

# Information and Training Needs Assessment for Improving the Quality of Agricultural Exports and Processing

## Executive Summary

An information and training needs assessment for improving the quality of agriculture exports and processing was conducted in response to two recommendations of the 13<sup>th</sup> Regional Conference of the Permanent Heads of Agriculture and Livestock Production Services (PHALPS) in Guam, 27 April -1 May 1998. The SPC Agriculture Adviser secured funding from Taiwan to assist with the costs of conducting the assessment. Eleven SPC member countries were visited to conduct the survey with fifty-one Ministry of Agriculture staff interviewed and thirty-six private sector people contacted. A further six SPC member countries provided feedback during visits to Fiji or via fax, email, and telephone which involved 19 Ministry of Agriculture staff and 10 private sector people.

- There are assessment results from seventeen of SPC member countries and territories.
- Only seven of the seventeen PICTS have significant exports of fruits and vegetables but fourteen PICTs are interested in improving the quality of agricultural products for the local market. This implies that attention should be given to quality improvement for the export market and the local market.
- Coconut exports are significant from eleven of the seventeen PICT but coconuts are important for the local market in all the PICTs.
- Commercial processing of agriculture products is currently undertaken in only eight of the seventeen PICTs but nearly every PICT is interested in developing processing for the local market, tourist market, and export.

**Current Agricultural exports:** A wide variety of fruits and vegetables as well as kava, root crops and coconuts are being exported. Fruits and vegetables rank high for quality improvement along with kava and a variety of other products. Information and training on organic production systems and improved market information were priority needs.

**Potential Agricultural exports:** There is great interest in expanding the export of fruits and vegetables. Appropriate production systems including organic methods, postharvest handling and marketing are needed for a variety of crops such as mangos, citrus, bananas, pineapples, watermelon, tomatoes, breadfruit, flowers, herbs, and spices.

**Current processed agriculture products :** There is currently some processing taking place in the region for the local market including coconuts, juice and chips. The greatest needs were expressed in processing technologies and marketing.

**Potential processed agriculture products :** The greatest single area of interest is in the processing of coconuts, root crops and fruit and vegetables. Similarly marketing information and assistance was ranked very high.

There is a wide range of information and training needs to improve the quality of agricultural products for the local market and export that are identified in the assessment. Actions to address the needs are currently underway by SPC and other regional and international partner organizations with new activities in the planning stages.

## Table of Contents

Executive Summary	1
Table of Contents	2
Introduction	3
Design and Planning of the Needs Assessment	4
Conducting the Needs Assessment	5
Information Collection	6
Overall Profile	6
Current Agricultural Exports	8
Potential Agricultural Exports	9
Currently Processed Agricultural Products	10
Potential Agricultural Processed Products	11
Information and Training Needs	12
Actions by SPC in Collaboration with Partners	14
Actions by Other Regional and International Organizations	15
New Initiatives Needed	16
Conclusions	17
Annexes	
Annex 1 Country Profiles	18
Annex 2 Information Summary by Country and Agricultural Product	30
Annex 3 Needs Assessment Forms	35
Annex 4 Visit Summary	39
Bibliography	40

## **Introduction:**

Agriculture is a significant part of the economies of the PICTs and an important sector for earning foreign exchange, employment, and food security. Export markets are important for the growth of agricultural economies of the PICTs. Historically, agricultural exports such as copra have played a significant role in the development of the region. However as small holder agriculture moves to a more commercial orientation basic changes are needed to improve the quality of agriculture products for the local market and export. The quality of agriculture products such as traditional root crops, fruits and vegetables is often very low in the PICTs. Low-quality products bring lower returns to farmers, deteriorate rapidly after harvest and make it difficult to compete on international markets. Trade liberalisation and the WTO means there will be export opportunities with developed markets and between the PICTs. To take advantage of these opportunities agriculture products will have to be of a high quality. Competition for export markets makes these markets very difficult to penetrate.

Nevertheless there have been successes in the region with papaya, squash, vanilla, ginger etc. The region needs to take active steps to improve the quality of agriculture products for export if agriculture exports are going to make a significant contribution to the economies of the PICTS. The recommendation number 14 of the 13th Conference of PHALPS in Guam April 1998 stated:

“That the SPC work with other regional organisations to carry out a training and information needs assessment for agricultural export commodities to determine regional and national requirements and to develop appropriate activities in response to those needs.”

Agricultural processing is important to the Pacific for extending the shelf life of food for household food security and disaster mitigation, local markets, tourist markets and export. In fact there is a long history of traditional agricultural processing in the Pacific. Processing offers opportunities to utilize agriculture commodities that do not meet quality specification for export as fresh commodities. Processing for the local market has the potential to replace costly imported foods. Seasonal surplus of fruits, vegetables and root crops could be processed rather than left to rot or sale for very low prices. Processing can help overcome quarantine barriers to trade and utilize less costly sea freight rather than airfreight for exports. Pacific Islanders living overseas are one important market for processed products from the PICTs. Developing “world class” products means the right processing and marketing for wider export markets that captures the imagination of consumers. The recommendation number 4 of the 13<sup>th</sup> Conference PHALPS in Guam April 1998 “That SPC in collaboration with other regional agencies undertake research, development, training, and market development to add value to agriculture products through processing.”

In order to respond to these 2 recommendations an information and training needs assessment was conducted that includes both improving the quality of agriculture exports and processing. It must be emphasized that this assessment is only for training and information and does not include other support at the national level to facilitate quality improvement and export. A major commitment is needed at the national level to put the infrastructure for exports in place including roads, cold storage, credit facilities, agriculture supplies, overcoming land issues, quarantine treatment facilities, and pilot processing facilities.

## Design and Planning of the Needs Assessment

Discussions were held initially within the agriculture programme of SPC including Crop Improvement Service, Plant Protection Service, and Resource Economics on the scope and strategy of the assessment. The primary focus of the needs assessment was on information and training. The approach was to have discussions with the farmers, exporters, processors, and Ministry of Agriculture staff on the needs related to improving the quality of agriculture exports and processing. The SPC Agriculture Adviser worked with the Plant protection staff to develop a needs assessment form that was used in the exercise. Edgar Cocker of the Forum Secretariat and Richard Beyer of USP were also consulted. (Annex #3) The needs assessment forms have been useful as a way to record information as well as to help the informant conceptualize and provide information.

A funding proposal was submitted to Taiwan and approved which helped to pay the expenses of conducting the needs assessment. The funding proposal included a consultant to conduct the survey. In order to have a broader coverage it was decided the Agriculture Adviser would instead visit the countries to conduct the needs assessment. The advantage of this approach was that the contacts and feedback were directly to SPC rather than through a consultant. In addition the Agriculture Adviser could conduct the needs assessment during country visits for other purposes which would mean that costs could be shared. This approach better prepares SPC for developing future activities in this area.

### Methodology

Information was collected on a country by country basis using the forms developed for the assessment (Annex #3). Wherever possible interviews with the public and private sector were conducted and in many cases the forms were filled out and used as a discussion guide.

**Assessment forms:** The information was divided into 4 categories to elicit a picture of what is currently happening in the PICTs as well as what is seen as important for the future:

- **Current agricultural exports:** This category consists of fresh and minimally processed agriculture products for export. Within this category are production, postharvest and marketing sections. In this category one can expect fine-tuning of existing systems.
- **Potential agricultural exports:** Fresh and minimally processed agricultural products that are not currently exported but in which there is an interest to export in the future. Within this category are production, postharvest and marketing sections. In general much more work is needed to understand the market and to develop quality production and post harvest systems.
- **Currently processed agricultural products:** Agriculture products that are currently being processed for the local market and or export. Within this category are production, postharvest, marketing and processing sections.
- **Potential processed agricultural products:** Agriculture products that are not currently processed in the country. Within this category are production, postharvest, marketing, and processing sections.

**The country profiles:** This is a summary of the information gathered from each country (Annex #1). An overview and comments on the 4 categories are provided.

**Information tables:** These tables have been compiled as a reference tool and to facilitate quick comparison between countries (Annex #2). There is a table for each of the 4 categories with a listing of the priority crops for each country.

**Ranking tables:** These tables that list the commodities most frequently mentioned by the PICTs.

By using the information in the completed assessment forms, country profiles and the ranking tables, the information and training need associated with the ranked agriculture products were determined. Actions to meet the perceived needs for information and training were then formulated. Current activities underway, planned activities, and new initiatives by SPC and other organizations to meeting the needs are listed. The gaps in these activities are identified and activities are proposed to fill the gaps.

### **Conducting the Needs Assessment**

In February 1999 the Agriculture Adviser started conducting the needs assessment during country visits to Samoa and American Samoa. Ministry of Agriculture staff were interviewed as well as members of the private sector. Farmer interviews were conducted in Savaii that drew attention to the element of risk when new export crops are promoted to small farmers. There is the advantage of lower risk in developing products and markets for crops that farmers know like root crops and coconuts. Initial discussions were held in Vanuatu in February 1999. This trip was followed by a visit to Pohnpei FSM, Guam, Palau, and New Caledonia. Interesting marketing studies have been conducted in the Federated States of Micronesia by Richard Bolt outlined the challenges of developing agricultural exports. Numerous discussions were conducted in Fiji with the public and private sector and other regional organizations were held from May to July. Visits by Ministry of Agriculture staff of some countries to Fiji and meeting country representatives at other meeting offered an opportunity to gather information. Wallis and Futuna and French Polynesia were visited in late 1999.

In March 2000, during a trip to Thailand for an Asia Pacific Seed Association executive committee meeting, a visit was made to a rural region where there are many village level processing activities. Thailand has made a major commitment to helping rural families increase their incomes. The participatory process and long term commitment to working with groups, and strong local leadership along with the appropriate technologies are the keys to success. I saw village level processing of mango leather, solar dried bananas, banana chips mulberry leaves for tea, and taro chips all for the local market. Some of the groups were 10 years old and still receiving technical assistance and guidance from the university. What I saw reinforces my belief that production for the local market is a good first step for most processing activities.

In April 2000, a visit to Papua New Guinea offered the opportunity for discussions with a variety of informants. The information collected thus far in the needs assessment was developing into a pattern that probably would not be altered by more country visits and there was not sufficient time available for more country visit. The remaining PICTs not covered so far were contacted by fax, email, and phone. Attending a meeting in Vanuatu in January 2001 offered a final opportunity for finalizing the assessment there.

In all 17 PICTs participated in the assessment. 11 SPC member countries were visited. 70 Ministry of Agriculture staff were interviewed and 46 members of the

private sector. The cost of conducting the assessment was modest since many of the countries visits were covered from other funding sources. The assessment had good coverage with 17 PICTs included and over 110 people interviewed.

## Information collection

### Overall Profile

The interview findings were compiled in Country Profiles (Annex #1) that provides a country overview as well as a written summary of the information collected. The information in the country profiles was then used to develop a series of tables to better analyze the findings (Annex #2) From the tables in Annex #2 the following tables were developed to summarize and rank the assessment results.

### Information and Training Needs Assessment for Improving the Quality of Agricultural Exports and Processing

#### Overview of information collected

Country	Current Exports of Fruits and Veg	Coconut Exports	Improve Quality for local market	Commercial processing		Interest in Ag. Exports
				Current	Future	
American Samoa			+		+	+
Cook Is	+				+	+
FSM	+	+	+		+	+
Fiji	+	+	+	+	+	+
French Polynesia	+	+		+	+	+
Guam			+		+	+
Kiribati		+	+		+	+
Marshall Is		+	+	+	+	+
New Caledonia	+		+	+	+	+
Palau			+		+	+
PNG		+	+	+	+	+
Samoa	+	+	+	+	+	+
Solomon Islands		+	+		+	+
Tonga	+	+		+	+	+
Tuvalu		+	+		+	+
Vanuatu		+	+	+	+	+
Wallis & Futuna			+		+	+
<b>Total</b>	<b>7</b>	<b>11</b>	<b>14</b>	<b>8</b>	<b>17</b>	<b>17</b>

The table provides a revealing overview of the region regarding agriculture exports and processing.

- Only 7 of the PICTs have a significant level of agricultural exports of fruits and vegetables. The public and private sectors in these countries have worked hard to identify markets, overcome the quarantine restrictions, develop appropriate quality assurance systems, invested and received assistance to build and manage High Temperature Forced Air Treatment (HTFA) facilities. Other factors such as local infrastructure of adequate transport systems, refrigeration, and air links are also important to successful exporting.
- A much greater proportion of the PICTS (17) is interested in improving the quality of fruits and vegetables for the local market and this figure includes most current exporters. Many of the PICTS are more interested in decreasing food imports and increasing local food production to increase food security and improve diets. At the same time many PICTS lack the infrastructure for exporting including cold stores and air links with markets. Training modules and publication used for production, plant protection, harvesting and postharvest for improving the quality of agriculture for exports can be applied to production for the local market.
- All of the PICTs interviewed want to develop the export of agriculture products. Most PICTs want to improve the quality of agriculture products for the local market and they perceive that there are opportunities for the export of processed and unprocessed agriculture products. Successful agricultural exports are dependent on having market information so the public and private sector can identify niche markets and develop branded products that will capture the attention of export markets. There is a dual problem of quality production on one hand but also market information to identify where they can link with promising marketing opportunities on the other hand. These potential opportunities must be examined in relationship to many factors such as local investment, scale of production, transportation to markets and competition for these markets.
- 11 PICTs are copra producers and exporters and this reminds us that coconuts remain an important part of the agricultural economy of the region. Coconuts are important as a cash crop, food security, many products and by products and the environmental benefits. Besides many of the traditional uses of coconuts there is scope for processing for the local market, tourist market and export. Many PICTS are interested in exploring new ways for Pacific Island families to earn more income from coconuts.

## Current Agricultural exports

There is a relatively modest demand for assistance with current agriculture exports. In most PICTS, exports of these products has been underway for sometime and quality systems are well established. Squash from Tonga and papaya from the Cook Islands and Fiji are good examples of successful agricultural exports. However for newer agricultural exports such as kava, noni, and Tahitian vanilla assistance is needed. An interesting feature is the desire to develop organic approaches to the production of existing exports in order to enter this niche market. The flower exports from French Polynesia demonstrate how identifying the market with facilitating the development of a quality product can lead to success to the point that the demand exceeds the supply for the local and export market.

### Ranking of Information and Training Needs for Current Agriculture Exports

Ranking	Production	Postharvest	Marketing
1	fruit and veg(5)	fruit and veg(4)	fruit and veg(4)
2	organic systems(3)	cacao(2)	kava (3)
3	kava (3)	kava(1)	noni(1)
4	cacao(1)	coconut (1)	root crops(1)
5	banana(1)	papaya (1)	papaya(1)
6	Tahitian vanilla(1)		copra(1)
7	root crops(1)		vanilla(1)

( ) Indicates the number of PICTS requesting assistance

- **Production:** Information and training is needed to fine-tune production systems of fruits, vegetables, and kava. There is limited interest for cacao, banana, Tahitian vanilla and rootcrops. The fruits include banana, oranges, lime, lychee, papaya, pineapple, mango, watermelon, The vegetables mentioned include capsicum, chillie, cucumber, French bean, eggplant, squash and zucchini. Information, training, and assistance for certification on organic productions systems had a high ranking.
- **Postharvest Handling:** Fruits and vegetables rank high with kava, cacao and coconuts also mentioned. It was mentioned that information on optimum storage conditions is lacking and this is a critical factor in maintaining the quality of exports.
- **Marketing:** Better packaging, promotion, and market information are needed for fruits, vegetables, and kava and to a limited extent with noni and root crops. There is a general feeling that marketing information that can put farmers and exporter in touch with potential markets and buyers is lacking.

## Potential Agricultural Exports

A wider range of products is mentioned in the potential agriculture exports with many more PICTs requesting assistance. Though fruit and vegetables still rank high many PICTs recognize the potential for unique products for the export market. Besides fruits and vegetables, flowers, honey and indigenous nuts are mentioned. A particularly important aspect of developing potential products is market information on prices, seasonal price differences, quality standards, quarantine regulations, cost of transport, importers etc. This information is important to help interested exporters determine if developing production will be feasible. For example, New Caledonia and French Polynesia have the capability for high quality production for export but they must carefully target their markets so that they can be competitive with lower cost producers. Potential exports also include opportunities for exports between PICTs and this will be more feasible as the free trade zone is developed.

### Ranking of Information and Training Needs for Potential Agricultural Exports

Ranking	Production	Postharvest	Marketing
1	fruits and veg(6)	fruits and veg(7)	fruits and veg(9)
2	organic systems(3)	indigenous nuts(2)	green coconuts(3)
3	flowers(2)	honey(2)	noni(3)
4	noni(1)	flowers(2)	indigenous nuts(3)
5	honey(1)	breadfruit(1)	flowers(2)
6	breadfruit(1)	green coconut (1)	kava(2)
7	kava(1)	spices(1)	spices(1)
8	spices(1)	noni(1)	breadfruit(1)
9	aloe vera(1)	kava(1)	organic honey(1)
10			betelnut(1)

( ) Indicates the number of PICTs requesting assistance

- Production:** Information and training on production systems for a wide range of fruits and vegetables was the highest priority. Specifically the fruits mentioned were avocado, banana (both cooking and dessert), limes, papaya, mango, banana, orange, pineapple, lime, soursop, watermelon. Vegetables mentioned include eggplant, tomatoes. These are many of the currently exported fruits and vegetables. Assistance on organic production systems had a high ranking. Tropical flowers including the antherium, heliconia, plumeria, orchid emerge as an interesting potential export. Many people believe that flowers have a strong potential because they are easy to grow, have few pest and disease problems, are relatively long lasting, and their uniqueness have great appeal in the developed markets. Noni, honey, breadfruit, kava, spices, and aloe vera were also mentioned. One of the important issues to overcome for many of the potential exports is the fruit fly in production, disinfestation or determining non-host status. In some cases fruit fly may be the determining factor in the potential export of a fruit or vegetable.
- Postharvest Handling:** There is a similar priority for production and post harvest. Fruits and vegetables rank high with some interest in nuts, honey, flowers, breadfruit, coconuts, spices, and noni. The indigenous nuts area has the most

potential in PNG, Solomon Islands, and Vanuatu. Because the nuts come from forests, production is not a major issue but postharvest handling is critical.

- **Marketing:** The greatest area of interest for potential exports was marketing. Producers and exporters can't determine the feasibility of producing agriculture exports without information about the market. A country can't determine the feasibility of investing in a high temperature force air (HTFA) treatment facility without knowing the prices and seasons for potential exports. Better packaging, promotion, and market information are needed for fruits and vegetable, green coconut, noni, flowers, kava and nuts.

### Currently Processed Agricultural Products

There is currently a limited level of processing of agriculture products in the Pacific. However for some of the traditional processed products such as coconut, root crops, masi, and kava there is some interest in improved processing and marketing. Coconuts are ranked very high with the urgent need to make it a more profitable crop for farmers by producing other products from the copra and the processing of coconut byproducts. Should handicraft be considered a processed agriculture product? There is a strong rationale for looking at the potential for handicrafts from coconuts, tapa and other materials because of their potential for income generation by rural families.

### Ranking of Information and Training Needs for Currently Processed Agricultural Products

Ranking	Production	Postharvest	Marketing	Processing
1	indigenous nuts(1)	indigenous nuts(1)	coconuts(6)	coconuts(6)
2			indigenous nuts(2)	root crops(2)
3			kava(1)	fruits and veg(2)
4			tapa(1)	Indigenous nuts(1)
5			root crops(1)	chocolate(1)
6			chocolate(1)	bananas(1)
7			bananas(1)	tapa(1)

( ) Indicates the number of PICTS requesting assistance

**Production & Postharvest:** There is minimal interest in the production and postharvest aspects of processed crops because these are well established crops or production issues have been mentioned under previous section. There is some recognition that planting of indigenous nuts may be a profitable crop in the future and more will have to be known about effective production and postharvest systems.

**Marketing:** Marketing figures prominently for coconuts, nuts and to a lesser extent kava, tapa, root crops, and chocolate. There is a high level of interest again for market information as well as packaging etc. Exports must be world class products able to compete with products from the developed countries. This is a huge challenge for the PICTS. Even for processed products to succeed on the local

market they must be able to compete with high quality imports. As one processor in the Pacific said “our aim is to produce a world class product for the local market.”

**Processing:** Processing is a priority for coconuts and to a lesser extent fruits, vegetables, nuts, and chocolate. Processing and marketing are interlinked because the market determines what kind of processing is acceptable. Market prices and competition determine what processed products are acceptable. Nevertheless innovative processing is needed in the Pacific for household use and commercial use. Many commercial processors want to target local markets while others are interested in export markets. Processing technologies need to be appropriate for a broad range of uses.

### Potential Agricultural Processed Products

The assessment reveals that PICTs which are not processing agriculture products are very interested in processing in the future for a variety of reasons: import substitution for the local market, to supply the local tourist market, to supply overseas Pacific Islanders and eventually the wider export market. In particular, the importance of root crops processing is noted. Root crops are widely grown and they are a relatively low risk crop for the local market and export compared to more high risk and perishable fruits and vegetables. Also of high importance are fruits, vegetables, and coconuts. The emphasis is on the processing technology and marketing rather than production or post harvest components.

### Ranking of Information and Training Needs for Potential Processed Products

Ranking	Production	Postharvest	Marketing	Processing
1	kava(1)	noni(1)	root crops(8)	root crops(10)
2	noni(1)		fruits and veg(8)	coconut(9)
3	fruits and veg(1)		coconut(8)	fruits and veg(9)
4			kava(4)	kava(4)
5			noni(2)	breadfruit(3)
6			breadfruit(2)	noni(2)
7			aloe vera(1)	spices(2)
			spices(1)	chocolate(1)
			chocolate(1)	
			coffee(1)	

( ) Indicates the number of PICTS requesting assistance

**Production and Postharvest:** The greatest interest is not in the production or postharvest area. There is some interest for kava, noni and fruit and vegetables on production issues.

**Marketing:** There was a high level of interest for assistance with marketing. Since these would be new products for new markets a great deal of assistance would have to be provided to determine appropriate packaging and market information and marketing assistance would be needed. Root crops, fruits and vegetables and coconut are priorities. Marketing for kava has been a problem because of the lack of quality standards and open pricing system. The buyers make the exporters compete for the orders in order to drive down the price. Market information for noni is inadequate for this niche market. Breadfruit mostly appeals to the overseas Pacific

Island market but perhaps through creative marketing it could gain wider acceptance. Marketing strategies for coffee, spices, chocolate and aloe vera were mentioned.

**Processing:** The priorities of the region in the future for processing are root crops, coconuts, fruits, and vegetables. In most of the PICTs the processed products would be for the local market, tourist market, and import substitution but there is also interest for exports. The processing of the traditional low risk crops of coconuts and root crops is a priority. Kava offers a special challenge because many pharmaceutical companies prefer to do their own processing. Innovative new kava-based products may be the right approach. Similarly for noni, new products need to be developed to widen the appeal in the market. If breadfruit had been included with the other starch crops then this area would have been the highest priority of the assessment. Limited interest in spices and chocolate complete the list.

### **Information and Training Needs**

The ranking and information provided in the previous section are useful for determining the priorities of the region. Based on that analysis, the information and training needs for improving the quality of agricultural exports and processing are provided as follows:

**Current Agriculture Exports:** In general the PICTs have succeeded in producing quality products for the export markets. The issue is fine-tuning production and post harvest handling to further improve product quality. There is also a desire to penetrate new markets including organic markets and an expressed need for better market information.

1. Quality assurance systems for a range of fruits and vegetables that are necessary to achieve the quality specifications of the market. The fruits include bananas, oranges, limes, lychee, papaya, pineapple, mangos, watermelon, The vegetables mentioned include capsicum, chilies, cucumbers, French beans, eggplant, squash and zucchini. Kava, noni, bananas, Tahitian vanilla and rootcrops were mentioned but not a priority for the region.
2. Quarantine requirements for trade between PICTs need to be examined so export opportunities can be increased.
3. Development of training modules for the various export crops for production and postharvest handling, storage for use at the national level through Ministries of Agriculture, farmer groups, marketing or producer association or the private sector. These modules could also be used for promotion of better quality production for the local market.
4. Determine the feasibility of organic production and marketing of a variety of crops. Exploring the most efficient means of organic certification in the Pacific would follow this.
5. Improved marketing of products and market information is needed. Training and technical assistance need to be available at a national level to develop the marketing skills of exporters. Packaging, labeling, branded products are all areas that need attention for current exports from the Pacific.

6. There is market information provided by national marketing services and the South Pacific Trade Commissions. However there is a very high priority for more information on a timely basis for a wider range of products and markets. Such information could be provided on websites and through other avenues.

**Potential Agricultural Exports:** Needs for these exports are similar to the current exports except a wider range of products need to be covered. Since many of these would be new exports it would be logical to start with information on the markets, prices, market windows, preferred varieties and quality specification. In this way potential growers could make decision based on their capability to meet the quality specification and at the same time with a profitability analysis including the cost to get products to potential markets.

1. Feasibility study on a wide range of agricultural exports from the PICTs including market information, quality standards, prices etc. Specifically the fruits mentioned were avocado, banana (both cooking and dessert), limes, papaya, mangos, bananas, orange, pineapple, limes, soursop, watermelon. Vegetables mentioned include eggplant, tomatoes. On a national level, profitability analysis needs to be determined because of differences in scale of production, labor, transportation and market access. There was mention of nuts, honey, flowers, breadfruit, green coconuts, spices, kava, and noni but these were not regional priorities.
2. Production guidelines for producing high quality products including preferred varieties, crop protection, crop management, organic production systems, business planning, harvesting and post harvest handling and quality specification. Training for farmers, exporters and agriculture extension agents. Some of these publications would be based on the materials developed for current agricultural exports.
3. Pest and disease survey, fruit fly host status of export crops, quarantine treatments, bilateral quarantine agreement, training and support for plant protection and quarantine services.
4. Marketing: Training modules with relevant publications is needed for exporters on packaging, promotion, branding products and how to effectively penetrate new markets. Pacific Island exporters need better access to market information in an appropriate form. Web based information could be very valuable for those with internet access.

**Currently Processed Agricultural Products:** Marketing and processing technology are the primary needs in this area. Coconuts were the regional priority in processed products though many other products were mentioned.

1. Research and product development is needed on village level processing and commercial processing of coconuts and coconut byproducts.
2. Market studies for coconut processing for the local market, tourist market and export. There is the potential for many ready-to-eat products from coconuts that include snack food, yogurt, ice cream etc. Particular attention should be given to food as well as handicrafts and how traditional products could be adapted to export markets.

**Potential Processed Products:** There is a high level of interest in processing of products for the local market, tourist market and export. Processing offers the possibility of reworking lower quality products that can not be exported or sold on the local market as fresh products. By processing, losses due to spoilage could be reduced. Seasonal gluts in production could be diverted to processing. High priorities include root crops, fruit and vegetables, coconuts, and kava. Breadfruit processing can be included with the root crops. Other potential products were mentioned but did not emerge as a priority in the region.

1. Research and product development is needed to examine the potential of village level processing and commercial processing of root crops & breadfruit, coconuts and fruits and vegetables. There is large scope for the local market for root crop based snack food, extended shelf life products that are vacuum packed, locally processed western foods such as frozen French fries, unique products from tropical crops such as cassava starch, papaya pectin, shelf stable traditional foods such as palusami, ivi nuts, ready to drink kava. Research and product development for the export market would initially focus on overseas Pacific Islanders and would include many of the products mentioned above.
2. Market studies for processed root crops, fruits and vegetables and coconuts for the local market, tourist market, import substitution, and export market studies need to be coupled with product development.
3. Feasibility studies on small-scale multipurpose processing facilities because most fruit and vegetable production is seasonal and in quantities that would not justify a dedicated processing facility for one crop. In addition processing of root crops and coconut products could be done at such a facility. The processed products could be for the local market or in some cases export.

### **Actions by SPC In Collaboration with National, Regional, and International Partners**

- Recommendations of the SPC/CIRAD Regional Tropical Fruit Meeting July 1998 supported training, information and marketing initiatives and also endorsed PHALPS Recommendations 4 and 14. Proposals submitted to fund action on recommendations were rejected.
- SPC supported regional and national kava initiatives, including workshops, as a means to promote national quality assurance systems, and thereby boost exports from the producing countries.
- SPC submitted proposal to EU to fund a regional study for establishment of kava extraction plant in the region but the proposal was rejected.
- Publication of *Pacific Kava: A Producers Guide* in April 2001
- ACIAR/CIRAD/IAC Postharvest meeting was hosted by SPC to develop regional project concepts for postharvest and marketing of tropical fruit to be proposed to PHALPS 14.
- SPC/USP Pacific Regional Indicative Programme proposal prepared for EU concerning a value-adding technology laboratory, pilot production facility and training for the region 9/98 but the proposal was rejected.
- Study on root/starch crops processing undertaken 10/2000
- Proposal submitted and accepted by Taiwan to compile and distribute Agriculture Processing Information

- NZODA funded Needs Assessment for Market Access and Quality Assurance for Apiculture Products through the AHA and Agriquality NZ.
- SPC with UNDP funding commissioned a market study for noni in 2000.
- SPC initiated a *Masi* (paper mulberry) study and industry conference in Fiji attended by women producers, buyers, NGOs and government representatives. The study and workshop was funded by UNDP and UNIFEM has commissioned a market study for *Masi* (tapa) and a tapa processing machine that will benefit other PICTs.

**Relevant activities of SPC Plant Protection Service:** Details of PPS activities are provided in other reports at PHALPS 14. There is a wide range of activities that facilitates improved quality of agriculture exports.

- Reducing pest status – PPS builds capacity in quarantine and plant protection services to manage pests, prevent incursions and reduce pest levels to minimise post harvest quality problems and costs of production and pesticide residues in exports and locally traded goods.
- Emergency response plans including surveillance, preparedness to eradicate and eradication of pests is well advanced for fruit flies, weeds and Giant African Snail and being developed regionally for all pests which reduces the prospects of outbreaks of pests affecting quality of fruit and vegetables.
- Harmonization of Quarantine laws and practices will facilitate regional trade.
- IPM systems for fruit and vegetables including a review of pesticide recommendations is in the planning stages will facilitate compliance with Codex residue standards
- Methyl bromide fumigation: PPS is assisting PICTs to comply with the Montreal protocol to sustain methyl bromide supplies in the short term to facilitate exports including fruits and vegetables, root crops, copra, timber products. The phasing out of this quarantine treatment could have a dramatic effect on agriculture exports from the PICTs. There is a study underway with FAO funding to examine socio-economic impact of MB withdrawal. Further developments will be based on outcomes of the survey
- Regional Post Harvest Working Group provided recommendations on regional needs in post harvest plant protection (Working paper 5.1, annex 06).
- A Postharvest quality survey of imported fresh commodities from the Pacific to New Zealand is being undertaken by SPC Plant Protection Service and SPTC NZ, with EU funding by a consultant from Tonga MAF under the supervision of HortResearch and SPTC.
- The SPC Fruit Fly Management (FFM), formerly RMFFP, is playing an important plant protection role both the production and post harvest area for the export of fresh fruit and vegetables.
- IPM for Fruit flies using bagging and bait sprays, early harvesting focussed at community level production is important for quality on local markets
- FFM is continuing its collaboration with exporters and importing countries such as New Zealand, Australia, and USA for the use of HTFA and Japan (vapor heat) for quarantine treatment for fruit flies.

### **Actions by Others Regional and International Organizations:**

There have been a number of activities in the region by other regional and international organizations related to the needs assessment for improving the quality of agriculture exports and processing.

- IRETA Regional Workshop on Quality Assurance in Agriculture 9-13/8/99.

- Forum Secretariat conducted a regional workshop on Post Harvest Handling of Fruits Vegetables and Root Crops in September 1998 in Vanuatu with recommended action.
- Forum Secretariat has conducted sub-regional food technology workshops in FSM in 1997, Cook Islands in 1999, Kiribati in 2000 and Vanuatu is scheduled for 2001
- FAO conducted a Regional Workshop on Improved Agriculture Marketing Development in the South Pacific in Apia, April 1999
- Hort Research and CIRAD are collaborating to conduct a regional survey, using Fiji, Samoa, Tonga and Vanuatu, of the technical constraints to horticultural trade to determine the scope for improving the quality and increasing the quantity of tropical fruit exports.
- FAO Sub-Regional Workshop on Small Farmer Participation in Export-oriented Production February 2001

### **New Initiatives Needed:**

There is a high level of activity by SPC and other organizations that addresses the identified needs. However there are certain gaps between the needs expressed and the current or planned activities. Additional attention needs to be provided to the following areas:

**Organic production and certification in the Pacific:** Determine the feasibility of organic production and marketing of a variety of crops. Exploring the most efficient means of organic certification in the Pacific.

**Marketing and Market information services:** The trade sector is the responsibility of the Forum Secretariat. Therefore it is necessary to work with the Forum Secretariat and other regional and international organizations to assess current market information services available in the region and determine how they can better serve the needs of Pacific Islander exporters. This area should receive some attention through the ACIAR/CIRAD Tropical fruit Postharvest initiatives. Explore marketing workshops and sources of assistance for Pacific Island exporters on packaging, promotion, branding products and how to effectively penetrate new markets.

**Niche exports:** There are several emerging exports that were identified including noni, flowers, indigenous nuts, Tahitian vanilla, aloe vera etc. There are other exports such as kava where the export market is unpredictable. These niche exports have high potential and should not be overlooked. A proactive approach is needed for assisting the public and private sector to help identify markets, establish quality standards, and explore processing where appropriate. An information-clearing house for such products may be something that would be useful.

**Product development:** Work with USP and national, regional, international organizations and the private sector to determine how to move forward with agriculture product development for the region. Particular attention needs to be given to root crops, breadfruit, coconuts, fruits and vegetables.

**Multipurpose processing facilities:** Seek funding to conduct a feasibility study for national facilities that could be used by the public and private sector. The quantities of products for processing would be small and processing may only be feasible at a facility that could serve many customers for processing a variety of crops. Such

facilities would play an important role in product development and processing for the local market and export.

## **Conclusions**

There is a wide range of information and training needs to improve the quality of agricultural products for the local market and export that are identified in the assessment. There was input from seventeen of the SPC member countries through discussions with the public and private sector. There are high hopes and expectation in the region in this area. The needs have been identified as well as the gaps that exist in current and planned activities.

SPC will continue to work closely with regional and international organizations to move forward in this area. At the same time, the PICTs will need to make a commitment to developing the other elements that are necessary for the improvement of quality of agricultural products for the local market and export as well as processing.

## **Suggested recommendations for consideration by PHALPS 14**

- 1. PHALPS 14 endorses the findings of the needs assessment for improving the quality of agriculture exports and processing, and**
- 2. That SPC collaborates with regional and international partners to respond to the identified needs and addresses gaps in current and planned activities to assist SPC member countries to improve the competitiveness of exports by improving their quality and adding to their value.**

## **Annex 1**

### **Information and Training Needs Assessment for Improving the Quality of Agriculture Exports and Processing**

#### **Country Profiles**

**Introduction:** From the information collected on each country an overview of each of the countries along with the findings related to the needs assessment are provided in this annex.

#### **AMERICAN SAMOA**

##### **Overview**

American Samoa produces taro, bananas, cassava and as well as fruits and vegetables for the local market. American Samoa is not currently an exporter of agriculture commodities except for orchids. American Samoa exports fish from its canning factory. American Samoa imports root crops from Samoa. There is a demand for increased production for the local market of root crops, bananas and vegetables. The school lunch program is a big market for local production.

##### **Identified Needs for Future Agriculture Exports:**

- There is great potential for cut flower exports of orchids and antheriums from the islands. It could be done on a small scale in screen houses. There is a huge market in Hawaii particularly during Oct-March and other places. There are varieties that are hardy, easy to grow and flowers that survive well during shipping. Climate in the islands is perfect for flower production i.e. high temperature and humidity.
- Training on the post harvest handling of plumeria flowers for the Hawaii market would be needed

##### **Identified Needs for Future Processing:**

- There is currently limited processing of banana and breadfruit chips for the local market that could be improved
- Information and training on production processing and marketing of kava and noni for export is needed.
- The processing of taro into flour for making bread and for people that are allergic to rice noodles. Taro flour is also suitable for fish food because it is a good binder and high in protein.
- Coffee also offers potential for the Pacific with American Samoa as the door to the US market based on what is happening in Hawaii.
- Chocolate candy produced in the islands with proper marketing is another area that should be explored.

#### **COOK ISLANDS**

##### **Overview**

The Cook Islands had the first High Temperature Forced Air (HTFA) treatment facility in the Pacific with which they export papaya to the Auckland market. From Rarotonga there are twice weekly direct flights to Auckland providing access to a market that they have been able to develop. They have continued to export papaya to the

Auckland market though occasional droughts have reduced exports. Attempts were made to export papayas via sea freight but that proved to be problematic.

#### **Identified Needs for Current Agriculture Exports**

- The production systems for papaya have been well established but improvement is needed in the postharvest handling, marketing and price information.

#### **Identified Needs for Currently Processed Products:**

- Noni (*Morinda citrifolia*) is processed for the export market and better information on markets and prices would be useful.

#### **Identified Needs for Future Processing:**

- Interest in developing cottage-type processing of products such as cassava, taro, papaya, banana, coconuts, in-season of mango, and breadfruit. In order to do this training and information is needed in processing technology, preservation technology, marketing, packaging, promotion, market identification, and price information.

## **FEDERATED STATES OF MICRONESIA**

### **Overview**

These islands are small, relatively isolated and characterized by small holder agriculture not oriented to production for export. The small scale agriculture exports from FSM states of Pohnpei, Yap, Chuk, and Kosrae consist of bananas, sakau (kava), betelnut & pepper leaves, coconuts, taro, vegetables (cucumbers, French beans and eggplant), and citrus (oranges, mandarins, and limes). The major market is Guam and to some extent the Marshall Islands and CNMI. Black pepper has also been produced and exported from Pohnpei but that has nearly ceased. Yap is the major producer and exporter of betelnut and pepper leaves to FSM and other islands. All the states of FSM want to develop production and export of betelnut.

Yams, cassava and breadfruit are processed before export to Guam to avoid quarantine restrictions.

There is a coconut soap producer that was established in Pohnpei with government funding. Considerable work has been done to examine the feasibility of export agriculture and import substitution from FSM by an ADB project with several publications produced (see bibliography).

#### **Identified Needs for Current Agriculture Exports**

- All fruit and vegetable exports need to improve production, postharvest aspects and marketing.

#### **Identified Needs for Future Agriculture Exports:**

- *Morinda citrifolia* could be an export with more market information.
- Green coconuts could be a better export if postharvest, quarantine, and marketing problems are overcome.

#### **Identified Needs for Currently Processed Products:**

- For soap production improved technologies, better packaging and marketing.
- The local producer is having trouble competing with low cost imports and this maybe difficult to overcome by the economies of scale of island enterprises.
- The processing of starch crops is a cottage industry for export to relatives. Potentially this could be developed into a small-scale commercial industry.

**Identified Needs for Future Processing:**

- Banana chips and breadfruit preservation for the local market and export is needed.

**FIJI****Overview**

Agricultural exports from Fiji are expanding. They range from copra, taro and cassava to fruits, vegetables, herbs, spices, and flowers. Good airline connections have helped Fiji to expand exports. The HTFA treatment facility has been in operation for several years and this has enabled the export of papaya, mangos, and eggplant to New Zealand and limited exports of papaya to the Japanese market. Chilies are being exported as well. Frozen and fresh root crops are also being exported as well as vacuum packed breadfruit. Potential exports include pineapple, bananas, other tropical fruits and vegetables. Some processing is taking place for the local market ranging from juices to chips.

**Identified Needs for Current Agriculture Exports**

- Agriculture export quality could be improved and producers know how to do it but it will take time.
- Reports from overseas importers to the exporter on the quality of what they received are needed. These reports could help improve quality because the causes of quality problems could be determined and provided to the exporter and producer.
- Organic production is an area that needs attention since this is a high price niche market that Fiji wants to exploit.
- Optimum storage conditions for commodities need to be more widely known and followed.
- Marketing is an area for improving in such areas as a better understanding of marketing windows, quality standards and promotion.

**Identified Needs for Future Agriculture Exports:**

- Now that the export market is developing a better understanding of potential markets, price information, quality standards are needed before production and postharvest systems can be set up.
- Again organic production systems is an area that needs attention.

**Identified Needs for Future Processing:**

- Organic production systems linked with drying, chips, puree, and powder of banana, mangos and papaya.
- Flour and starch production of root crops and breadfruit.
- Organic spices and herbs using low humidity drying for the European market is of interest. For these areas the technology and the markets need to be identified and developed.

**FRENCH POLYNESIA****Overview**

French Polynesia has great diversity in its islands, which also influences the crops that are grown for the local and export markets. As with New Caledonia there is modern capital-intensive agriculture mostly for the local market and traditional small-scale agriculture producers. The local market demands high quality fruits and vegetables and the central market in Papeete is not only functional but attracts

tourists as well. There are relatively high costs of production compared to other Pacific islands which means that production is oriented to import substitution, niche export markets and processing. For example there are large hydroponics vegetable producers (for tomatoes, lettuce, capsicum, cucumbers etc) mainly on Tahiti for the local market and for the passenger ships. In the Austral islands CIRAD is working with local farmers on potato, carrots, and cabbage. There is export of pineapples, exotic flowers such as anthurium, heliconias, and orchids. There is processing of vanilla, noni, citrus. French Polynesia was one of the first Pacific islands to export processed noni to the US market. Coconuts are still an important source of income on the outer islands both as copra and drinking coconuts. There is a pilot food processing facility and food laboratory in the Ministry of Agriculture.

#### **Identified Needs for Current Agriculture Exports**

- The fruit flies are a problem but work is underway to control it. Otherwise the current exports are doing well. The production and marketing of exotic flowers is gradually developing under the guidance of the Department of Rural Development. There is not enough production of flowers to meet the demand and the local market for flowers is strong as well.

#### **Identified Needs for Future Agriculture Exports:**

- There is interest to develop new agriculture exports of citrus, tropical fruits, kava, and other products. Along with new exports there may be a need for a HTFA facility for exports so that products can meet the quarantine requirements of the importing countries.

#### **Identified Needs for Future Processing:**

- Research is underway for processing of breadfruit into chips and other technologies such as the use of osmotic dehydration technology.

## **GUAM**

### **Overview**

Guam has small-scale fruit and vegetable production for the local market. Guam does not have any agriculture exports of fresh commodities but instead is an important market for FSM and other islands around Guam. Increased production of fresh fruits and vegetables would be focused on the local market. Strong cyclones often affect Guam and this increases the risk of investment in agriculture.

#### **Identified Needs for Future Agriculture Exports:**

- Create awareness and agriculture extension for production of tropical fruits and vegetables that can be grown easily for household consumption and the local market not for export.

#### **Identified Needs for Currently Processed Products:**

- Jellies, jams and juices are being produced in limited quantities for local consumption. Some limited sales to a couple of hotels. Information on standardizing the processing and making products that are acceptable to our tourist market is needed.
- Home processing of fruits and vegetables such as pickled mango, papaya, peppers sent to relatives and friends off island. This could become a commercial activity through information and training.
- Sweet potatoes, taro and cassava are currently being processed into a pulp and mixed with coconut cream then wrapped in foil with or without banana leaves

then boiled to make a sweet “tamales”. Other uses such as for breads, cakes and others would help get more products onto the markets.

- Information on the availability and source of equipment for processing is almost non-existent. Even harder to find is information on alternative packaging methods and materials.

#### **Identified Needs for Future Processing:**

- Processed yams, taro, breadfruit and cassava and other crops for the larger markets such as the US where there are ethnic groups who are familiar with these foods.
- There seems to be potential to develop coconut products for export. The region has considerable coconut production with few markets. Coconuts are one of the few crops that do well in the typhoon belt and on coral islands. Processing and developing alternative products from coconuts could help revive some of the remote islands.

### **KIRIBATI**

#### **Overview**

Coconuts offer one of the few opportunities for agriculture exports from Kiribati and a limited amount of copra is exported. Otherwise agriculture production of fruits and vegetables is for the local market which has expanded in the last few years.

#### **Identified Needs for Future Agriculture Exports:**

- Noni production and marketing.

#### **Identified Needs for Future Processing:**

- Processing of coconuts and coconut byproducts is an urgent need for the local market and export.

### **MARSHALL ISLANDS**

#### **Overview**

Coconuts are the basis of the agriculture economy of the Marshall Islands for household use and as a cash crop. Copra is processed locally into coconut oil and cake for export. Soap is made from the coconut oil for the local market. There is also limited vegetable production for the local market.

#### **Identified Needs for Processed Products:**

- Expand processing opportunities for coconuts and coconut products for the local market and export. This will require looking at the feasibility of this approach, production levels, prices and market locally and for export.
- Products for the local market from coconut oil and meal including poultry feed.

#### **Identified Needs for Future Agriculture Exports:**

- Processing of banana and pumpkins for the local market.
- Systems for village-level dehusking, copra drying, cold oil pressing and production of other products such as coir, charcoal handicrafts, and energy generation. Determine export markets for coconut products.
- Feasibility of exporting drinking coconuts to the US market.
- Noni harvesting, processing, and marketing

## **NEW CALEDONIA**

### **Overview**

Urban Noumea is a market that that demands quality fruit and vegetables. Historically the demand for fruit has been satisfied by imports. However the development of tropical fruit production in New Caledonia has received considerable attention. As a result commercial fruit production in New Caledonia has increased by over 50% since 1990, an average increase of 6% per year (over 3000t in 1997, 4000t forecast for 1998). This has been achieved through a partnership between research, extension, farmers and the private sector.

Furthermore a policy was developed to increase production by import substitution particularly for citrus. New Caledonia is continuing to develop fruit and vegetable production for the local market for import substitution and processing. In addition export markets are being identified. A HTFA treatment facility has been recently been installed.

The territory of New Caledonia, selected provinces, and CIRAD are pursuing research and development of production and processing mainly on tropical and subtropical fruit crops. As a result New Caledonia could be a source of technology for the region.

The current agricultural exports to Japan and New Zealand include squash, watermelon, zucchini, eggplant, lychee, mango, lime, and pineapple. Potential agricultural exports include avocado, cooking bananas, tomatoes. Current processing include potato chips, orange juice, other citrus juices, mango juice, pineapple juice and jams and jellies. In general they have some specific technical production problems to overcome but the greatest need is in the marketing area.

### **Identified Needs for Current Agriculture Exports**

- The production systems are well established but certain technical production problems persist partly due to a variable climate.
- Storage of watermelon.
- Lychee varieties that produce large fruit every year, physiological browning, optimizing the shelf life of the fruit, and alternative quarantine treatment.  
Mango: uniform fruit size, anthranose control, identification of the optimum harvest date, packaging, and new varieties for new ethnic markets.
- Lime: problem of yellowing of lime during storage, stylar end-rot and coloration of the lime.
- Pineapple: to find the good harvesting date for export (depending of the time of transportation), problem of black spot inside the fruit.
- With all current exports marketing and market information is an area that needs improvement.

### **Identified Needs for Future Agriculture Exports:**

- With avocado the determination of the optimum harvest date is a problem and how to treat avocado for fruit flies since the HTFA causes damage; improving the shelf life of the fruit.
- Cooking bananas: to optimize or to find an alternative quarantine treatment. Determination of the good harvesting date for export.
- Tomatoes: alternative quarantine treatment to the HTFA.
- Fruit flies and other quarantine constraints are difficult to overcome.
- Marketing research on specific commodities needs to be undertaken.

**Identified Needs for Currently Processed Products:**

- There are not problems solved by information and training but one that affects the processing industry. Oranges, others citrus and mango and pineapple are being processed into juice. The problem is that the price for the fresh market is high and therefore farmers are not interested in accepting a lower price for fruit that will be processed. The production level is not high enough. The quality of the fruit juices could be improved.

**Identified Needs for Future Processing:**

- New Caledonia and CIRAD are moving ahead on research and development on processing technologies for juice and other semi-processed or processed products for the local market for import substitution such as fruit chips and processing of yams and taro.

**PALAU****Overview**

There are currently no agricultural exports from Palau and limited agriculture processing. Palau agriculture consists primarily of Asian vegetable producers and women producing taro, cassava and bananas. There are also a few innovative expatriate farmers growing fruit trees. The soils are highly acid, very leached with steep slopes and most of the land on the main island is covered by primary forest. The very aggressive oriental fruit fly was introduced into Palau and it has a wide range of fruit and vegetable hosts. There is interest for an eradication programme for the oriental fruit fly. A major road project to open up the interior is about to start which will accelerate development but with possible negative environmental effects. The former president has formed a National Task Force on Agricultural Development (NTFAD), which is a positive move, but the problems and issues are difficult ones.

**Identified Needs for Current Agriculture Exports**

- Currently no agriculture exports

**Identified Needs for Future Agriculture Exports:**

- Soursop, avocado, papaya, pineapple, and bananas were identified as potential exports and the local market will require training, information related to production, plant protection, postharvest and marketing.
- Betelnut is currently grown but would only require marketing assistance.

**Identified Needs for Future Processing:**

- Fruit juice of the local tropical fruit for the local market initially and export. The appropriate scale of technology is needed as well as preservation, packaging, marketing.
- The reject fruit and seasonal oversupply on the local market could be processed into fruit juice but right processing and preservation technologies need to be explored.
- Vegetable processing i.e. cleaning and cutting and packaging for the local market.
- Root crops processing for the local market of cassava, taro and sweet potatoes.

**PAPUA NEW GUINEA****Overview**

PNG is a major producer and exporter of coffee, oil palm, cocoa, and copra. Statutory bodies receive funding from the producers, the government and donors to

service these industries. The National Agriculture Research Institute is involved with the staple crops and minor crops. In the vegetable sector the Fresh Produce Development Corporation has been an important body that has assisted in the development of the vegetable industry with assistance to small private growers for production and marketing. PNG has an enormous potential for production for the local market and export because of its size and range of agroecologies. There is interest for developing quality production of fruit for the local market for such crops as pineapple, citrus, and watermelon. A constraint to fruit and vegetable production is the fruit fly problem so work needs to continue in this area. The biodiversity of PNG offers an opportunity for the harvesting of exotic fruits and nuts for the export market. The full potential of the non-timber forest products has yet to be realized. The proximity of Asia and markets such as Singapore offer export opportunities.

#### **Identified Needs for Current Agriculture Exports**

- Needs were identified for improving the quality of traditional agriculture exports such as improved drying of cacao and copra. Coconut and Cacao Research Institute and the extension staff are largely addressing these needs through the Coconut and Cacao Extension Agency.

#### **Identified Needs for Future Agriculture Exports:**

- There is considerable interest for developing the production, postharvest and marketing for a variety of fruit such as mango, bananas and papaya; spices such as cardamom, vanilla; and staples such as taro and sago. Kava is also of interest.
- Non timber forest products such as indigenous fruits and nuts need postharvest and marketing.
- Control of fruit flies is essential for production of fruits and vegetables.

#### **Identified Needs for Currently Processed Products:**

- The currently processed agriculture exports such as coffee, cacao, oil palm and copra have systems in place to improve quality.

#### **Identified Needs for Future Processing:**

- The need for processing technology is recognized in many areas for the local market and export including fruit, vegetables, spices, root crops and kava. Processing could help overcome some of the quarantine issues that make export difficult.
- Market information is also an issue for exports.

## **SAMOA**

### **Overview**

Samoa views agriculture exports as an important growth area for agriculture. There was a team in Samoa from HortResearch doing research with High Temperature Forced Air (HTFA) to verify the effectiveness of this treatment against the local species of fruit fly. Samoa is planning to install an HTFA facility for the treatment of agriculture products to meet the quarantine requirements of New Zealand and other countries. In general, there is not so much concern about current exports but how to develop future exports. The major current agricultural exports are coconuts, kava, cocoa and bananas. Other fruit such as papaya, mangoes, limes, and avocado are considered future agriculture exports.

The private sector has been quite aggressive in agriculture exports and processing. The private sector is involved in niche exports of organic bananas, ginger, mango

puree, and soon dried mango. The processing of coconuts into a variety of products, chocolate candies, and Noni (*Morinda citrifolia*) juice bottling.

There is a concern about how small farmers can benefit from agriculture exports without exposure to excessive risk. There is an interest for processing of root crops for the local market and export in various forms. This is a topic that needs to be further explored. Samoa has a UNDP Tropical Fruit project phase 3 that will help develop its tropical fruit industry.

#### **Identified Needs for Current Agriculture Exports**

- Coconuts: how to increase profitability for farmers.
- Kava: nursery methods, production techniques, and price information.
- Cocoa: improved production techniques for high quality.
- Bananas: organic production methods.
- Bananas and ginger: organic production methods and overcoming quarantine restriction of importing country.
- Noni: market information.

#### **Identified Needs for Future Agriculture Exports:**

- Papaya, mango, lime and avocado: full range of information and training needs in production, postharvest, and marketing.

#### **Identified Needs for Currently Processed Products:**

- Coconuts: preservation and processing technology, packaging and promotion.
- Banana chips: processing technology, packaging.
- Chocolate and coconut products: organic certification, marketing, access to technical assistance, and packaging so they can compete in the global market.

#### **Identified Needs for Potential/Future Processing:**

- Kava: processing and marketing.
- Papaya: processing, marketing, packaging, market identification, and price information for papaya that is rejected for export as fresh fruit.
- Root and starch crops: processing technologies, packaging and marketing.
- Chocolate and coconut products: access to product development research.

## **SOLOMON ISLANDS**

### **Overview**

The Solomon Islands is a producer and exporter of copra, oil palm, and cocoa. There is huge potential for the export of non-timber forest products particularly the nuts such as nangai (*canarium*) and navelle (*Barringtonia*). Honey production is also a potential export. There is a need for greater production of vegetables for the local market. Fruit flies are a constraint to fruit and vegetable production and production is needed for the local market. The isolation of many of the islands and lack of reliable transportation links is a constraint to the development of agriculture production and export.

#### **Identified Needs for Future Agriculture Exports:**

- Non-timber forest products including indigenous nuts need attention particularly for postharvest handling and marketing.

#### **Identified Needs for Currently Processed Products:**

- Improved local processing of coconuts and new coconut products for the local market and export.

**Identified Needs for Future Processing:**

- The processing of indigenous nuts and markets is an important area.
- Coconut processing and marketing.

**TONGA****Overview**

Tonga is known in the region as one of the innovators in agriculture exports. Tonga has been able to penetrate the competitive quality-oriented Japanese market for squash and this crop provides the largest source of export revenue. Success in agricultural exports has been achieved through a partnership between the farmers, the Ministry of Agriculture and private sector exporters. Agriculture extension and the quarantine quality management division provide support to grower and exporters to ensure high quality standards are met for agricultural exports. Tonga exports a wide range of agricultural commodities to New Zealand, Australia, USA, other Pacific islands and European countries. Exports besides squash include yams, cassava, taro, kava, watermelon, whole coconuts, French beans, vanilla and noni. The HTFA treatment plant was completed in 1999 and opens up the possibility of export of commodities that are hosts of fruit flies.

**Identified Needs for Current Agriculture Exports**

- With the primary exports of squash, kava, vanilla and root crops there is information and training needed for organic production techniques for the local and export market. Price and market information is needed for export markets. In addition there is a need for information and training on the production for Tahitian vanilla; and on postharvest handling and storage of root crops and vanilla.
- For watermelon, eggplant, papaya, beans and capsicum there are wide ranging needs for information and training in production, organic production, postharvest handling & storage, marketing and quality assurance. For copra market and price information is needed.

**Identified Needs for Future Agriculture Exports:**

- For green coconuts, callalilies, aloe vera, taro leaves, tomatoes, mangos, and breadfruit there are a wide range of information and training needs for production (particularly varieties and organic production), all aspects of postharvest handling, storage, market, price information and quality assurance.

**Identified Needs for Currently Processed Products:**

- For powdered kava and coconut timber there are information and training needs for preservation and processing technologies, and the various aspects of marketing

**Identified Needs for Future Processing:**

- Kavalactone extraction, coconut drinks, Tongan oil, noni juice, aloe vera products, coconut milk, pineapple juice, and cassava flour need attention for information and training for handling, processing, preservation technology, quality assurance systems. Marketing needs include packaging, promotion, market identification and price information.

## TUVALU

### Overview

Like the other atoll members of SPC, Tuvalu's only agricultural export is copra. Otherwise Tuvalu is more concerned with agriculture production for the local market.

### Identified Needs for Future Agriculture Exports:

- There is the interest to establish apiculture for the export of organic honey in selected atolls. The first step would need to be further analysis of the potential for production, organization development and marketing to determine if this is feasible. In-country training and information materials for community members and agriculture extension agents. The marketing aspect would need particular attention since organic honey from Pacific atolls would have to be presented in such a way to appeal to a niche market.

### Identified Needs for Currently Processed Products:

- The main processed products are pork and pork products such as bacon and sausage for the local market. There is the interest to expand the pork production into a commercial phase with more efficient and cost effective enterprises.

### Identified Needs for Future Processing:

- There is interest for value adding for coconut for the local market and export with such products such as handicrafts, soap, cooking oil, vinegar etc.

## VANUATU

### Overview

Vanuatu is a major copra producer and exporter: cocoa and coffee are minor exports. Kava has also emerged as the major export to the pharmaceutical industry in Europe and the United States as well as New Caledonia and Fiji. Vanuatu beef is another major export that is well developed. Non-timber forest products such as indigenous nuts such as nangai (*canarium*) and navele (*barringtonia*) offer an opportunity for the local and export market. Charles Longwah is a local processor with over 70 processed products including canarium nuts, peanuts, dried papaya, kava tea, chutney etc. There is an active private sector involved in production and export and they are leading the way with niche crops such as horticulture crops, coffee, vanilla and other spice crops.

### Identified Needs for Current Agriculture Exports

- In general the kava industry needs better production systems, improved post-harvest handling (cleaning and drying) and established quality standards.
- Organic production systems and certification though there are some certified organic producer.

### Identified Needs for Future Agriculture Exports

- The private sector in Vanuatu is interested in export opportunities. Fruit and vegetable exports will depend on the establishment of a HTFA treatment facility and improved air links. Quality standards and market information will be important.

### Identified Needs for Currently Processed Products:

- The major problem is the lack of consistent production. Traditional farming is on a small scale and transport between the island needs to be improved. With

indigenous nut crops tree, ownership disputes and poor motivation to harvest can be a problem.

**Identified Needs for Future Processing:**

- Fruit and vegetable processing for the local market when there is surplus production.
- More processing of coconuts and coconut byproducts for the local market and export

**WALLIS AND FUTUNA**

**Overview**

The agriculture economy of Wallis and Futuna is based on mixed cropping taro, cassava, yams, bananas, sweet potatoes and of course pig production is quite significant. However production is for the home consumption and the local market not for the export market. There is an interest in increased production of fruits, vegetables and kava for the local market.

**Identified Needs for Currently Processed Products:**

- A small project promoted the production of tutu (tapa) in Wallis and it has met with a great success. This could become an export with the appropriate product designs and marketing.

**Identified Needs for Future Processing:**

- Processing of root crops to export to relatives.
- Fruit and vegetable processing for the local market when there is surplus production.

## Annex 2: Information Summary by country and agricultural product

**Introduction:** This section provides the information from the Country Profiles in table form for better analysis of the needs.

### Information and Training Needs Assessment Summary for Current Agricultural Exports

Country	Production	Postharvest	Marketing	Comments
American Samoa				
Cook Is		papaya	papaya	
FSM	fruits and veg	fruits and veg	fruit and veg	
Fiji	organic prod of fruits and veg	quality standards, storage for fruits and veg	fruits and veg	
French Polynesia				local & export flower market expanding
Guam	Fruits and veg for local mkt			
Kiribati				
Marshall				
New Caledonia	fruits and veg	fruits and veg	fruits and veg	need to fine tune current systems
Palau				
PNG		cacao, coconut		improve quality
Samoa	kava, cocoa, organic bananas, ginger	cacao	kava, noni	improving profitability of coconuts for farmers
Solomon Islands				
Tonga	organic production of veg, Tahitian vanilla, kava, root crops	fruit and veg	veg, vanilla, kava, root crops, copra	
Tuvalu				
Vanuatu Wallis & Futuna	kava	kava	kava	organic production

**Information and Training Needs Assessment Summary for Potential Agricultural Exports**

Country	Production	Postharvest	Marketing	Comments
American Samoa	flowers	flowers	flowers	orchids, antheriums, plumeria for Hawaii mkt
Cook Is				
FSM		green coconuts	noni, green coconuts	
Fiji	organic prod of fruits and veg		fruits & veg	
French Polynesia			fruits, kava	feasibility of HTFA
Guam				
Kiribati	noni		noni	
Marshall		noni	noni, drinking coconuts	
New Caledonia		fruits and & veg	fruits and veg	
Palau	fruits	fruits	fruits, betelnut,	local mkt and export
PNG	fruits, spices, kava	fruits, nuts, spices, kava	fruit, nuts, spices, kava	fruit fly constraint
Samoa	fruits	fruits	fruits	
Solomon Islands	fruits and veg	fruits and veg, indigenous nuts, honey	fruits and veg, non timber forest products	for local & export mkt fruit fly constraint
Tonga	organic production callalilies, veg, aloe vera, breadfruit	flowers, veg, breadfruit	green coconuts, flowers, veg, breadfruit	
Tuvalu	organic honey	honey	organic honey	
Vanuatu		indigenous nuts	fruits and veg, indigenous nuts	
Wallis & Futuna				

### Information and Training Needs Assessment Summary for Currently Processed Products

Country	Production	Postharvest	Marketing	Processing Technology	Other
American Samoa Cook Is			noni		
FSM			coconut soap, root crops	coconut soap, root crops	
Fiji					
French Polynesia					
Guam			fruits	fruit jams & jellies, veg, pickling, root crops	for local & tourist mkt, export to relatives and others
Kiribati			coconuts	coconuts	local & export mkt
Marshall Islands			coconuts	coconuts	
New Caledonia				fruit juices	improve quality
Palau					
PNG					
Samoa			coconuts, bananas, chocolate	coconuts, bananas, chocolate	organic certification
Solomon Islands			coconut, non timber forest products	coconut, non timber forest products	
Tonga			kava, coconut timber	kava, coconut timber	
Tuvalu				pork for local mkt	
Vanuatu	indigenous nuts	indigenous nuts	indigenous nuts	indigenous nuts	
Wallis & Futuna			tapa	tapa	

**Information and Training Needs Assessment Summary for Potential  
Agricultural Processed Products**

Country	Production	Postharvest	Marketing	Processing Technology	Other
American Samoa	kava, noni		kava, noni, taro flour, coffee chocolate	kava, noni, taro flour, chocolate	
Cook Islands			rootcrops, breadfruit, fruit, coconuts	rootcrops, breadfruit, fruit, coconuts	
FSM			banana, breadfruit	banana, breadfruit	
Fiji			fruits, root crops, spices	fruits, root crops, spices	
French Polynesia				breadfruit	research on breadfruit underway
Guam			root crops	root crops, coconuts	
Kiribati			coconuts	coconuts	local & export mkts
Marshall Islands		noni	noni, coconuts	bananas pumpkins, coconuts	
New Caledonia				fruit, root crops	research underway on juice, root crops etc
Palau			fruits, veg, and root crops	fruits, veg, and root crops	local and export mkt
PNG	overcome fruit fly for fruits and veg		fruits, veg, root crops spices, kava	fruits, veg, root crops spices, kava	local and export mkt
Samoa			kava, papaya, coconuts, chocolate	kava, papaya, coconuts, chocolate root crops	
Solomon Islands			coconut, non timber forest products	coconut, non timber forest products	

<b>Tonga</b>			noni, kava, coconuts, fruit juice, cassava flour, aloe vera	noni, kava, coconuts, fruit juice, cassava flour	
<b>Tuvalu</b>			coconut products	coconut products	for local & export mkt
<b>Vanuatu</b>			fruits, veg, Coconut products	Fruits, veg, coconut products	local market and export
<b>Wallis &amp; Futuna</b>			root crops fruits & veg	root crops, fruits and veg	for local mkt and export

### Annex 3

Name:

Country:

Title:

Date:

### Current Agricultural Exports Information & Training needs assessment for Improving Quality

Topics	Ag Export Product #1	Ag Export Product #2	Ag Export Product #3	Ag Export Product #4
<b>Production</b>				
Variety				
Gen Mgmt				
Fertility Mgmt				
Plant Protection				
Organic Prod				
Harvest timing & method				
<b>Post Harvest Handling</b>				
Disease & Pest control				
Grading				
Packaging				
Optimum Storage				
<b>Marketing</b>				
Price info				
Standards				
Market info				
Promotion				
<b>Other</b>				

Agricultural export products should be listed in priority order. Use additional pages if necessary

Key: MR= MAF research active in this area  
 ME= MAF extension active in this area  
 T= need attention for training,  
 I= needs attention for information  
 Markets: L= local, T= tourist, E= export

Comments

Name:

Country:

Title:

Date:

**Potential Agricultural Exports**  
**Information & Training needs assessment for Improving Quality**

Topics	Ag Export Product #1	Ag Export Product #2	Ag Export Product #3	Ag Export Product #4
<b>Production</b>				
Variety				
Gen Mgmt				
Fertility Mgmt				
Plant Protection				
Organic Prod				
Harvest timing & method				
<b>Post Harvest</b>				
Handling				
Disease & Pest control				
Grading				
Packaging				
Optimum Storage				
<b>Marketing</b>				
Price info				
Standards				
Market info				
Promotion				
<b>Other</b>				

**Agricultural export products should be listed in priority order. Use additional pages if necessary**

**Key: MR= MAF research active in this area  
 ME= MAF extension active in this area  
 T= need attention for training,  
 I= needs attention for information  
 Markets: L= local, T= tourist, E= export**

**Comments**

Name:

Country:

Title:

Date:

**Currently Processed Agricultural Products**  
**Information & Training Needs Assessment for Value-adding/ processing**  
**of Agricultural products**

Currently Processed Products				
Type of processing?				
Market/ Ultimate use				
<b>Areas of need for training and info</b>				
Production				
Harvesting				
Ph Handling				
Preservation Technology				
Processing technology				
Marketing				
Packaging				
Promotion				
Market Id				
Price info				
<b>Other</b>				

Processed agricultural products should be listed in priority order.

MR= MAF research active in this area

ME= MAF extension active in this area

T= need attention for training,

I= needs attention for information

Markets: L= local, T= tourist, E= export

Comments

Name:

Country:

Title:

Date:

**Potential Agricultural Processed Products**  
Information & Training Needs Assessment for Value-adding/ processing  
of Agricultural products

Potential Processed Products				
Type of processing				
Market/ Ultimate use				
Areas for training and info				
Production				
Harvesting				
PH Handling				
Preservation technology				
Processing technology				
Marketing				
Packaging				
Promotion				
Market Id				
Price info				
Other				

Processed agricultural products should be listed in priority order.

Key: MR= MAF research active in this area

ME= MAF extension active in this area

T= need attention for training,

I= needs attention for information

Markets: L= local, T= tourist, E=export

Comments

## Annex 4

### Summary of Country visits

Country	Date visited	Number Interviewed	
		Public	Private
Samoa	February 1999	5	5
American Samoa	February 1999	1	
Vanuatu	February 1999	1	1
Federated States of Micronesia	April 1999	3	5
Guam	April 1999	1	
Palau	April 1999	2	3
New Caledonia	April 1999	5	2
Wallis and Futuna	Nov 1999	4	
French Polynesia	Dec 1999	10	4
Thailand	March 2000	5	8
Papua New Guinea	April 2000	10	2
Vanuatu	Jan 2001	4	6
	<b>Sub Total</b>	<b>51</b>	<b>36</b>
<b>Interviews in Fiji and telephone fax</b>			
Cook Islands	August 2000	2	1
Fiji	Ongoing	10	5
Solomon Islands	August 1999	1	1
Kiribati	October 1999	1	
Tuvalu	September 1999	2	
Marshall Islands	July 1999	2	1
Tonga	December 2000	1	2
	<b>Sub Total</b>	<b>19</b>	<b>10</b>
	<b>Total</b>	<b>70</b>	<b>46</b>

## Bibliography

- Jung-mun, Choi. *Home-Scale Food Processing Business in Fiji*. Suva, Fiji: Fiji. Ministry of Agriculture, Fisheries and Forests, Food Product Development Unit and Korea International Cooperation, 2000.
- Meetings of the IFAD/ADB-Funded Coconut Research Projects and Future Directions of the Coconut Industry in the South Pacific (2000 : Apia, Samoa)* [Unpublished conference papers], 2000.
- Taufatofua, Rosemary. *Sub-Sector Analysis of the Masi Industry in Fiji*. [Suva, Fiji: United Nations Development Programme, SMILE], 2000.
- Shepherd, Andrew W. *Linking Market Development to Farming Systems in the Pacific Islands*. SAPA Publication, 1999/2. Apia, Samoa: FAO Sub-regional Office for the Pacific (SAPA), 1999.
- . *Agricultural Marketing in the South Pacific*. SAPA Publication, 1999/1. Apia, Samoa: FAO Sub-regional Office for the Pacific (SAPA), 1999.
- Figuerola, Vilda, and José Lama. *Manual for Preservation of Food and Condiments in the Home*. English ed. Havana, Cuba: Community Project: Preservation of Food, 1999.
- Hawaiian Islands Air Cargo Resource Book 1999-2000*. Hawaii: University of Hawaii at Manoa, College of Tropical Agriculture and Human Resources, 1999.
- Opara, Linus U. *Commercial Postharvest Handling of Fruits, Vegetables, and Root Crops for Export: Proceedings of Regional Workshop (1996, Nukualofa, Tonga)*. Apia, Samoa: Institute for Research, Extension and Training in Agriculture (IRETA), 1999.
- Ohler, J. G., editor. *Modern Coconut Management: Palm Cultivation and Products*. London, UK; Rome, Italy; and The Netherlands: Intermediate Technology Publications, FAO and in collaboration with Universiteit Leiden, 1999.
- Accreditation Criteria for Programmes Certifying Organic Agriculture and Processing*. Germany: International Federation Organic Agriculture Movements (IFOAM), 1998.
- Battcock, Mike, Sue Azam-Ali, Barrie Axtell, and Peter Fellows. *Training in Food Processing: Successful Approaches*. London, UK: Intermediate Technology Publications, 1998.
- Batugal, Pons A., Ramanatha Rao, and C. Bong, editors. *Promoting Multi-Purpose Uses and Competitiveness of the Coconut: Proceedings of a Workshop, 26-29 September 1996, Chumphon, Thailand*. Serdang, Malaysia: International Plant Genetic Resources Institute (IPGRI), Regional Office for Asia, the Pacific and Oceania, 1998.
- Coconut Oil Production Using the Aqueous Method: Processing Manual*. (Improving the Small-Scale Extraction of Coconut Oil. Coconut Fund for Commodities Project FIGOOF/01.) CFC Report, no. 105. Kent, England: Natural Resources Institute, 1998.
- Ovasuru, Tore. "Problems and Opportunities of PNG Farmers Related to Coconut Varieties." In *Promoting Multi-Purpose Uses and Competitiveness of the Coconut: Proceedings of a Workshop, 26-29 September 1996, Chumphon, Thailand*, editors Pons A. Batugal, Ramanatha Rao, and C. Bong. Serdang, Malaysia: IPGRI, Regional Office for Asia, the Pacific and Oceania, 1998.
- Sanchez, Priscilla C. "Potential of Value-Added Products From Coconut for the South Pacific." In *Promoting Multi-Purpose Uses and Competitiveness of the Coconut: Proceedings of a Workshop, 26-29 September 1996, Chumphon, Thailand*, editors

- Pons A. Batugal, Ramanatha Rao, and C. Bong. Serdang, Malaysia: IPGRI, Regional office for the Pacific and Oceania, 1998.
- Atkinson, Garth. *Exporting Fruit and Vegetables to New Zealand : a Guide for Pacific Island Exporters*. Rev ed. Auckland, New Zealand: South Pacific Trade Commission, 1997.
- Coconut Processing Technology : a Manual of Procedures - Step-by-Step Guide...* Davao City, Philippines: Secretariat of the Pacific Community; Philippine Coconut Authority; Bureau for the Development of Research on Tropical Perennial Oil Crops, 1997.
- Fellows, Peter. *Traditional Foods: Processing for Profit* London, UK: Intermediate Technology Publications, 1997.
- Fiji. Ministry of Agriculture, Fisheries, Forests. *Exporter, Quarantine & Food Standards Workshop (1997 : Suva and Nadi, Fiji)*. Unpublished paper. Suva, Fiji: Fiji. MAFF, Economic Planning and Statistics Division, 1997.
- Fuller, R. J. *Solar Drying in the Pacific: a Guide for Commercial Producers*. Suva, Fiji: Forum Secretariat, Energy Division, 1997.
- . *A Review of Solar Drying of Fruit, Vegetables and Other Food Crops*. Suva, Fiji: Forum Secretariat, Energy Division, 1997. Originally published by Victorian Department of Agriculture, Melbourne, Australia as Research report series No. 121.
- Lebot, V. "An Overview of Kava Production in the Pacific Islands: What We Do Know and What We Don't." *Journal of South Pacific Agriculture* 4, no.1&2 (1997): 55-62.
- Kosrae State. Department of Agriculture and Lands, and Department of Commerce and Industry. *Kosrae. State Agricultural Marketing Assessment and Guidelines*. (ADB TA Project No. 2484-FSM.) Kosrae, Federated States of Micronesia: Department of Agriculture and Lands, Department of Commerce and Industry, 1997.
- Markose, V. T., and Sreekumar Poduval. *Coconut Oil Production Using the Aqueous Method: Country Manual - India*. (Improving the Small-Scale Extraction of Coconut Oil. Coconut Fund for Commodities Project FIGOOF/01.) CFC Report, no. 96 . Kent, England: Natural Resources Institute, 1997.
- Setiawan, Y. Y., G. R. Breag, Lukman Junaidi, Dadang Supriatna, and A. S. Tariq. *Hot Oil Immersion Drying (HOID) Technology for Producing Coconut Oil (Medium Scale): Project - Country Manual - Indonesia*. (Improving the Small-Scale Extraction of Coconut Oil. Coconut Fund for Commodities Project FIGOOF/01.) CFC Report, no. 103. Kent, England: Natural Resources Institute, 1997.
- . *Hot Oil Immersion Drying (HOID) Technology for Producing Coconut Oil (Small Scale): Project Country Manual - Indonesia*. (Improving the Small-Scale Extraction of Coconut Oil. Coconut Fund for Commodities Project FIGOOF/01.) CFC Report, no. 102. Kent, England: Natural Resources Institute, 1997.
- Setiawan, Yang Yang, G. R. Breag, H. G. Pohan, and Maman M. Rohaman. *WHU Technology for Copra Production: Project Country Manual - Indonesia*. (Improving the Small-Scale Extraction of Coconut Oil. Coconut Fund for Commodities Project FIGOOF/01.) CFC Report, no. 104. Kent, England: Natural Resources Institute, 1997.
- Tillekeratne, H. A., and A. T. Ranasinghe. *Coconut Oil Production Using the Intermediate Moisture Content Method: Country Manual - Sri Lanka* (Improving the Small-Scale Extraction of Coconut Oil. Coconut Fund for Commodities Project FIGOOF/01.) CFC Report, no. 100. Kent, England: Natural Resources Institute, 1997.

- Brown, Michael W. *Market Development for Selected South Pacific Indigenous Tree Nuts*. Apia, Samoa: Institute for Research, Extension and Training in Agriculture (IRETA), 1996.
- Fellows, Peter, Ernesto Franco, and Walter Rios. *Starting a Small Food Processing Enterprise*. London, UK: Intermediate Technology Publications in association with Technical Centre for Agriculture and Rural Cooperation (CTA), 1996.
- Harrington, Michael T. *Tropical Fruit Production Manual for Extension Workshops*. Agriculture Instructional Materials, ADAP 96-3. Honolulu, Hawaii: ADAP, 1996.
- Ogazi, Paul O. *Plantain : Production, Processing, Utilisation*. Okigwe, Nigeria: Paman and Associates, 1996.
- Brown, Michael W. *Quality Standards and Marketing of Selected South Pacific Root Crops*. Apia, Western Samoa: Institute of Research, Extension and Training for Agriculture (IRETA), 1995.
- Crude Copra Oil, a Biofuel for Diesel Engines*. Noumea, New Caledonia: South Pacific Commission (SPC) and International Institute of Agricultural Research for Development (CIRAD), 1995.
- De Taffin, G., Anare Macedru, Tevita Kete, and O. Trocme. *The Processing of Coconut Products in Fiji*. Suva, Fiji: MAFF, 1995.
- McGregor, Andrew M. *A Marketing Study for Pineapple and Other Tropical Fruit From Fiji; With Particular Emphasis on the Seqaqa Pineapple Project*. Unpublished paper. Suva, Fiji: [MAFF?] 1995.
- Vegetable Production & Marketing Training Programme* Suva, Fiji: MAFF, Koronivia Research Station, 1995.  
Title page- Establishment and agronomy of tomato and English cabbage.
- Brown, Michael W., and Emil M. Adams, editors. *South Pacific Roots and Tubers Marketing for Exports Workshop, 10-12 November 1993, IRETA, University of the South Pacific, Western Samoa : Report of a Workshop*. Apia, Western Samoa: Institute for Research, Extension and Training in Agriculture, 1993.
- Fruit and Vegetable Processing*. Food Cycle Technology Source Books. London, England: Intermediate Technology Publications in association with Unifem, 1993.
- Oil Processing*. Food Cycle Technology Source Books. London, England: Intermediate Technology Publications in association with Unifem, 1993.  
First published by Unifem as 'Oil extraction', 1987.
- Proceedings of the Seminar on Small - and Medium-Scale Technology for Oil Palm and Coconut, 6-9 December 1993, Accra, Ghana*. Paris, France: Bureau for the Development of Research on Tropical Perennial Oil Crops, [1993?]
- Root Crop Processing*. Food Cycle Technology Source Books. London, England: Intermediate Technology Publications, for United Nations Development Fund for Women, 1993.
- Björnå, Finn B. "Root and Tuber Processing, Marketing, and Utilization in the South Pacific." In *Product Development for Root and Tuber Crops : Volume 1 - Asia*, editors Gregory J. Scott, Siert Wiersema, and Princess I. Ferguson, 95-100. Lima, Peru: International Potato Center, 1992.
- Fellows, Peter, and Ann Hampton, editors. *Small-Scale Food Processing: a Guide to Appropriate Equipment*. London, England: Intermediate Technology, 1992.

- Fleming, Euan, and Brian Hardaker. "Prospects for Niche Marketing in South Pacific Island Nations." *Pacific Economic Bulletin*, no. 1 (1992): 21-26.
- Scott, Gregory J., Siert Wiersema, and Princess I. Ferguson, editors. *Product Development for Root and Tuber Crops : Volume 1 - Asia*. Lima, Peru: International Potato Center, 1992.
- Reid, G. Murray. *A Review of Apiculture in the South Pacific : a Discussion Paper Prepared for the Development Cooperation Division, Ministry of External Relations and Trade*. Ruakura, New Zealand: Ministry of Agriculture and Fisheries, 1991.
- Varnakulasingam, M. *Niue : Post-Harvest Utilization of Coconuts*. Port Vila, Vanuatu: United Nations Economic and Social Commission for Asia and the Pacific, 1991.
- Carlos, Juan T., and S. Balakrishnan. *South Pacific Perennial Spice Production : Developments and Prospects*. Apia, Western Samoa: Institute for Research, Extension and Training in Agriculture (IRETA), 1991.  
Cover and title page are dated 1990.
- Carlos, Juan T., and S. N. Dawes. *South Pacific Perennial Nut Cultivation : Status and Outlook*. Apia, Western Samoa: Institute for Research, Extension and Training in Agriculture (IRETA), 1990.
- Vinning, Grant. *Marketing Perspectives on a Potential Pacific Spice Industry*. ACIAR Technical Reports, 15. Canberra, Australia: Australian Centre for International Agricultural Research, 1990.
- Woodhouse, Steve. "Mangosteen in Papua New Guinea." In *South Pacific Fruit Production: Technoguides and Recent Advances*, editor Juan T. Carlos, p79-85. Alafua, Western Samoa: University of the South Pacific, Institute for Research, Extension and Training in Agriculture (IRETA), 1990.
- Wickam, Frank. "Fruit and Nut Production in Solomon Islands ." In *Proceedings of 1987 Regional Meeting on Tropical Fruit Production in the South Pacific, Held in the Cook Islands, May 4-7, 1987*, editors Juan T. Carlos, and S. C. Ooi, p.23-32. Apia, Western Samoa: Institute for Research, Extension, and Training in Agriculture, 1989.
- McGregor, Andrew. *The Fiji Fresh Ginger Industry : a Case Study in Non-Traditional Export Development*. Research Report Series (East-West Center. Pacific Islands Development Program), no. 10. Honolulu, Hawaii: University of Hawaii Press, 1988.