immune system and protect against bacterial, viral and fungal infections. The fats derived from coconut oil are now routinely used in hospital IV formulations and commercial baby formulas. They are also used in sports drinks to boost energy and enhance athletic performance.

The virgin coconut oil project began in 1996. With funding from the Canada Fund, five sets of equipment were purchased and projects were started on family farms in five villages on Upolu and Savaii. Canada Fund funded a further four sets of equipment in 1998. The project has introduced 13 sets of equipment to family farms around Samoa, with all the production sites being organically certified or in conversion status.

Feasibility studies on costs and likely virgin coconut oil prices indicated that virgin oil production offered an opportunity for a profitable farm-based production process. Armed with this information, WIBDI staff visited farmers on Upolu and Savaii to assess interest by farmers in seeking certified organic status for their farms and supplying oil to WIBDI to be marketed.

Obtaining organic certification

A key factor in the project has been obtaining organic certification for organic virgin coconut oil. This access has been managed by WIBDI on behalf of the grower group.

To provide the training necessary for farmers, WIBDI first contracted a certified BIO-GRO trainer and a local consultant to train their own staff in the requirements related to certification such as farm mapping and records. Assistance with training was also provided by a local organic farmer who provided access to his property.

Having assessed the different certification processes available, WIBDI opted for the National Association for Sustainable Agriculture Australia (NASAA) certification system. The trained WIBDI staff then trained farmers about both organic farming practices and the certification requirements, such as mapping the farms in preparation for the annual inspection visits of the NASAA certifying officers.

When families were ready to produce coconut oil, WIBDI staff assisted with building the dryers, installing equipment and training the production staff. A monitoring process involving weekly visits by WIBDI staff was also set up to ensure that certification requirements would be met.

The Pure Coconut Oil Company (PCOC) was then set up as the vehicle to market the virgin oil product and families were encouraged to sell 70 per cent of their oil to the PCOC for export and retain 30 per cent for local sale.

Full certification for five family farms was achieved through NASAA in 2001 and NASAA undertakes annual audit inspections as part of the process of maintaining accreditation. In 2001, following certification, exports to Australia rose significantly from one to three tons per month and further markets opened in Germany and New Zealand.

Involvement of local community, national government and international agencies

This project has been driven primarily by a community-based Samoan NGO, WIBDI, which is now working with the Samoan Organic Farmers Association, an organization set up by WIBDI and Malaefono Organic Plantation in 2001.

At a national level within Samoa, little support was initially received for the project. However, more recently support for organic farming initiatives has been forthcoming from the Ministry of Agriculture which is currently developing a strategy for the development of organic farming in Samoa.

At an international level, support has come from several sources. The Canada Fund has provided funding for capital purchases – initially for the purchase of equipment for farmers and subsequently for the purchase of three vehicles over a five-year period. These vehicles are used by WIBDI staff to visit growers regularly to monitor that organic certification requirements are being met and to advise on production and financial aspects of the project.

Volunteer support has been secured through the US Peace Corps and the United Nations UNV programme for two people to assist with helping farmers to meet their certification requirements. NZAID, the PIIDS (Pacific Islands Industrial Development Scheme) and the South Pacific Project Facility have provided funding support for improving marketing, and AUSAID has provided funding support for the organic certification process.

Oxfam New Zealand has also provided funding over the 1999–2003 period to WIBDI to support the expansion of the micro-finance project, which involves a range of rural initiatives; part of this funding has been used to support the costs of field visits and training.

Current status

The project combines three concepts at the heart of all Women in Business endeavours: tradition, trade and technology.

- *Tradition* is protected as family groups who remain within the village do the work. The product is a pure version of an ancient product.
- *Trade* is encouraged by the local and international sale of the oil and value-added products, such as scented oils and soaps. Furthermore, participants are given the opportunity to learn small business management and to partake in a micro-finance scheme which teaches them credit discipline and saving methods.
- *Technology* comes in the form of applying the DME technology.

Currently, family farms in 12 villages across Upolu and Savaii are involved in coconut farming operations which have secured organic certification under the umbrella of WIBDI. WIBDI manages the quality control, administrative and marketing aspects of the operation. Not all the farms produce regularly and some are involved in work to upgrade their facilities, for example for drying. At present six farms are able to produce when product is required

WIBF currently provides ongoing support to the families involved in the form of weekly visits by field staff to the sites to check on each farm. The quality of oil is monitored, a check is made that certification requirements such as record-keeping are being attended to and training is provided in small business management, production and packing of value-added products. Staff also introduce the families to a micro-finance programme which enables the them to be part of a banking system where they live.

The need for maintenance of the equipment is also identified on these weekly visits. This is done by the WIBF technical person who also gives training to family members on simple maintenance of the machines. Families are encouraged to save money to cover maintenance costs.

Once pressed, the extracted oil product is stored on each farm. The oil is then collected from the production sites and stored at the Pure Coconut Oil Company site. Some value-added products are also produced at this site, for example soap, insect repellent, scented oils and cooking oil. Bulk volumes are sold on to overseas buyers through contacts made directly or on the Internet

Families were initially encouraged to sell 70 per cent of their oil to the PCOC for export and to retain 30 per cent for local sale. However, the majority of current producers sell all the product to the PCOC with each producer also paying 5 litres of oil back to WIBDI per production week for process expenses.

The PCOC is responsible for exporting the virgin coconut oil, but it hires a customs agent to prepare documentation. The PCOC itself operates as cost effectively as possible. It commenced operations with two employees and the staffing remains at this level. Proposed expansion of oil production is likely to require an increase in staffing resources in the future.

At present, virgin coconut oil is produced primarily for export. The oil is used overseas mainly as edible oil, but also for soap making and other cosmetic purposes. Locally it is used as a skin and hair product. Some edible oils are also sold to small local cottage industries for production of biscuits and doughnuts.

Local markets have been secured by the PCOC for supplying local businesses with a gourmet cooking oil, moisturizing oils, insect repellent and coconut soap. However, these markets are small (for example 3–4 dozen of each item a month). Because of financing problems, a sun tan oil and skin

balm have not yet been packaged or marketed. The residue of the DME process makes good food for human consumption as well as stock-feed.

Along with *nonu* juice and bananas, virgin coconut oil is currently the major organic product exported by Samoa. In 2001, 14 tonnes of virgin coconut oil was exported to Australia, New Zealand and Germany, but output has since dropped because of difficulties related to management and marketing arrangements. These difficulties are being addressed through greater resources which are now available to develop and market the product. This has arisen from expertise sought from Germany on technical aspects of processing and marketing, together with the sale of the Pure Coconut Oil Company, in late 2003, to a private New Zealand buyer with Samoan family connections.

3 The Virgin Coconut Oil Commodity Chain

Who does and gets what?

There are three major steps in the production of virgin coconut, commencing with the collection of raw material (coconuts) by families through to the marketing and distribution of the oil. These are set out below with details of the economic benefits which accrue at each stage.



Shredding coconut.

PICTURE: JOHN CRETNEY

Plantation owners

This step takes place at the family farm level. Coconuts collected from nearby land areas are sold to the family producer. The price per nut ranges between ST\$0.06–0.10 and the truck transport costs ST\$20 (US\$8) per load. The collectors are members of the extended family and are paid by the site manager. A family can typically harvest around 500 nuts per day bringing an income of ST\$30 (US\$12) per day or ST\$150 (US\$60) per week.

The way in which families harvest nuts from their own plantations ensures that transportation is not a major problem. Family members who had no previous employment can now be gainfully employed picking up the nuts and transporting them to the production site if it is close enough. Problems are encountered on the larger plantations where appropriate transportation is not available. Some families do not have the workforce to gather the coconuts, as family members have moved away to find work.

At present, there is no competition for coconuts, as they are not normally being harvested except for family use for food. Copra prices are so low that small farmers are not interested in copra production.

Oil producers

This step takes place with families who have obtained the equipment required to undertake the oil extraction process.

Workers, including men, women and children, husk the coconuts, and grate and weigh the coconut meal. They are also involved in the drying and oil pressing process. They are paid ST\$12 (US\$4.80) per day or ST\$60 (US\$24) per week.

One problem encountered at the beginning of the project concerned the time spent on the production process. Families complained that once the dryer was lit, they had to produce continuously during the day and could not stop and start. They were not accustomed to spending a whole day working. Their frustrations receded as they became familiar with the process and saw how beneficial the cash earned was to their families.

Once the oil has been extracted at farm level, producers can either sell the oil locally or sell to the PCOC. Locally, the oil can fetch between ST\$12–15 (US\$4.80–6) per litre. Although this option is more lucrative, Samoan producers prefer to sell all the oil in bulk through the PCOC. Currently only two producers are taking regular advantage of the local market, which is encouraged by WIBDI.

Table 3 illustrates monthly production by oil producers in October 2001, and the volumes sold locally or to the PCOC.

Table 3: Oil Production and Sales, October 2001

Village	Oil Produced (litres)	Local Sales (litres)	Local Sales (ST\$)	Sales to PCOC (litres)	Sales to PCOC (ST\$)	Total Sales for Month (ST\$)
Saolufata	250	74	740	176	526	1,266
Siumu	450	50	280	400	1,200	1,480
Saleimoa	1,400	50	250	1,340	4,020	4,270
Patamea	1,200	200	1,000	1,000	3,000	4,000
Foailalo	120	120	1,200		1,200	1,200
Lano and Tafua tai	1,300	20*		1,280	3,840	3,840
Taga	200	100	1,000	100	300	1,300

*For personal use

There is a reluctance to produce other value-added products like scented oil and soaps, perhaps because of the time spent on the additional processing.

The PCOC initially set the wholesale price at ST\$3 (US\$1.20) per litre while markets were still being established. As the market has developed, the price has increased and the current price for organically certified oil is ST\$4.65 (US\$1.85) per litre or ST\$5 (US\$2) per kilo to the producer. Providing a market for the oil is available, a typical producer with an output of up to 200 kilos (215 litres) per week can earn up to ST\$1,000 (US\$400) per week selling through the PCOC. If they take advantage of the local market, this can be much higher.

As an example, one producer responsible for a family farm sells all her coconut oil on the local market and her family is totally dependent on the oil as well as the few pieces of handicraft that she produces from time to time. She has the capacity to produce up to 200 litres a week, but usually works only two or three days and production is around 60 litres or three buckets. By selling the oil in 500ml bottles for ST\$5 a bottle, she earns ST\$600 (US\$240) per week.

Another family produces up to two and a half to three buckets of oil a day, and sells all the oil to the PCOC. It earns around ST\$750 (US\$300) a week, but can increase production if it needs money for a special occasion.

The Pure Coconut Oil Company – marketing and distribution

The PCOC either sells the virgin oil in bulk to overseas interests or produces value-added products for local or overseas distribution. A number of value-added products can be derived from the virgin oil or from other coconut material.

The PCOC takes responsibility for the sale of bulk virgin coconut oil to

Box 2: Production and Distribution of Value-added Products

The PCOC also undertakes limited production locally of value-added products. Current or potential products are outlined below.

Scented Oil

Scented oil was the first value-added product developed for the virgin oil in Samoa. It utilized the leaves of the *lau maile* plant and flowers from the *moso'oi*, frangipani and wild ginger. Although this process ensured a price of up to ST\$15 (US\$6) per litre, producers did not want to spend the extra time on the process. Local sales have been very promising, but families only produced enough when there was a great need for cash. There is much potential for this product at the village level.

Soap

Soap-making workshops were conducted for soap producers and other interested women, but this resulted in only two people taking this further with one exporting overseas. Soap is also produced by the PCOC, but the demand in the local market alone is high so that more women (including those not involved in oil production) could be involved in this activity. Originally local women produced the soap, but they could not be relied on for regular supplies and the PCOC needed to produce soap to ensure that the market was supplied. It remains difficult to attract women to produce soap, as often work ethics have not been established because of the traditional reliance on remittances for cash needs.

There is huge potential in the Pacific Islands for rural and urban women to produce soap, especially in countries where tourism is more established. In 2003, with the assistance of a German consultant funded by the Centre for Development of Enterprise (CDE) in the EU, the PCOC produced an organically certified soap. The soap will be produced for sale in New Zealand and Europe in the near future. Some virgin oil based soap is also being produced in both Fiji and Niue.

Insect Repellent

A natural insect repellent was developed by the PCOC, when it needed to boost cash flow, while waiting for the export market to develop. The age-old practice of rubbing the body with coconut oil before going out in the evening was coupled with the benefits of citronella as an insect deterrent, to produce this pleasant smelling moisturizing insect repellent. Sales have been steady. In Fiji, there is the potential to combine the virgin oil with oil of the Neem tree for an effective insect repellent.

Box 2 (continued)**Edible Oil**

It has always been the intention of the project to market the oil as an edible oil. This has been very difficult because of adverse publicity put out by the soybean oil industry since the 1980s. However, the dissemination of news of the benefits of coconut oil through books, video resources and the Internet is slowly changing attitudes. With appropriate advertising, the oil could also be sold in the villages for cooking, bringing health benefits for Samoan people.

Charcoal

A number of women produce charcoal from the coconut shell, which they sell either locally or at the produce market.

Coconut Meal

There is the potential to use the residue meal after oil pressing for baking and for animal feed. WIBDI has established youth groups to sell the meal for baking as a fund-raising project, and there are indications that meal as animal feed can improve milk yields – one dairy farmer noticed an increase of 10 per cent in the yield after feeding his cows on the meal for four days.

overseas purchasers and currently this has involved a single major purchaser, Kokonut Pacific, based in Australia. The oil sold is used primarily as edible oil and for soap and cosmetic production. Initially oil was purchased at a price of ST\$6.50 (US\$2.60) per litre or ST\$7 (US\$2.80) per kilo, which with organic certification has now risen to ST\$11.50 (US\$4.60) per litre or ST\$12.50 (US\$5) per kilo, a price still less than the price prevailing in larger countries such as the Philippines.

In contrast, recent prices for commodity coconut oil exported by countries like the Philippines has fluctuated from US\$0.36 per litre in 2000 to a 15-year low of US\$0.26 in 2001 – around a tenth of the price of virgin coconut oil.

4 Impact of the Project on Women and Men

The benefits of this project accrue at a number of levels.

Village level

At the village level, the project has provided a means of extracting a value-added niche product from a plentiful renewable resource which was previ-

ously either being wasted or which was providing a commodity product (copra) highly susceptible to international price fluctuations. The project provides a source of badly needed cash for families, as well as employment for family members in harvesting and processing the coconut. Typically, a family farm venture may involve up to 45–50 people if members of the extended family are included through their involvement in harvesting nuts. However, numbers fluctuate according to production needs or to family members' need for income.

Women's Economic Empowerment

Participation in this project is also injecting new skills into the community through the training needed both to manufacture the virgin oil and to manage the financial and budgeting aspects of each operation. Each village or family involved needs to manage the income, and the capital and operating costs of the operation. As can be seen in Table 4, women are playing an especially important role in this aspect of the project, with many of the ventures managed by women.

Through the project, many women have become responsible for bringing income earning opportunities to their families. As a result, they have achieved changes in their status in the family which would not have happened to such an extent in the past. Husbands, for example, may now seek advice from their partners and discuss more decisions with them, while other members of the extended family also seek advice on issues they would normally have discussed only with the father of the family.

This has been especially true of women who were not born in the village

but are there because of marriage. Women manage all but three of the coconut oil production sites, and through these women the whole family has been empowered. In all its projects, WIBDI seeks to focus on benefiting the whole family, not only the women.

However, while women in rural areas are becoming increasingly acknowledged as sole income generators within the family unit in the villages, this change has not



Women drying coconut.

PICTURE: JOHN CRETNEY

automatically meant that they have gained an improvement in social status within the family or village community. Although women usually manage the finances within the family and their advice on some issues may be sought more often than in the past, their control of money distribution is limited as the male head of the family has the ultimate say as to how money is spent. However, this does not seem to have affected the way women feel about their traditional status.

Table 4: Virgin Oil-producing Villages from Inception

Village	No. of Youth Working	No. of Women Working	Year Installed	Year Ended	Status of Operation	No. of People Benefiting
Siumu	2	3	1996		Still in operation	20
Fasitootai		3	1996	1998	Equipment returned	12
Fagaloa	3	4	1996	1998	Equipment returned	15
Tuanai	1	2	1998	1998		8
Lefaga	4	2	1999	1999		12
Saoluafata	6	2	1998		Operating	47
Saleimoa	2	2	2000		Operating	50+
Foailalo	4	3	1996		Operating	16
Puapua	4	4	1997	1998		32
Tafuatai	3	2	1998	2001	Transferred to youth group	9
Lano	4	5	1998		On hold	36
Patamea A	4	3	1998	1998		
Patamea B	2	1	2000		Operating	50+
Taga	4	2	2001		Operating	18
Malua	6		2002		Operating	<100

It appears that Samoan women still mostly feel comfortable about their traditional status and their access to the decision-making processes in the village. Within the existing traditional system, as daughters and sisters, they can have access to the village council. As wives they have access to the village council through their husbands. As mothers they have access to their sons and daughters who make up the *nuu o alii* and *nuu o tamaitai*.

Nonetheless, the women involved in the coconut oil project and other WIBDI programmes have been empowered by the opportunity to be involved in an income-generating activity where they do not have to leave their villages. Their families have been collectively empowered by the opening up of alternative avenues for income generation and self reliance in the village itself. This has eased the pressure of total reliance on remittances for some families in the village and provided some welcome respite for the remitting family members to concentrate on their own livelihoods where they live.

Micro-finance and savings scheme

In addition, women on the project are empowered individually through their new ability, and the opportunity that WIBDI provides them with, to save money and to take out a loan, either collectively or individually. All project participants are required to commit to a micro-finance scheme by saving at least ST\$5 (US\$2) each time they are paid. The families have a savings account which is given the name that they give to their project operations.

Each family has access to this account for their family needs and for the maintenance of the DME equipment and drier. At least two families on the coconut oil project save up to ST\$200 (US\$80) at times through the scheme. Some women prefer to have a second savings account in their individual name for cash they earn themselves. This gives them a source of cash that they can spend without discussion with their husbands.

The micro-finance scheme enables women and their families to make savings and eventually to become eligible for a loan of up to 60 per cent of their savings. Analysis of loan applications shows that the three most common reasons to apply for a small loan are to pay for school fees, electricity bills and materials for cottage industries, such as pandanus leaves for weaving. Samoan women take it upon themselves to ensure that children are educated, clothed and stay healthy.

Women are considered by society to be responsible for the family's health and well-being. The self-esteem of our project women, and indeed of whole families, has improved greatly with the opportunity to earn cash in the villages. With the family now able to make cash donations themselves, rather than having to rely on other relatives, the social status of the family in the village has been elevated.

Village men involved in the coconut oil project are happy with the improved situation in their families and, although they are still 'in charge', they appreciate what the women have brought into the families through their extra efforts in our programmes. They show this through their cooperation with WIBDI field staff who visit. The husbands have been part of the training

programme from the outset. They have gone through the processes of planning and budgeting and know how important it is that their partners are part of the decision-making process. They are also mindful that the projects were begun because of their partners and they give them credit for this by always conferring with them about spending the money.

Box 3: Examples of Change

Large amounts of cash are only used when there is a big family commitment, which the women understand as being made for cultural reasons and therefore must involve the whole family. For example, when the husband in one family was made mayor of his village, the family took out a loan of ST\$2,000 (US\$800) to pay for the presentations of fine mats and food to the village. Such presentations are accepted practice and without the coconut oil project, the family would have needed to ask their children living in Australia to provide this sum. It was a source of pride to them that the village knew that they could afford it, and that they were able to repay the total amount two weeks later when oil was sold. Income from the project has enabled the father of the family to care for his family financially and to make regular contributions to the village and the church.

Another family is a good example of the technology benefiting a whole extended family. Forty-seven people depend on the project for their livelihoods. This number includes two nuclear families living near the plantation who receive payment for nuts gathered; family members who help with production; and school children whose school fees are covered by money generated by the project. Furthermore, the family's church donations are made with proceeds from the project.

A family member sums up: 'The project has enabled members of our family who didn't have jobs to make meaningful contributions to the family, and not just sit back waiting for those working overseas to send money. Also, we save money, by using the oil for cooking our food, and the coconut meal is used for feeding our pigs.' She feels that her self-esteem has improved. However, there are some negative aspects. Some villagers think that they are now wealthy and are always asking for oil without offering payment. Nevertheless, her husband, who the head of their extended family, is very happy about being able to provide for his family financially.

National level

At a national level, the project has facilitated the development of new skills by WIBDI. The project has led to a skill base within the organization related to the management and monitoring of projects, about how to meet certification requirements and about how to develop and administer budgets. These skills are transferable both to other projects managed by WIBDI and to other organizations seeking to manage community-based projects.

5 Lessons Learned

Main findings

The virgin coconut oil project illustrates many of the issues faced by a developing country in identifying projects which can lead to a sustainable and marketable product through which people at different levels in the community can benefit. The key issues faced in developing this organic product based on a local resource are set out below.

Identifying suitable products

A first step is to obtain up-to-date market information about organic product demand and prices and target importing countries through trade organizations or government agencies. Possible organic products suited to local climatic conditions then need to be identified with the assistance of grower or farm advisory organizations.

Identified products then need to be assessed for sustainable sales and profitability based on factors such as:

- a combination of high value and low volume to offset distribution costs;
- a 'point of difference' compared with other competing countries;
- non- or low perishability;
- products based on crops which have high pest and disease resistance;
- ability to provide a sustained and reliable supply to export markets;
- availability of local markets to support exports;
- costings which demonstrate that production is profitable in the long term.

Advice on farming practices or growing techniques needs to be available through either grower associations or government advisory services, and product certification needs to be readily achieved and sustained for export purposes.

The production of virgin oil meets many of these criteria for a suitable

Pacific-based organic product. It is based on a plentiful Pacific resource, the production process is cost effective and can be operated at a local level, the product has low perishability, low volume and potentially high value, and import regulations are not difficult to meet.

Training families to participate in the project

A factor in the success of the project is that each venture is family, rather than village, based. Earlier attempts to base projects at village level were not successful because it was more difficult to engender project responsibility with a wider group. At family level, it is possible to identify particular families with the aptitude and motivation to make the venture a success and to take responsibility for the financial planning and implications of being involved.

A key element has been the training provided through WIBDI to family members which has included budget and financial advice and training in administration and record-keeping, as well as in the skills required for oil production itself. These skills have particularly benefited women. One aspect which has proved to be an ongoing challenge has been the need to train farmers to meet ongoing certification requirements (especially record-keeping and quality control of the pressed oil) and the need for more effective marketing.

Achieving organic certification

Obtaining organic certification for virgin coconut oil as an organic product has assisted in overcoming buyers' comparison of it with copra oil; this was a key factor in the improved marketing which led to increased demand for the oil in 2001.

An intensive training and monitoring programme is required and mapping of farms takes up a considerable amount of time and energy. The annual costs of maintaining certification are also significant. These demands have imposed a heavy commitment on WIBDI, so that in 2001 it established the Samoa Organic Farmers Association to take over this role with the help of UN volunteers. The certification process is an intensive process that requires significant resourcing both initially and on an ongoing basis.

Marketing and exporting organic products

The export of organic products from the Pacific faces a number of barriers. These include identification of sustainable markets, handling and storage of export products, meeting quarantine and biosecurity requirements, transport costs, the lack of an organization devoted to product research or coordination and a lack of certified suppliers. Progress in Samoa includes the establishment of an organic farming association and an initiative by the Ministry

of Agriculture and Fisheries to stimulate research on organic products and develop a strategic plan for organic production.

In the case of virgin coconut oil, a number of these barriers do not apply. Certified virgin coconut oil is a processed niche product with a relatively high cost-to-volume ratio, so that transport costs are manageable and quarantine issues are not significant.

However, distribution and marketing of the virgin oil has faced a number of problems.

Marketing the oil has been a very difficult process. Potential buyers tended to compare the product with copra oil and were concerned about the price sought despite the proven high quality of the oil (less than 0.1 per cent free fatty acids). The Pure Coconut Oil Company was then set up to manage the market aspects of the project and was able to negotiate arrangements with a major purchaser.

However, intermittent demand by this single purchaser for the product led to production back-up with both WIBDI and the producers experiencing cash flow problems and inability to meet costs incurred. Obtaining multiple outlets for the product to avoid this dependency is important.

Achieving fair returns for stakeholders

The families involved, when producing regularly, enjoy a better standard of living, as demonstrated by their ability to improve their material standard of living and to meet outside community and church commitments without resort to income from sources such as remittances. With the new partners in the PCOC, and vigorous marketing, production will step up and returns to the producers will be even better.

The PCOC is in the process of signing contracts with producers which are in line with fair trade practices. WIBDI is keen to see the final price of the product exported better reflected in the price to the producer. The long-standing problem with the traditional crop copra has been that the producer receives the least benefit while the greatest benefits have accrued to those milling the oil.

The Future

The Virgin Coconut Oil Project operating in Samoa has been successful primarily through its evolution as a grassroots-based operation based around the skills and commitment of women in Samoa.

It is an example of a programme in which a grassroots organization (WIBDI) has assisted families, and especially women, by coordinating their use of improved and appropriate technologies to produce a valuable product

without resort to large enterprises which absorb profits, and which has also facilitated access to international markets. This model has been described elsewhere as a successful model.¹⁶

There is huge potential for the expansion of virgin coconut oil production in Samoa. Currently there is capacity to export just three tons of oil a month from the five farms in active production. A further five farms could be brought into production, in which case a total of ten family farms in active production could see output lifted to as much as six to ten tons a month. Emerging technology could see sites producing up to one ton of oil a week. There are vast areas of coconuts across the two larger islands of Samoa which have not been utilized for many years. Many more people in Samoa could be employed, not only in the production of virgin coconut oil, but also in the production of value-added products.

While the overall number of trees does not match that in larger countries such the Philippines, on a per capita basis Samoa has the second largest number of coconut trees in the world. Samoan coconuts are also larger than the coconuts of many other countries such as Fiji. For example, in Fiji it would take between 12 and 15 coconuts to produce one litre of virgin coconut oil, whereas in Samoa the number is between 8 and 12.

Refined coconut oil extracted from copra on an industrial scale has been plagued by exposure to price fluctuation and dependence on larger-scale operators able to undertake the processing involved. Such processing in Samoa has been especially prone to problems of stop-go mill operations, low prices and delayed payments to growers. As a result, many growers have ceased making copra and sell unprocessed coconuts instead.

Because virgin coconut oil is a newly emerging product, there are few statistics available on country or world output. However, compared with coconut oil extracted from copra, world output of virgin coconut oil is low and the product is in demand because of its health properties and its suitability for human consumption

Virgin coconut oil production provides a great way for Pacific Island countries to revive their coconut industries if they can work together to supply markets. While larger countries such as the Philippines, India and Sri Lanka can produce huge amounts of commodity refined coconut oil compared with smaller Pacific Island countries, the technology used for virgin coconut oil production relies on the production of small quantities at a time. This means that larger countries have less of an advantage.

The Pacific could also use marketing techniques focused on their clean green image, especially if they also made a commitment to organic certification. This market could be most effectively exploited by Pacific countries sharing information and markets.

An emerging potential market for virgin coconut oil is use as a substitute for diesel fuel. Companies are looking very seriously into this prospect, especially in Vanuatu and American Samoa.

This project has also assisted in strengthening organizational capacity at a national level. As WIBDI has evolved as an organization, it has built up its skill base through extensive networking with external agencies which have provided support at key stages to build capacity and to provide the capital required for project development. Government support has been a critical factor in this development.

The key challenges facing the project lie mainly in the ability of those managing the project to find and sustain multiple overseas outlets for virgin oil which will encourage increased production, and to ensure that income from the project meets the expectations of stakeholders and especially those operating at family and village level.

The project demonstrates the economic benefits which NGOs can bring to women and men in developing countries through working alongside their communities, governments and overseas agencies to supply a product sought in global markets. With government support, potential exists to develop products such as virgin coconut oil as a source of much-needed foreign exchange.

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Currency ST\$1 = US\$0.40

Density of virgin coconut used for price conversion = 0.925kg per litre

