

Agricultural Value Chain Guide for the Pacific Islands

Making value chain analysis
a useful tool in the hands of
farmers, traders and policy makers.



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About CTA

The Technical Centre for Agricultural and Rural Cooperation (CTA) is a joint international institution of the African, Caribbean and Pacific (ACP) Group of States and the European Union (EU). Its mission is to advance food and nutritional security, increase prosperity and encourage sound natural resource management in ACP countries. It provides access to information and knowledge, facilitates policy dialogue and strengthens the capacity of agricultural and rural development institutions and communities.

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For more information on CTA, visit www.cta.int

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Foreword

In 2011, the Technical Centre for Agricultural and Rural Cooperation (CTA) developed a new Strategic Plan, 2011-2015, which refocused our work in African, Caribbean and Pacific (ACP) countries on several priority topics, one of which was value chain development.

As a first step in this process, we carried out what we called a “Mapping Study”, to fully assess the value chain support needs of our ACP partners. This study not only confirmed to us that we had made the right choice to emphasise value chain issues but also highlighted several areas of work that required immediate attention.

One of these was the suitability for ACP countries of the existing guides on how to analyse and upgrade value chains. The Mapping Study found out that most of our partners considered these guides to be too complex and insufficiently tailored to the needs of the individual ACP regions, such as the Pacific. They also felt the guides were too orientated to the requirements of donors and insufficiently focused on the needs of those actually involved in operating value chains. This publication, therefore, is designed to address those perceived weaknesses, by offering a guide that can be used both by Pacific Island value chains and by organisations that work to assist their development.

I should like to thank Koko Siga (Pacific) for its work in preparing this guide. I should also like to acknowledge the valued partnership of the Secretariat of the Pacific Community (SPC) in implementing the value chains project, supported by CTA, that has not only resulted in this guide but also in the excellent regional value chains conference in 2013 and in a valuable new web site (<http://www.aglinks.net/>) that we hope will become an important tool in promoting the exchange of value chain information within the region.

CTA looks forward to continued cooperation with SPC and our many other partners in the Pacific region.

Michael Hailu
Director, CTA

Acknowledgements

The contribution of Heiko Bammann, Enterprise Development Officer with FAO's Rural Infrastructure and Agro-Industries Division (AGS) at FAO headquarters in Rome, is particularly acknowledged. For a decade Heiko was Farming Systems Development and Marketing Officer in the FAO Sub-Regional Office for the Pacific. While he was based in Samoa, Heiko energetically encouraged interest in agricultural value chain analysis and development throughout the region. This manual is a direct product of these efforts. The support and encouragement of Andrew Shepherd (CTA) and Tevita Kete (SPC) is gratefully acknowledged. The final version of the manual incorporates inputs and suggestions made by participants at an SPC/CTA workshop where an earlier draft was discussed. The production of the manual in its final form would not have been possible without the contribution of numerous Pacific Island value chain actors. These key drivers freely shared their knowledge and informed us of what they wanted from the manual. A number of these people are mentioned by name in the manual itself and we hope that we have been able to meet their expectations.

List of acronyms

ADB	Asian Development Bank
AGS	Rural Infrastructure and Agro-Industries Division
AusAID	Australian Agency for International Development
AVRDC	The World Vegetable Centre
BAF	Biosecurity Authority of Fiji
BQA	Bilateral Quarantine Agreement
CBA	Cost Benefit Analysis
CGA	Cocoa Growers Association of Vanuatu
CIP	International Potato Centre
CTA	Technical Centre for Agricultural and Rural Cooperation
DIIS	Danish Institute for International Studies
FACT	Facilitating Agricultural Commodity Trade Project (EU funded)
GM	Gross Margin
GTZ	German Agency for Technical Cooperation
HACCP	Hazard Analysis and Critical Control Points
HTFA	High Temperature Forced Air Quarantine Treatment Technology
ICRAF	World Agroforestry Centre
IFAD	International Fund for Agricultural Development
ILO	International Labour Organization
ISHS	International Society for Horticultural Science
ITC	International Trade Centre

List of acronyms

M4P	Making markets work for the poor
MA	Main Actor
NGOs	Non-governmental organizations
NMA	National Marketing Authority (Fiji)
NPK	Nitrogen Phosphorous Potassium based Fertilizer
NWC	Nature's Way Cooperative (Fiji) Ltd.
NZAID	New Zealand Agency for International Development
PICs	Pacific Island Countries
PITIC	Pacific Islands Trade and Investment Commission
PPP	Public Private Partnership
SA	Supporting Actor
SDC	Swiss Agency for Development and Cooperation
SFA	Samoa Famers Association
SWOT Analysis	S (Strength) W (Weakness) O (Opportunities) and T (Threats)
TLB	Taro Leaf Blight
UNDP	United Nations Development Programme
UNCTAD	United Nations Conference on Trade and Development
USAID	United States Agency for International Development
VCD	Value Chain Development
VCO	Virgin coconut oil
VOCGA	Vanuatu Organic Cocoa Growers Association



Introduction to Agricultural Value Chains

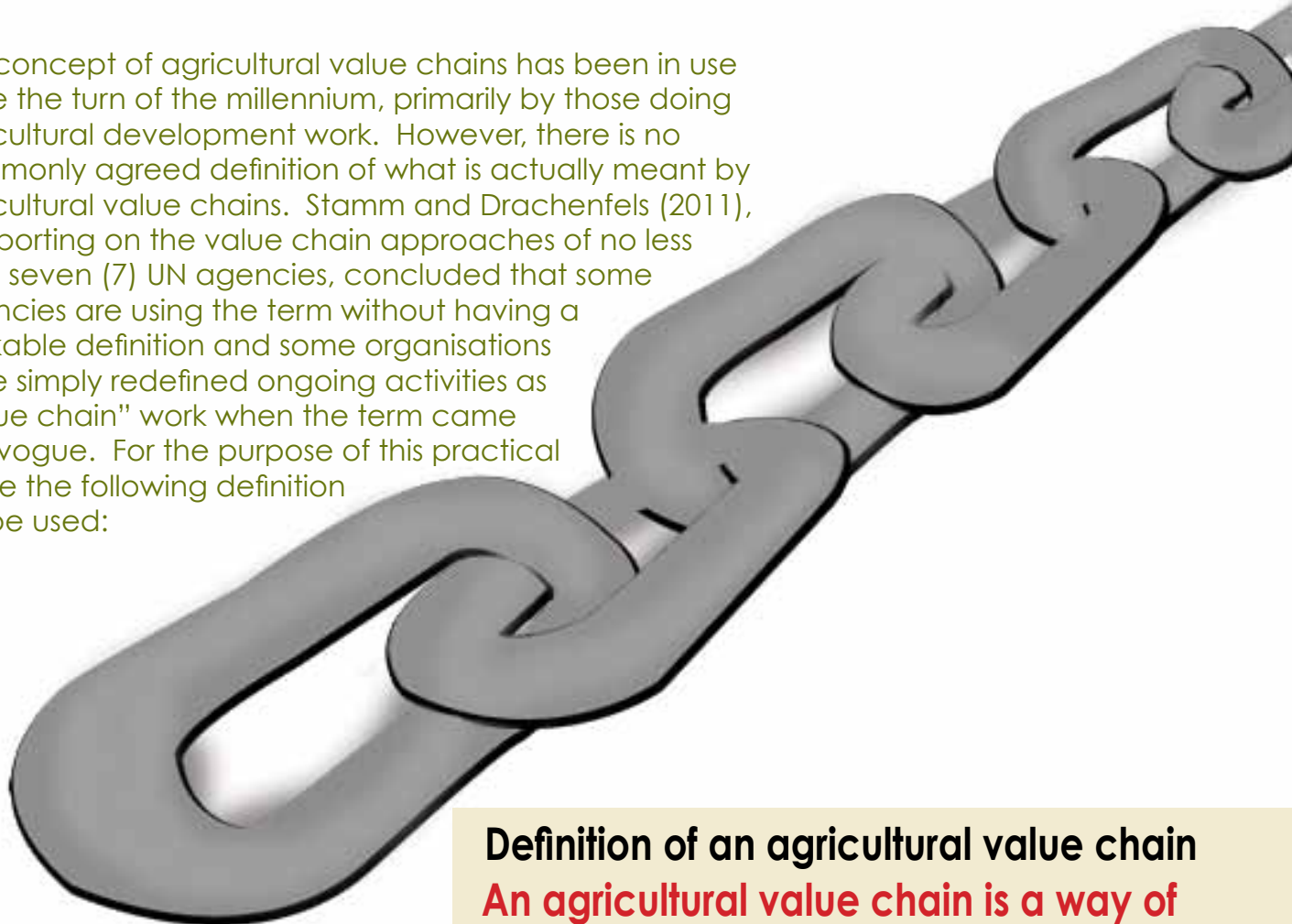
There have been numerous studies of Pacific Island agricultural value chains. Shepherd et.al (2012), in reviewing these studies, highlighted the often short-term successes but frequent unsustainability of many horticultural and other high-value product developments in the Pacific. The reasons for the lack of sustainability include location, transport linkages and high costs, poor economies of scale, natural disasters, plant disease and market access barriers.

Despite constraints, significant opportunities exist to reduce failures and to expand successes through identifying ways to improve the value chains for Pacific Island products. Improvements are measured in terms of the sustainable increase in the income earned by those participating in the value chain. This guide endeavours to make a practical contribution to this process.

Key definitions for the user

What is a value chain?

The concept of agricultural value chains has been in use since the turn of the millennium, primarily by those doing agricultural development work. However, there is no commonly agreed definition of what is actually meant by agricultural value chains. Stamm and Drachenfels (2011), in reporting on the value chain approaches of no less than seven (7) UN agencies, concluded that some agencies are using the term without having a workable definition and some organisations have simply redefined ongoing activities as “value chain” work when the term came into vogue. For the purpose of this practical guide the following definition will be used:



Definition of an agricultural value chain
An agricultural value chain is a way of describing the different 'links' required to take a product from the farm to the end consumer.

Who are value chain 'actors'?

At the heart of the agricultural value chain concept is the idea of actors connected along a chain, producing and delivering goods to consumers through a sequence of activities (Henriksen et.al 2010).

Definition of value chain actors

Value chain actors are the people at each link along the chain required to move a product from the farm to the consumer.



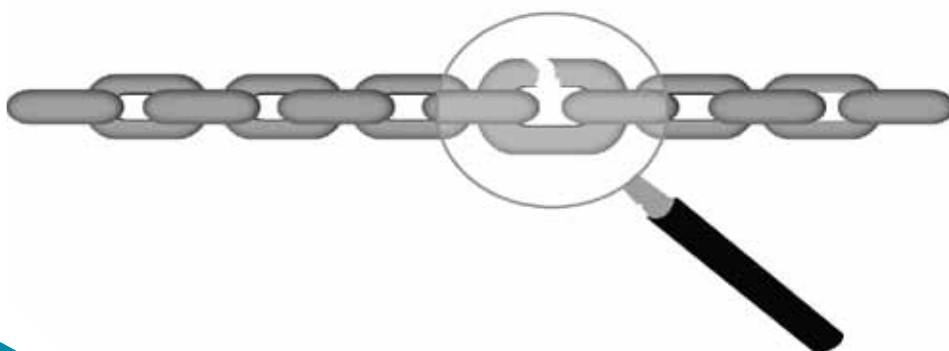
It can be said that there are really two categories of actors in the value chain. These are:

Main actors - those who buy and sell the product as it moves along the chain.

Supporting actors - those who provide services help move the product along the chain.

What is value chain analysis?

Value chain analysis is simply a tool that can assist people involved in the chain to better understand the business world in which they operate.



Definition of value chain analysis

Value chain analysis is a tool for looking at every step and actor along the value to identify both weaknesses to be resolved and opportunities for increasing profits for all involved in the chain.

Why is value chain analysis important?

The value chain approach is orientated toward the market and what consumers want. By analysing the value chain, information is obtained that should lead to better decision making by both those involved (farmers, traders, etc.) and those wanting to support the value chain (policy makers, donors, etc.). The result of better decisions is higher and more sustainable income for those participating in the chain.

a) Value chain analysis can identify all of the people (actors) involved in getting the product from the farm to the consumer

Farmers and other actors along the chain often do not realise how many people are involved, and what they do, in getting the final product to the consumer. A simple value chain map can illustrate this: Example: "Fiji Red" papaya from the seedling nursery to consumers in Auckland.




b) Value chain analysis can identify the contribution, (the share of value added) and the risks faced by each actor involved.

Individual actors along the value chain, and policy makers, often don't appreciate:

- The contribution each actor makes in getting the final product (value added) to the consumer;
- The share (reward) each actor receives from the value of final product in the hands of the consumer (share of retail price);
- The risk each actor takes in trying to obtain their share of the value of the final product.

The actors need this information to get the most from and contribute most to the value chain.

Example: "Fiji Red" papaya exports to Auckland: exporter contribution, reward and risk

Exporter	What the exporter contributes to the final product (value added)	The exporter's share of the final selling price to the consumer	Exporter risk assessment
	Transports, packs and grades, arranges and pays for quarantine treatment, finds markets and arranges air freight, etc.	The price of papaya loaded on the aircraft (fob price) minus the farm gate price of the papaya. Estimated export share of consumer purchase price: 12.6%	High: Post-harvest losses; importer claims for poor quality, delay in payments from importer; product offloaded due to lack of airline space; market access problems, etc.

c) Value chain analysis can identify weaknesses that prevent progress and suggest actions that can be taken

Example: Fresh breadfruit exports to New Zealand.

The value chain analysis undertaken by Natures Way Cooperative showed:

Situation: Large market exists, lots of breadfruit trees but very little breadfruit exported.

Weakness in chain: Breadfruit wild harvested – not possible to maintain quality and keep costs low.

Action to be taken: A project to assist moving from “wild” harvest to orchard production (the Pacific Breadfruit Project).



“WILD” HARVEST TO ORCHARD PRODUCTION

Who benefits from quality value chain analysis and how?

Those that benefit from value chain analysis are: farmers; traders; consumers; policy makers and aid donors.

Farmers

Accurate and understandable value chain analysis equips farmers to make business decisions that are in their best interest and helps them to decide where to focus their limited resources (time, land & \$s).

Example: A value chain analysis of Fiji taro exports to New Zealand shows that the exporters gross margin (the difference between the export selling price and the direct cost of marketing the taro – including the cost of buying the taro from the farmer) is 9.5% of the fob price (the price of the taro on the ship at the Suva wharf) (page 74). In assessing this level of profitability consideration has to be given to the exporter's contribution: costs incurred, investment made, expertise required and risks involved.

Using value chain analysis, taro farmers can make better business decisions, including:

Do

- Focus your effort and limited resources on what is most likely to increase and maintain your income taro - increase production, reduce costs and adopt more sustainable production practices.
- Consider alternative crops and land use activities.

Don't

- Don't withhold supplies from exporters in an effort to secure a higher price.
- Don't sell to "fly by night" buyers who offer unrealistic prices and then disappear and spoil your relationship with long standing reliable buyers.
- Don't lobby government to impose minimum prices which would make your product uncompetitive to consumers in the export market.
- Don't try to become an exporter with other farmers when no one has any experience of exporting.

Traders

Accurate and understandable value chain analysis helps traders understand the requirements of their buyers and needs of their suppliers and therefore enables them to perform better in the value chain.



Example: The Samoa taro export value chain. The Samoan taro industry was decimated by taro leaf blight (TLB) in 1993. Over the following twenty (20) years, considerable resources were devoted to the breeding of TLB resistant varieties. As a result, Samoa now has numerous taro varieties resistant to TLB. The target consumers in New Zealand like some of these new varieties but don't like others. The taste panel based market study undertaken as part of the value chain analysis identified which varieties consumers like and which they do not like.

Appropriate business decisions for taro exporters resulting from the value chain analysis could include:

Do

- Only export those varieties that have been identified by the market study as 'acceptable' to consumers.
- Clearly label consignments to identify the varieties for consumers.

Don't

- Don't export varieties just because you think they taste good.



Numerous taro varieties resulting from the breeding program for TLB resistance

Consumers

Value chain analysis is focused on the market and what consumers want. Thus accurate and understandable analysis of the value chain should lead to information on what the consumers of the product want being passed on to the actors in the chain. If the actors act on this information, the result is satisfied consumers spending more money on the product being produced by the value chain.

Example: Fiji papaya value chain analysis found that the consumers in target markets (NZ, Australia, US and Japan) preferred fruit that was red fleshed, around 600 gms and bell shaped and had high brix (sweetness) count. If papaya exports were to earn maximum income it was necessary for the value chain to supply to the market such a product.



Policy makers

Accurate analysis of the value chain and the identification of bottlenecks will assist government policy makers to introduce policies and programs that enhance rather than hinder the performance of the value chain.

Example: Fiji taro export value chain analysis found:

- The Fiji taro industry is characterized by a large number of marketing agents, traders and exporters, resulting in narrow marketing margins.
- Environmental vulnerability resulting in declining soil fertility.
- Market access vulnerability resulting in declining exports to Australia.

The appropriate response from policy makers resulting from the value chain analysis:

Do

- Promote sustainable agricultural practices in commercial taro production.
- Negotiate improved market access with importing countries.

Don't

- Don't try to set minimum farm gate prices for taro.
- Don't promote government agency involvement in taro marketing.
- Don't encourage farmers to become involved in taro marketing.

Aid donors

Accurate analysis of the value chain and the identification of bottlenecks can assist donors to identify appropriate programs and projects that enhance rather than hinder the performance of the value chain.

Example: Fiji taro export value chain analysis found:

- The Fiji taro industry is characterized by a large number of marketing agents, traders and exporters resulting in quite narrow marketing margins.
- Environmental vulnerability is reflected in declining soil fertility and the The Ministry of Agriculture has limited capability to address this problem.
- The vulnerability of Pacific Island taro to taro leaf blight.

Do

- Support farmer organisations together with the Ministry of Agriculture, to promote sustainable production practices.
- Facilitate the manufacture of low cost local lime manufacture to reduce soil acidity.
- Support taro breeding programs to develop varieties that are resistant to taro leaf blight.

Don't

- Don't support farmer groups wanting to get involved in taro marketing.



notes

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Why another guide and how can this guide be used?

Inclusive value chains???

Upgrading strategy???

Participatory value chain analysis???



Pacific farmer: "All this talk about value chains gives me a headache. What I want is more \$\$\$ from my papaya to pay my rent, paint my house, pay school fees and pay for my daughter's wedding.....!. Yes, if it helps me with these things than I am interested in this value chain thing"

Other Value Chain Guides

There are a wide range of value chain guides/resources that have been written to help people understand and apply the value chain concept. A recent report prepared for CTA "Guides for value chain development: A comparative review" analysed twelve of these guides (Table 1) and concluded:.

"All of the guides intend that their direct users, that is, those who collect and analyse data, will be development practitioners from government agencies, donor-funded projects, or NGOs. No guide is elaborated for implementation specifically for the private sector or for farmer groups, although many suggest that representatives of these be invited to participate during specific steps in the implementation process. Without exception, the guides are designed to be implemented by the organizations that sponsored the development of the guide and by other organizations." (Donovan et. al 2013)

The production of these various guides has taken place in an environment where key conceptual and methodological elements of value chain analysis are still evolving. Many of these guides include not only detailed procedures that require experts to carry out the analysis but also use detailed quasi-academic methodologies (Henriksen et.al. 2010). Existing value chain manuals and guides usually don't take sufficient account of the context of Pacific Islands agriculture – with its small volumes, high transport costs, remote producers and markets, etc. Furthermore, existing guides are also usually excessively complex and designed for use by those outside value chains, not by people who are actually working in them. Thus, in essence, they have been of very limited practical value. This guide endeavours to redress this shortcoming from the view point of Pacific Island farmers, traders and policy makers.

Target audience for this guide

This guide is intended to be practical and usable by the actors in Pacific Island value chains. It draws on the experience of actual Pacific Island value chains. The intended users include:

- Market orientated farmers, most of whom in the Pacific Islands are smallholders
- Input suppliers
- Marketing enterprises (traders, market vendors, exporters)
- Agro-processors
- Farmer organisations and industry associations
- Government departments (responsible for extension, economic planning, trade)
- Politicians
- Aid donors supporting agriculture and enterprise development
- Consultants, university academics and students (agriculture, business and economics)

In the development of this guide we asked our target users what they really wanted and needed from a value chain guide and these were some of their responses:

What do you want from a value chain guide?



Minoru Nishi
– Managing Director of Nishi Trading, Growers and Exporters of fresh produce, Tonga

“From Tonga one of our biggest issues is logistics, we are a small island in the middle of the ocean with very limited linkages to our main markets in NZ. I want to make my export company more efficient using the best available information and resources.”

“The papaya export business is very competitive and costs are going up every year. I want to know where I can drive out some of these costs and make more money for me and my network of farmers. I also want to know what we can do to help our buyer in NZ to sell more organic papaya so we can expand our farms.”

Lasa Aiono
- Extension Manager for Samoa Farmers Association (SFA) managing the export of Tahitian lime, foliage and crops

“One of the primary goals of the SFA is to improve linkages between farmers and marketing/processing enterprises. We would like a value chain guide to help explain to our members the importance of these enterprises and the contribution they make.”



Livai Tora
– Commercial organic papaya farmer from Nadi, Fiji Islands





Aileen Burness
- Managing Director of South Sea Orchids, Grower, Outgrower Manager and Chairperson of the Flower Grower Support Organisation, Fiji.

“For the small business people who are our members, it is very important for them to know how much time and money they spend on selling their products and understand other businesses selling prices. Many small floriculture businesses in Fiji sell their products at too high a price, which then limits the number of products sold. They could make more money if they lowered their prices and sold a lot more. I would like this guide to illustrate this point.”

“I really believe that the only (relatively) successful agribusinesses in the islands are the ones that started ‘slo-slo nomo’, gaining experience on the way and targeting the local market at the beginning. All the ones blabbering about millions of \$ went or will go kaput. A useful value chain guide needs to illustrate this to investors, policy makers and the large number of aid donors in operation.”



Piero Bianchessi
- Managing Director of Venui Vanilla, Grower, Processor and Marketer of spices, Vanuatu.

Basile Malili
- Manager of Cocoa Growers Association (CGA) of Vanuatu



“CGA members need to understand the requirements of the market in terms of quality – which means better fermentation and drying that is not contaminated by smoke. It would be good if value chain analysis helped our members to understand that this is what our market requires.”

"I have had my stall at the market for the last 12 years. However this is a very small municipal market. I would like to start supplying hotels with my produce but I really don't know much about that business. I would like a guide that can help me expand my business into new markets."



Uate Logapila
- Second largest market vendor at Rakiraki Municipal Market, Fiji.

Cema Bolabola
- Local Consultant, UNDP Pacific Centre, Millennium Market Project on economic security and rights of women market vendors and their economic empowerment



"I have heard so much about value chains from numerous organisations and many development project staff but all the talk really didn't make sense to me. I would like a value chain guide to demystify the concept and the practice of value chain and just explain to me in simple terms what this 'value chain' is all about, how it can be used to inform and empower our women market vendors to make business decisions to improve their livelihoods."

"People need to understand that profitable agriculture starts with quality seed and seedlings. If you don't get this first step right you will not succeed even if you have a good market and do everything else right. I would like a value chain guide to help explain that your business is only as strong as the weakest link."



Sant Kumar
- Managing Director of Bula Agro Enterprise, Fruit and Vegetable Seedling Suppliers



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The steps in value chain analysis

There are many approaches to value chain analysis and numerous tools to help make this analysis meaningful. This guide outlines the six recommended steps for practical value chain analysis. These are:

Step 1: *Drawing a value chain map*

Step 2: *Putting real and accurate information into the map*

Step 3: *Identifying the services each actor provides and returns received for these services*

Step 4: *Assessing the market*

Step 5: *Assessing strengths and weaknesses for all actors along the chain and ways to capitalise on strengths and minimise weaknesses*

Step 6: *Developing a plan to improve the value chain*



In support of each of these steps is a list of helpful tools that can be used by those analysing the value chain.

We have used the example of the 'Fiji Red' papaya export value chain to New Zealand as an example for each of these steps. The steps for value chain analysis are best carried out by a group of the actors who are themselves involved in various links of the value chain.

This is called a 'participatory value chain approach'. In this approach, it is often helpful to assign someone to be the 'facilitator' which involves the writing up of all of the information drawn out from the different steps above. It is usually desirable for the facilitator to have some experience and training in value chains. This facilitator can also be tasked with chasing up additional information the group require to finalise their work. More than one meeting of the group is usually required.



Stakeholders discussing fresh produce the value chain from PNG's Central Province to a Port Moresby supermarket chain

Step 1: Drawing a value chain map

What's involved

1. List down all of the people involved in getting the product from the farm to the plate of the consumer. The people you have listed can also be called 'actors'. You may decide to divide your list into main actors and supporting actors, with the main actors being those who buy and sell the product as it moves along the chain and the support actors being those who provide services to facilitate the movement of the product along the chain.
2. Arrange these people in order of how the product moves (the map) starting from the farm all the way through to the consumer.

Example from 'Fiji Red' papaya export value chain to New Zealand

Part 1:

List of actors involved in the value chain

The main value chain for the papaya being exported to New Zealand

Main actors - (those who buy and sell the product as it moves along the chain)	Supporting actors - (those who provide services to facilitate the movement of the product along the chain)
Farmers	Input suppliers (nursery operators, farm supply companies)
Exporters	Extension officers (Nature's Way Cooperative and Ag Department)
New Zealand importer/wholesaler	Nature's Way Cooperative (Quarantine treatment)
Retailer	BAF (the Fiji Quarantine Service)
Consumers	

The secondary value chain is the papaya being sold on the local market

Main actors - (those who buy and sell the product as it moves along the chain)	Supporting actors - those who provide services to facilitate the movement of the product along the chain
Farmers	Input suppliers (nursery operators, farm supply companies)
Traders/Exporters (selling export reject fruit on the local market)	Extension officers
Market vendor/other retailers/hotels	Transport operators
Consumers	

Part 2:

Drawing a map of how the product flows and placing each actor in their correct place along the chain



Tools and tips

- Appoint a good facilitator – preferably with some experience and basic training.
- This exercise is best done with a very specific value chain, that is, a real product from a specific location to a specific customer (wholesaler, retailer or hotel). More general value chain maps can be quite difficult.
- This exercise is best done with a group of people who are directly involved in the supply chain.
- Using a whiteboard or butcher paper for 'brainstorming' is useful.
- When drawing your map, you should start with placing all of your 'main actors' in their places and then adding in your supporting actors.

Step 2: Putting facts and figures into the map

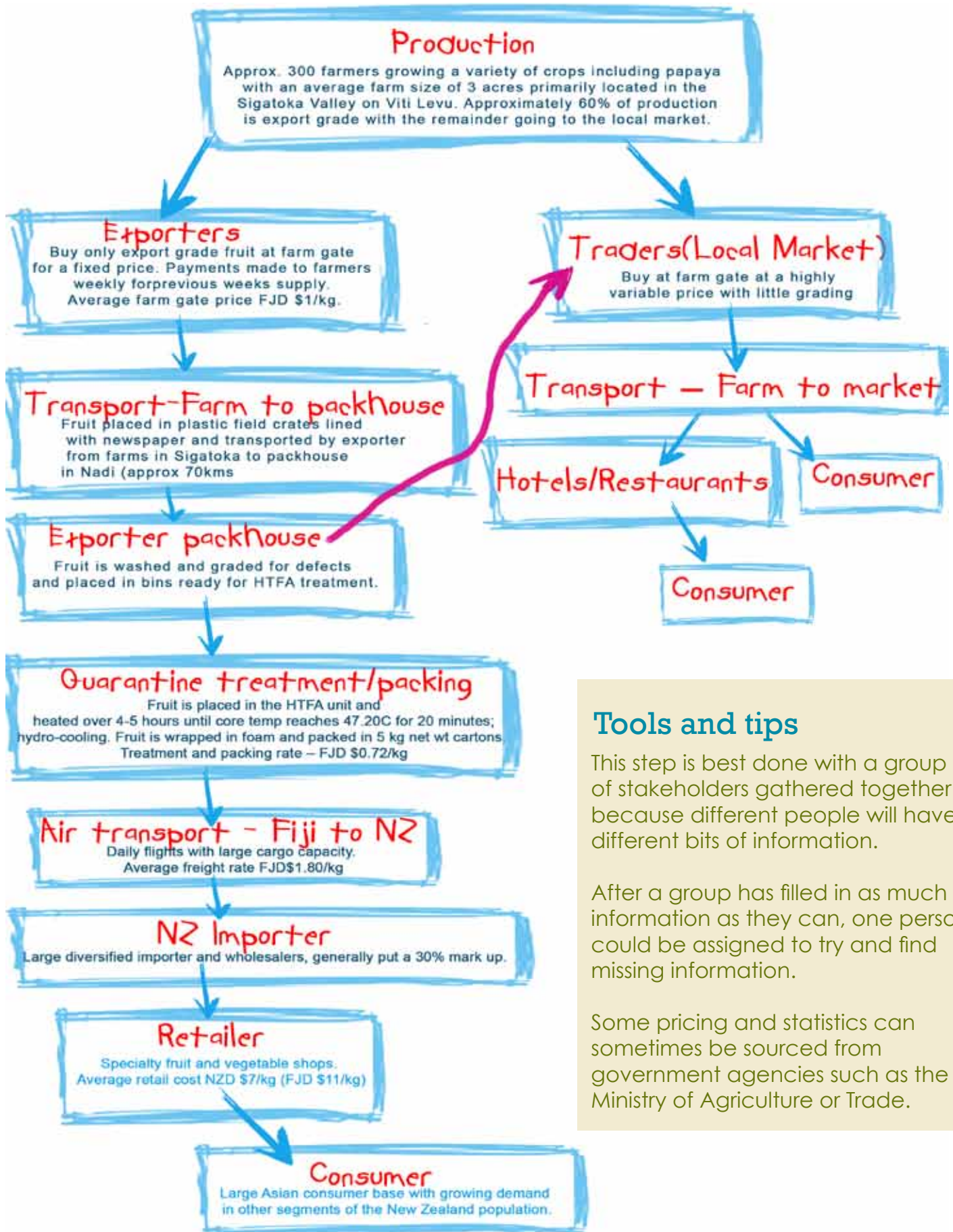
What's involved

This step involves adding as much 'relevant' information as possible to your value chain map in the form of real and accurate facts and figures. This step can also be called 'quantification of the chain' or adding numbers to the value chain map.

Some things to think about at each step of the chain are: How many people are involved, what is the cost of the activity, what is the transport distance, pricing, margins, losses or wastage and risks.



Example of populating the value chain map from 'Fiji Red' papaya export value chain to New Zealand



Tools and tips

This step is best done with a group of stakeholders gathered together because different people will have different bits of information.

After a group has filled in as much information as they can, one person could be assigned to try and find missing information.

Some pricing and statistics can sometimes be sourced from government agencies such as the Ministry of Agriculture or Trade.

Step 3: Identifying what each actor contributes to the final product and the returns they receive


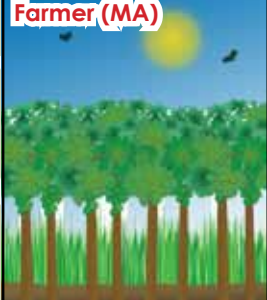
What's involved

- Create a table that starts with a list of the actors in the value chain. List what each actor specifically does to produce the final product.
- List the cost of (and where possible quantify) each actor's contribution to the final product.
- Calculate the return the actor receives (the difference between the actor's buying and selling price).
- Consider (and where possible quantify) the risks (the chances of things going wrong) faced by each actor.

Tools and tips

- Formal questionnaires and interviews
- Group "brain storming" with actors along chain
- Make full use of any available price and cost information

Example from 'Fiji Red' papaya export value chain to New Zealand

Actor (participant in the value chain) Main actor (MA) Support actor (SA)	What the actor contributes to the final product	The cost of the actor's contribution	The reward the actor receives (share of the final selling price to the consumer)	Actor risk
 Seedling supplier (SA)	Certified seedlings that provide the sweet "Fiji Red" papaya that overseas consumers look for at their local supermarket	Cost of certified seed, potting mix, nursery operators' time	The selling price of the certified seedlings to the farmer. Estimated seedling supplier share of the consumer purchase price: 0.02%	Moderate: Natural disasters such as floods or cyclones
 Farmer (MA)	Takes the certified seedlings and combines with other inputs to produce papaya to sell at the farm gate. Farmers contribute their land, labour and expertise, etc.	Cost of land preparation, fertiliser, farmers' time	The farm gate selling price of a kg of exportable papaya minus the cost of seedlings and other inputs. Estimated farmer share of the consumer purchase price: 11.0%	High: Natural disasters, weather, disease, theft, etc.

Actor (participant in the value chain) Main actor (MA) Support actor (SA)	What the actor contributes to the final product	The cost of the actor's contribution	The reward the actor receives (share of the final selling price to the consumer)	Actor risk
 Exporter (MA)	Transports, grades, washes, arranges and pays for quarantine treatment, finds markets, arranges air freight, etc.	Cost of operating packing facility and operating trucks. Cost of cartons and packaging, paying for quarantine treatment, pack house labour, etc.	The price of papaya loaded on the aircraft (fob price) minus the farm gate price of the papaya Estimated exporter share of consumer purchase price: 12.6%	High: Post-harvest losses; importer claims; delay in payments from importer; product offloaded due to lack of airline space; market access problems.
 Quarantine treatment (SA)	Provides quarantine treatment required to conform to bilateral quarantine agreement (BQA) with importing country. Provides grading and packing services.	Cost of energy, cost of labour and management, repair and maintenance, "rainy day" reserves, BAF charges, etc.	The cost incurred for quarantine treatment Estimated quarantine treatment share of consumer purchase price: 8.0%	Low to moderate: Natural disasters
 Biosecurity (SA)	To ensure the requirements of the BQA are met	Contribution to BAF overheads, time of BAF officers	The cost incurred to obtain the quarantine certification required by the importing country Estimated BAF share of consumer purchase price: 0.04%	None
 Air freight (SA)	To transport the papaya from Nadi airport to Auckland airport	Fuel, labour and management, etc.	The cost incurred to transport the papaya from the Nadi airport to the Auckland airport Estimated air freight company share of consumer purchase price: 13.8%	None
 Importer/Wholesaler (MA)	Clears, stores, ripens and distributes the product to retailers	Clearance charges, ripening charges, labour, cost of operating and maintaining storage facilities, transportation	The difference between the price of the papaya landed at Auckland airport and the wholesale price paid by the papaya retailers Estimated importer/wholesaler share of the consumer purchase price: 9.4%	Moderate: post shipment losses, claims and delayed payments from retailers
 Retailer (MA)	Makes the papaya conveniently available to the final buyer – displays, promotes and serves	Cost of operating the supermarket, advertising, etc. Cost of produce that cannot be sold	The difference between the wholesale and retail price Estimated retailers share of the consumer purchase price: 43.0%	High to very high: not being able to sell a highly perishable product that must be disposed of in a very limited time. Post rots are most prevalent at the retail stage. Price undercutting from competitors.
 Consumer (MA)	The "Queen" at the end of the chain			Insignificant: If the customer doesn't like the product she won't buy again and will tell her friends.

Step 4:

Assessing the market

This step is sometimes called market research or market analysis

What's involved

Write down what you understand the consumer cares about the most and try to score the performance of the value chain in meeting these demands and why.

Depending on how close you are to the consumers (whether it is a local or export product), you will either need to interview consumers or try to get in contact with someone who deals with end consumers often and can help you list down what the consumers really care about.

If you have sufficient funding, formal taste testing of consumers by experts can provide very useful information (see example above for Samoan taro sold to New Zealand)

Tools and tips

- This step can best be done if you have access to a recent market study to draw information from.
- Market studies tend to be far more useful if you already have a product to discuss with buyers rather than just an idea or a concept.
- Market studies are often undertaken by consultants. It can be far more useful if the exporter is also involved which allows actual buyers and sellers to meet.
- Good to have somebody involved in this step who regularly handles the product at the retail side – deals with customers.
- If you don't have a recent market study or access to a retailer, you may try sending a questionnaire to the wholesaler or retailer asking them to provide the information for the table above.
- Try sending what you have already worked on to the wholesaler and retailer to provide their comments. Sometimes you will have to send them several requests in order to get a response – be persistent.
- Some Pacific Island exporters have found repeated participation in trade and fine food fairs to be very useful. However, for small niche markets such participation may not be profitable unless sponsored by donors.
- Formal consumer taste panel tests undertaken by professionals can be very useful.
- In-store promotions can also provide useful information – but these can be expensive.

See Shepherd, Andrew, 2003. Market research for agroprocessors. Marketing Extension Guide No. 3, FAO. <ftp://ftp.fao.org/docrep/fao/007/y4532e/y4532e00.pdf>

Example from 'Fiji Red' papaya export value chain to New Zealand

What consumers care about	Performance of value chain in meeting demand (score from 1 – 10) and why
Fruit taste	9 – Feedback is that consumers in New Zealand love the taste of 'Fiji Red' papaya and it is superior to other products on the market. However, there are some cases where seed purity has been lost and the consumers get a less tasty and yellowish fruit.
Quality (disease and physical damage)	7 – Physical damage is a problem for Fiji papaya because there are so many steps in the chain where the fruit is handled and generally it has more marks on the fruit than the competition. Disease in the form of post-harvest rots can be a problem in Fiji's wet season (November –April).
Health benefits	10 – Fiji papaya is a healthy product like all papaya. However, Fiji papaya has the added advantage that consumers often envision that it is produced in a healthy, "pristine" environment.
Price	7 – Fiji papaya in New Zealand is more expensive than the competition.
Packaging and labelling	5 – Most exporters do not use any fruit stickers and retailers do not use special labelling or displays that indicate it is a 'Fiji Red' product. VC analysis has identified the need to patent the "Fiji Red" brand.



Step 5: Assessing strengths and weaknesses along the chain and identifying actions required.

This step is sometimes referred to as SWOT Analysis - S (Strengths) W (Weaknesses) O (Opportunities) and T (Threats)


What's involved?








- Examine each link along the value chain to find out what is done well and what is not done so well in terms of producing the final product and getting it into the hands of the consumer. Consider, where possible, potential threats and risks along the chain.
- Consider what more can be done to take greater advantage of what is being done well and make recommendations for the appropriate action.
- Consider what can be done to reduce the weaknesses and make recommendations for the appropriate action. This would take account of threats and risks along the chain.

Tools and tips

- First undertake a preliminary analysis before working in a group.
- Present preliminary draft findings to meetings with actors along the chain for verification and refinement.
- To be completed with an industry-wide meeting for endorsement of findings and ownership of recommendations that forms the basis of developing the plan to improve the value chain (step 6).

Example from 'Fiji Red' papaya export value chain to New Zealand

Actor (participant in the value chain)	Strengths and opportunities	Weaknesses and threats	Action needed
 <p>Seedling supplier (SA)</p>	<ul style="list-style-type: none"> • Competent private nurseries in place to supply high quality seedlings at a competitive price • The availability of selected "Fiji Red" seed • A reserve stock of quality seed now in place • No longer necessary to import seed from Hawaii or elsewhere. 	<ul style="list-style-type: none"> • Poor cross-pollinated seed being used by some farmers and seedling suppliers. 	<ul style="list-style-type: none"> • The implementation of a seed certification scheme. • The importance of high quality "Fiji Red" seed promoted to farmers

Actor (participant in the value chain)	Strengths and opportunities	Weaknesses and threats	Action needed
 <p>Farmer (MA)</p>	<ul style="list-style-type: none"> • Relatively high level of entrepreneurship by farmers growing papaya (particularly in the Sigatoka Valley). • Excellent inherent agronomic conditions for growing “Fiji Red” papaya. • Ability to produce high quality organic papaya at a competitive price. 	<ul style="list-style-type: none"> • Vulnerability to natural disasters • Most farmers don't have access to irrigation • Inadequate attention given to drainage. • Some farmers not using selected “Fiji Red” papaya seed. • A susceptibility to post-harvest rots • A concentration of papaya farming in one location – increasing disaster risk. • The risk of future incursion of pest and diseases of quarantine significance 	<ul style="list-style-type: none"> • A more focused extension effort • Expanding papaya production areas • The implementation of measures to reduce post-harvest rots • Implementation of a certified seed scheme
 <p>Exporter (MA)</p>	<ul style="list-style-type: none"> • A number of long-standing exporters that provide competition 	<ul style="list-style-type: none"> • Mainly purchasing fruit from one geographical area • Under-developed contract farming • No track record in developing mainstream supermarket markets 	<ul style="list-style-type: none"> • Incentives to link exporters to farmers in new areas • Patent and certify the “Fiji Red” brand
 <p>Quarantine treatment (SA)</p>	<ul style="list-style-type: none"> • A longstanding highly reliable quarantine treatment in place • A non-chemical quarantine treatments allows for organic papaya exports 	<ul style="list-style-type: none"> • The high cost of quarantine treatment 	<ul style="list-style-type: none"> • Support for measures to reduce energy costs • Support for market access requests to reduce the necessary treatment time • Support for programs to increase treatment throughput to reduce unit costs
 <p>Biosecurity (SA)</p>	<ul style="list-style-type: none"> • Fiji Quarantine involvement only regulatory – government now not involved in treatment 	<ul style="list-style-type: none"> • High cost of biosecurity certification due to user pays policy • Slow pace of securing and reforming market access agreements. No market access to the remunerative US market 	<ul style="list-style-type: none"> • Reform of BAF to reduce costs and increase efficiency. • A concerted effort required to secure long outstanding US market access
 <p>Freight (SA)</p>	<ul style="list-style-type: none"> • Daily flights to Auckland 	<ul style="list-style-type: none"> • Limited air freight capacity on new Fiji Airways aircraft • High air freight charges 	<ul style="list-style-type: none"> • Working with Fiji Airways and other companies to improve air freight availability. • Priority given to undertaking sea freight trials
 <p>Importer/Wholesaler (MA)</p>	<ul style="list-style-type: none"> • A number of wholesalers/ importers keen to import “Fiji Red” papaya 	<ul style="list-style-type: none"> • Insufficient consistent supply at a competitive price available to expand the market. • Not supplying the major supermarket chains yet. • Fiji papaya not price competitive with sea freight imports from the Philippines. • Seasonal problem with post-shipment rots 	<ul style="list-style-type: none"> • Improve competitiveness – quantity, consistency, quality and price
 <p>Retailer (MA)</p>	<ul style="list-style-type: none"> • Fiji papaya has superior flavour and flesh colour. • The Fijian environment and people have good image in the market 	<ul style="list-style-type: none"> • Not found in major supermarkets • Not taking full advantage of superior attributes of Fiji papaya 	<ul style="list-style-type: none"> • A campaign to promote superior attributes of Fiji papaya • Development of niche premium markets (certified organic)

Step 6:

Developing a plan to improve the value chain

In this step we are converting our value chain analysis to real value chain development. This step leads to what is often referred to as the upgrading strategy.

What's involved?

Take the findings from Step 5 to develop a plan to improve the value chain. This should involve both short-term and longer-term plans.

There can be plans for the individual actors and plans for the entire value chain.


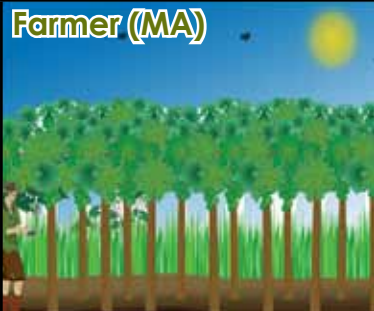





- Short-term plans (things to be done that will have a quick impact – to take advantage of “low hanging fruit”).
- Longer-term plans (things to be done, the impact of which will be felt further into the future)

It is important to identify a key driver in the value chain that can take a leading role in implementing the value chain improvements.

Tools and tips

- In developing plans, set priorities taking into account what is achievable and what are the costs and expected benefits. Cost-benefit analysis is an important tool in setting priorities (see 6.1).
- Present draft plan to actors along the chain for their verification and inputs.
- Present plan(s) to industry-wide meeting for endorsement and ownership.
- Remember what is being proposed may require external funding assistance. This could involve a bank loan, being part of a public private sector partnership with the government or aid donor assistance. If so, you will need to take into account the requirements of these external entities in preparing your plan.

Example from 'Fiji Red' papaya export value chain to New Zealand

Actor	Short term plan	Longer term plan
 <p>Seedling supplier (SA)</p>	<ul style="list-style-type: none"> • The training of selected farmers in “best practice” seed collection techniques. • Facilitating the establishment of seed and seedling supply enterprises. 	<ul style="list-style-type: none"> • Papaya planting material only to be supplied by certified private nurseries.
 <p>Farmer (MA)</p>	<ul style="list-style-type: none"> • A concerted extension effort advising farmers of the adverse consequences of collecting their own seed but to instead purchase seedlings from recommended nurseries. • Introduce improved field practices to reduce rots. 	<ul style="list-style-type: none"> • The development of papaya production “best practice” for disaster and climate change mitigation.
 <p>Exporter (MA)</p>	<ul style="list-style-type: none"> • The adoption of wrapping fruit in newspaper to reduce costs. 	<ul style="list-style-type: none"> • Development of appropriate contract farming in new production areas.
 <p>Quarantine treatment (SA)</p>	<ul style="list-style-type: none"> • Negotiate reduced treatment holding time with New Zealand quarantine authorities. • Install equipment to reduce post-harvest rots. 	<ul style="list-style-type: none"> • Increasing throughput to reduce unit treatment costs.
 <p>Biosecurity (SA)</p>	<ul style="list-style-type: none"> • Industry negotiating with BAF and Ministry of Agriculture to reduce treatment charges. 	<ul style="list-style-type: none"> • Focus attention on improving market access and the Bilateral Quarantine Agreement (BQA). • Reform of the Biosecurity Authority of Fiji (BAF) to improve service, reduce cost and improve efficiency.
 <p>Freight (SA)</p>	<ul style="list-style-type: none"> • Industry negotiations with Fiji Airways and other airlines, to reduce freight charges. 	<ul style="list-style-type: none"> • Undertake applied sea freight research.
 <p>Wholesaler/Retailer (SA)</p>	<ul style="list-style-type: none"> • Develop an industry marketing plan for “Fiji Red” papaya to be sold in major supermarket chains (how to compete with Dole papaya from the Philippines). • Develop an industry marketing plan for niche speciality “red” papaya (organic/speciality markets). 	<ul style="list-style-type: none"> • The implementation of the industry market plans.

notes



notes



Key lessons from Pacific Island value chain studies

There are a number of key lessons that can be drawn from the experience of value chain development in the Pacific Islands which are incorporated into practical messages for value chain training. Twelve (12) key lessons are summarised below and discussed in the detailed case studies presented in annex 1.

The key lessons are:

- The most successful value chains have been built around niche markets and/or seasonality.
- Gradual stepwise development is a feature of successful niche market value chains.
- Bulk commodities are now shifting slowly toward niche market exports.
- Premium quality products are imperative for the commercial viability of niche market exports from small remote locations.
- In successful value chains, agribusinesses “pull” the products through the chain.
- There is a need to respond to the “tyranny of isolation” and diseconomies of scale, if farmers from outer-island and interior locations are to benefit from value chains.
- Technology plays an important role in providing market access and improving efficiency.
- There is a need to provide smallholder farmers with the necessary information and technical skills.
- Market access constraints for export market value chain development are very difficult to resolve.
- There is a role for public-private partnerships in value chain development.
- Longer term financial viability can depend on more sustainable production practices being adopted.
- Continuing donor and technical assistance is likely to be needed for many chains to reach sustainable profitability.



Key lesson #1:

The most successful value chains in the Pacific Islands are likely to be built around niche markets and/or seasonality.

A niche market is a small but different part of the overall market for the product.

Example 1: Vanuatu pepper exports to Europe (Case Study 4)

Smallholders from the outer islands of Vanuatu can produce premium quality pepper. However, they cannot compete in European markets with bulk pepper producers from Kerala in India or Sri Lanka.

Volumes from Vanuatu are too low and costs are too high to compete in the pepper commodity market. For the Vanuatu pepper value chain to survive, it requires a selling price three (3) times higher than bulk pepper from Sri Lanka and India.

To compete, Vanuatu's pepper exporters must offer a small part of the pepper market something special that enables them to secure a much higher price for the small volume of pepper supplied.

To achieve this, Vanuatu offers selected buyers a premium quality product that is beautifully packaged and certified (organically grown, food-safe pepper sourced from the romantic islands of Vanuatu).



VS

Bulk pepper from Sri Lanka

**Example 1:
Vanuatu pepper exports to Europe (Case Study 4)**



Example 2: Samoan lime exports to New Zealand based on seasonality (Case Study 5)

From September to March, New Zealand cannot produce Tahitian limes – thus the local price is very high during this period. Samoa can produce quality limes all year round. During the September to March window, they are exported to New Zealand when the price is sufficient to offset the high cost of air freighting small volumes.



Imported Tahitian limes selling in an Auckland supermarket in September for an exceptionally high price.



Example 3: Fiji built a major export industry around exporting ginger to the US during the Hawaii “off season”

In Fiji, (southern hemisphere) ginger is harvested between July and October which is the off season for Hawaii ginger (northern hemisphere). Thus US ginger importers combined Hawaii and Fiji ginger value chains to secure year round supply



**Fiji mature ginger curing
in August, destined for Los
Angeles**



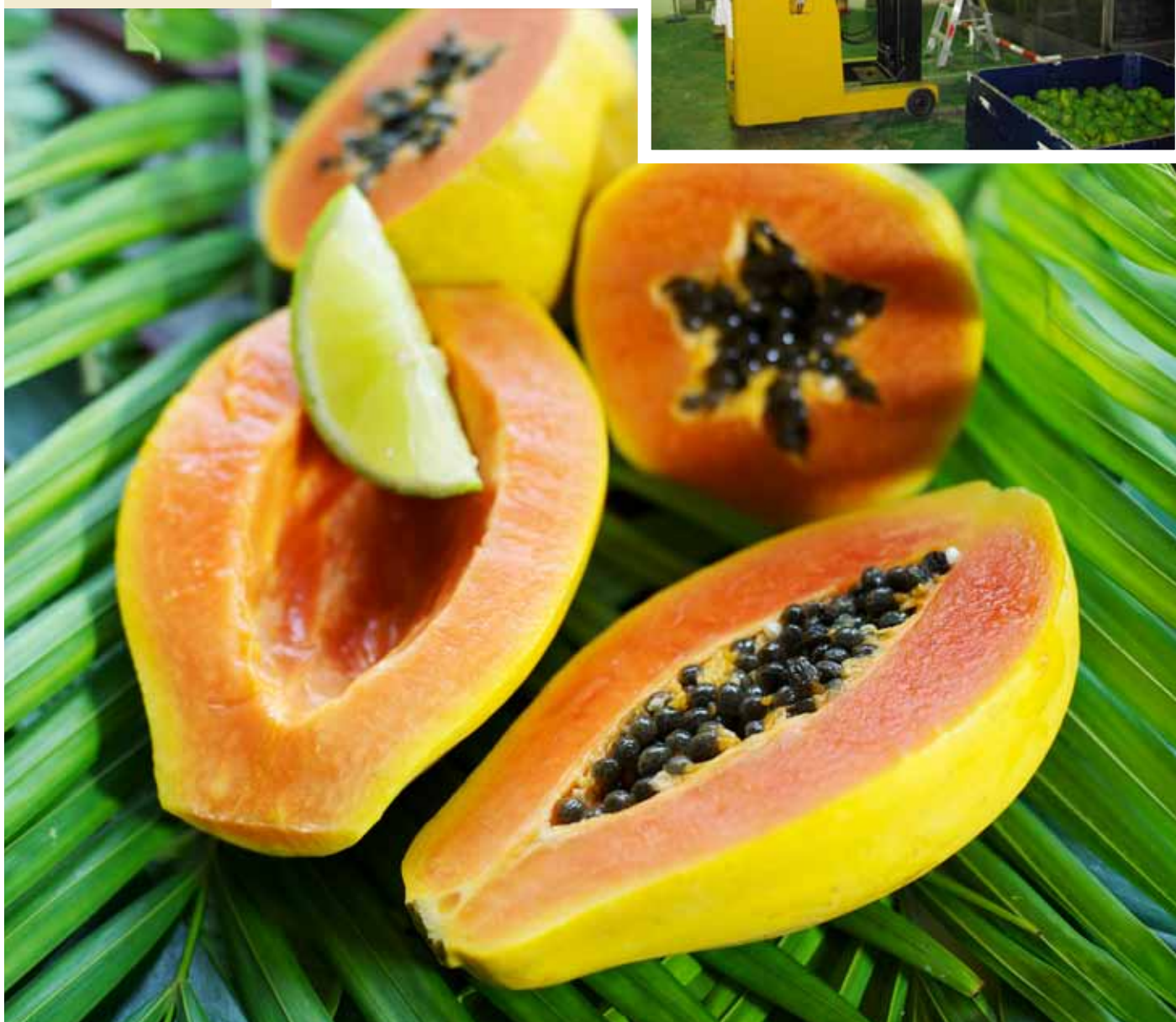
**Hawaii mature ginger curing
in February, destined for Los
Angeles**

Example 4: Fiji Red papaya (Case Study 2)

Fiji Red papaya, with its unique quality characteristics, has been able to develop niche markets in New Zealand, Australia, Japan and hopefully in the future, the United States. The development of these markets was facilitated by the establishment of a non-chemical quarantine treatment facility owned and operated by the industry. Premium quality provides the basis for establishing and expanding these markets.

**Non-chemical quarantine
treatment at Nature's Way
Cooperative**

**Premium quality
"Fiji Red" papaya**





Example 5: Solomon Islands cut flowers (Case Study 6)

The large increase in the expatriate community in the Solomon Islands following the crisis of 2001 substantially increased the demand for high price cut flowers in the Honiara municipal market.



The large donor community in Honiara regularly buy flowers to decorate their homes.



Flower growers make a good return from selling cut flowers at the Honiara market.

Key lesson #2: Gradual stepwise progression a key feature of successful niche market value chain development.

Most successful Pacific Island agricultural value chains have developed in a gradual progression. These chains often start with an entrepreneurial investor with a concept. Vanuatu spice exports (Case Study 4) and Fiji fresh ginger exports (McGregor 1988) provide examples. The key lessons from these examples are:

- Building products and markets is an incremental step-by-step process involving continuous feed-back between seller and buyer.
- The importance of long-term exporter/buyer relationships – a close relationship based on trust must be developed.
- Successful value chains need to be market driven, but you first need a product to develop a market. The skill of the entrepreneur is to be able to first identify and finance products that the market will want. These products can then be tested in the market and adjusted and developed accordingly.
- The role of the local market (particularly tourism based) in developing and testing products that can later be exported.
- The role of smaller nearby export markets such as New Zealand in serving as a learning process before venturing to larger and more difficult markets such as Australia, United States or Japan.
- The importance of participatory marketing studies where the actual marketing entrepreneur takes the product to actual buyers.
- The value of repeat participation of small Pacific exporters in appropriate industry networking events such as Fine Food Fairs.
- Third-party consultant market studies are of limited value. However, organisations such as PITIC (based in Auckland and Sydney) play an important “marriage broker” role placing Pacific Island exporters and potential buyers together.



Where it all began 20 years ago
in a kitchen in South Santo



The first packaged products
sold to tourists in Vanuatu



Today –
premium
Vanuatu
vanilla
is sold
around
the world

Key lesson # 3: Pacific Island bulk commodities are now slowly shifting toward niche market exports.

Pacific Islands commodities such as cocoa, coffee and coconut products have been traditionally sold on bulk international markets. On these markets it is the interaction of numerous anonymous buyers and sellers that determines the price. If you supply the minimum quality (usually a sea freight container load – 10 tonnes), you receive the price that has been determined at that time for a specified quality standard (different quality standards receive different prices).

If you have the product, you deal with a commodity trader (not the end user) and you get the international market determined price on offer. The marketing study requirements are limited to knowing who the traders are, where they are located, their shipping requirements and the quality requirements of the market. For such bulk markets, an incremental growth strategy for the value chain is not relevant. The quicker the exporter can move from supplying one container (10 tonnes) to 100 containers (1,000 tonnes) the better. The market can absorb all that can be shipped at the prevailing market determined price.

EXAMPLE 1: BOUGAINVILLE COCOA SOLD ON WORLD MARKET



The price for bulk traded cocoa is determined by numerous buyers and sellers trading in New York. It is not necessary for a cocoa exporter based in Bougainville or Malekula to establish a relationship with these traders.

Recent years have seen a shift in some Pacific Island commodity chains toward extending through to the end user to obtain a higher price for the relatively small volumes exported. Niche markets are created by differentiating Pacific Island products for final consumers through origin, fair trade and organic certification, and further processing or packaging, such as producing Pacific Island chocolate from Pacific Island cocoa or packing beans in individual packets.

EXAMPLE 2: NICHE MARKET COCOA FROM MALEKULA VANUATU



Organically certified cocoa beans from Malekula Vanuatu ready for shipment to French chocolate maker



French chocolate maker selling the Vanuatu 'name' directly to the retailer and the final customer

By selling directly to end users, significant value can be added. This should flow on to all the actors in the value chain. However, unlike bulk commodity markets, success depends on establishing and maintaining long-term relationships with the buyer who markets your product at the end of the value chain. For example, the French organic chocolate brand, Kaoka, had established a long-term relationship with the Vanuatu Organic Cocoa Cooperative Association (VOCCA) to supply organically certified cocoa beans.

These beans were manufactured into Vanuatu origin chocolate – with the name Vanuatu featuring prominently on the retail label (McGregor, Wotas and Tora 2009). At its peak, over 200 tonnes of organically certified cocoa were exported to France. Regrettably, the Vanuatu organic cocoa value chain collapsed when this relationship broke down, which in turn led to the collapse of the Cooperative. Vanuatu has now returned to selling its cocoa on bulk commodity markets at significantly lower prices.

Key lesson # 4: Premium quality products are imperative for the commercial viability of niche market exports from small remote locations.

Transport costs for Pacific Island products are high along the entire value chain due to factors such as isolation, poor infrastructure, diseconomies of scale and lack of competition. These costs tend to be the same regardless of the quality of the shipped product. The only way profits can be made along the value chain is to sell high quality products that can secure the highest possible price. Profitability can be further enhanced by adding value through such things as packaging and various forms of certification (organic, fair trade, origin, food safety) sought by the market.



Key lesson # 5: In successful value chains, agribusinesses “pull” the products through the chain.

Farmers or farmer groups have not been successful in “pushing” products through the value chain.

A successful agribusiness is linked to the market and knows what the consumer wants. The consumer, via the agribusiness, that is said to “pull” the product through the chain. This compares with farmers who are removed from the market but still think they know what the market wants, and try to “push” the product through the chain.

Donors and NGOs have nearly always focused their attention at the farmer end of the value chain ignoring the needs of the businesses that buy the product and pull it through the chain. This can be to the detriment of the entire chain including the farmers.



Successful value chains are “pulled” by the consumer

Key lesson # 6:

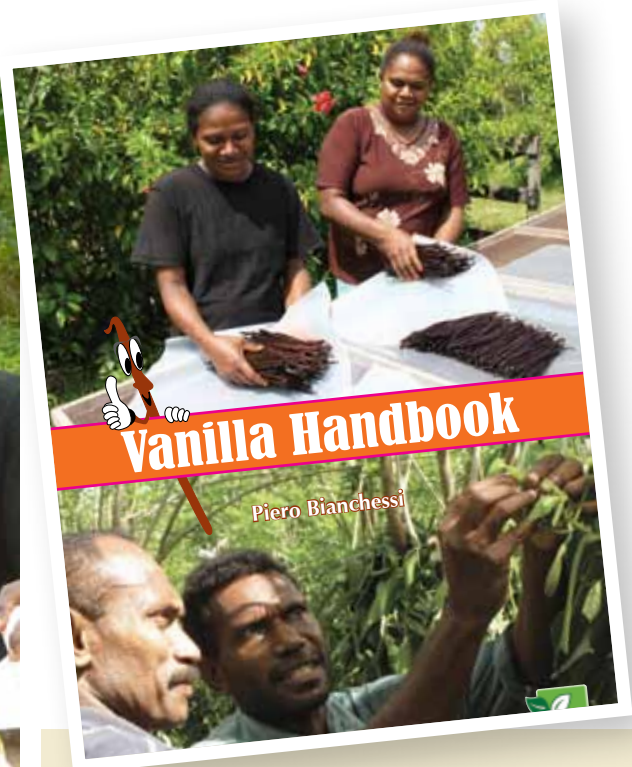
There is a need to respond to the “tyranny” of isolation and diseconomies of scale if farmers from outer-island and interior locations are to benefit from value chains.

In countries like PNG, Solomon Islands and Vanuatu, a high percentage of the people are isolated from the main urban centres and international ports and airports. The “tyranny of isolation” means that many of these people do not participate in agricultural value chains. The Vanuatu spices value chain case study (Case Study 4) has shown that it is possible to overcome this “tyranny of isolation” provided the following three necessary conditions are met:

- the right product (high unit value and non-perishable);
- the right type of marketing and processing enterprise (“pulling” the product through the value chain) and,
- the right support mechanism (providing correct and appropriate information to farmers).



The right product – shelf stable high value vanilla from Tanna, Vanuatu



The right support – Venui Vanilla and CTA training materials and a market outlet for remote farmers on the islands of Vanuatu.

Key lesson # 7:

The role of technology in providing market access and improving efficiency.

New technologies and processes have been fundamental in the development of Pacific Island value chains. A prominent example was the introduction of High Temperature Forced Air (HTFA) quarantine treatment technology in Fiji. HTFA was the catalyst for the current papaya and breadfruit export value chains (Case Studies 2 and 3).

Key features of the introduction and operation of this technology were:

- Donor technical assistance.
- Operation by the private sector (the industry) – a major departure from past arrangements.
- A public private sector partnership to mobilize the necessary resources.

Samoa lime exports (Case Study 5) have also been based on the introduction of a new quarantine technology/process (the New Zealand non-fruit fly host quarantine treatment protocol).

In Fiji, further down the value chain, the ready availability of plastic field crates has substantially reduced post-harvest losses and increased the returns from the growing and marketing of papaya (Case Study 2). The adoption of this simple technology would benefit all fresh produce industries throughout the region – including those servicing domestic markets.

In Fiji, the access to air freight capacity sharply deteriorated in 2013 and costs rose, threatening the viability of fresh export industries. Applied collaborative research has illustrated that it is technically and economically feasible to sea freight papaya to New Zealand and the research focus has now shifted to sea freight to Australia (Case Study 2). Reliance on air freight for exports is always risky when flights are used primarily for tourists. Natural disasters or political disruptions can affect the number of visitors and reduce the number of flights and, hence, cargo space availability.

The development of the Fiji breadfruit value chain requires technology to move from wild harvesting to fruit grown in small commercial orchards (Case Study 3). In-field and mass propagation techniques are being developed together with appropriate orchard management systems.

The introduction of new sustainable land management technologies has been necessary for the Fiji taro value chain in the face of deteriorating soil fertility. The viability of Vanuatu's spice exports has depended on the introduction of state-of-the-art value adding and packaging technology for vanilla that is being sourced from village-based farmers in the remotest locations.

The introduction of plastic field crates by Nature's Way Cooperative has led to a significant uptake in this technology and an improvement in quality.



Pallets of 'Fiji Red' papaya ready for a sea freight trial to New Zealand.

Key lesson # 8:

The need to provide smallholder farmers with the necessary information and technical skills.

Pacific Island value chains all involve smallholder farmers, who are usually village based. Such farmers invariably have poor access to the technology required to meet market requirements. This limits their ability to effectively participate in value chains. Some key information and skill areas identified include: pest and disease control, soil fertility maintenance, post-harvest handling of produce and food technology.

Government research and extension entities have faced difficulty in providing technical information and skills required by farmers to produce high value horticultural and spice products. Yet there has been an unwillingness on the part of agribusinesses to provide these essential services – because of the small number of farmers.

In Vanuatu, the value chain for high value spices is able to reach village farmers in the remotest locations via the “Spices Network” that provides the necessary technical skill and information (Case Study 4). This successful outreach has been based on a long standing relationship between a processing and marketing company and a farmers’ organisation. Without these, the value chain would not exist.

The Samoa Farmers Association (SFA) is playing a similar role in the development of lime exports by providing high quality planting material, tree husbandry and post-harvest handling advice (Case Study 5).

In the Fiji papaya and breadfruit case studies, NWC has stepped in to start providing extension and applied research services on behalf of the industry as a whole. This has been through the adoption of a public private partnership (PPP) approach. Donor assistance was necessary to facilitate the process.

The taro case study showed that the most critical information required by Taveuni farmers was to understand the management of their soils to ensure sustainable production. This involved the introduction of innovative extension models driven by farmer organisations within the value chain itself. Targeted donor assistance in support of the process has been critical.



Marcotting breadfruit: A skill necessary for the commercial propagation of breadfruit

Key Lesson # 9:

Market access constraints for export market value chain development are very difficult to resolve.

The problem of access for Fiji taro, papaya and ginger to the Australian market illustrates the difficulty in developing value chains based on exporting to large neighbouring countries that have domestic industries producing the same product or other products that might be susceptible to pests or diseases found in the exporting country. Substantial and appropriate technical assistance is required to allow for even a modest degree of “playing field levelling” in dealing with quarantine related market access issues.



The Vanuatu spices value chain study shows that in the realm of food safety certification, small PIC agro-processing enterprises are increasingly facing similar barriers to entry, although these are not based on protectionism. Certification involves considerable costs that are best shared by large numbers of farmers, which is often lacking in most PICs.



Key Lesson # 10: The role of public private partnerships in Pacific Island value chain development.

Sustainable successful value chains in the Pacific Islands have been without exception, private sector driven. However, the Fiji papaya and breadfruit value chains illustrate the need for effective public-private sector partnerships. In the context of the Pacific Islands, the public sector includes both national governments and donor agencies. Public sector involvement has been necessary due to large capital and resource requirements relative to the size of the agribusiness entities involved. The example of quarantine treatment facilities is highlighted in the case studies.



A public private partnership (PPP) was required to establish Fiji's industry operated quarantine treatment facility which now provides state of the art quarantine, grading and packing facilities to the industry

Key Lesson #11:

The need to adopt more sustainable production practices to stay in business.

Some of the initially successful Pacific Island value chains have floundered because of environmentally unsustainable production practices. Prominent examples are Fiji ginger and taro, Samoan taro and Tongan squash. The adoption of a “green growth” approach by the value chain has become an imperative for long run commercial survival. The Fiji taro value chain study shows how these industry driven “green growth” adjustments are being made. In contrast, the Fiji breadfruit, Samoan lime and Solomon Islands floriculture value chains are all based on an environmentally sustainable development path from the outset.

Land being prepared in the 1980s for ginger planting in Fiji: to achieve good drainage, and to minimise labour inputs, farmers grew ginger on steep land planting up the slope. The result was severe soil erosion with the land becoming unsuitable for agriculture”



Vetiver grass being planted along the contour using rows for soil conservation

Key lesson # 12:

The continuing role of aid and technical assistance in Pacific Island value chain development.

In the early 1990s, the Pacific Islands Development Program (PIDP) at the East West Centre undertook a study of the impact of aid and development assistance of agricultural development in the Pacific Islands (McGregor et.al. 1993). The report concluded:

The provision of aid in the Pacific Islands is a complex and vexatious issue. Despite the increasing, numerous policy pronouncements from donors, aid had done little to accelerate private sector development in agriculture. At worst, project aid has actually weakened the position of the private sector by requiring the direct involvement of government agencies in production and marketing activities. Redesigned foreign aid has a crucial role in facilitating horticultural development in the region.

Two decades on, a significant amount of the aid to the sector continues to be misdirected and ineffectual. However, there is now some willingness amongst donors to directly support the private sector, particularly if it involves an industry organisation. Focused aid and technical assistance has played a critical role in all the value chain case studies. In varying degrees, their very existence has depended on this support.

Fiji would not be exporting fruit fly host products (papaya, mango, eggplant and breadfruit) had not USAID transferred the HTFA quarantine treatment technology to the fresh produce exporting industry. Samoa would not be exporting limes to New Zealand had not the Regional Fruit Fly Project transferred the technology to the Pacific for determining no fruit fly host status for products and assisted with market access submissions.

Fiji's taro export value chain was initiated and thrived for nearly two decades without any donor assistance. However, in recent years the industry has faced major problems associated with declining soil fertility and market access. Technical assistance, supplied through various agencies, is now making a major contribution to meeting the industry's identified need for environmentally sustainable production practices. Without this assistance, it is difficult to see how this value chain could be sustained.

The Vanuatu spices value chain has depended less on outside assistance. However, even here, key focused inputs have been critical in the development of the chain. The case study cites the importance of the support for the involvement of the agribusiness in Fine Food Fairs. This company could not have met the initial overhead costs of organic certification without donor assistance. The "Spices Network", created by a farmer organisation, the Farm Support Association (FSA), has been critical in extending the value chain to farmers of remote locations. The FSA has depended over the years on obtaining modest injections from various external funding sources.

The biggest market access challenge facing small agro-processing exporting enterprise is food safety (HACCP) certification. Because of the high overhead costs and the technical requirements of obtaining such a certification, it is unlikely that this can be achieved without significant donor assistance.

Some lessons from the consolidated experience of Pacific Island and Caribbean value chain development.

The Pacific Islands and the Caribbean have a lot in common, terms of scale, numbers of farmers and the type of agricultural products involved. Westlake (2014), in synthesising CTA's Pacific and Caribbean value chain studies, concluded:

The case studies demonstrate that value chains for agricultural commodities can function more efficiently and effectively when small-scale farmers develop relationships with suppliers of inputs and services and with entities which market and process their output. The integration of farmers into value chains can have mutually beneficial outcomes both for the farmers themselves and for other value chain participants. Farmers can aim to supply a product that is suited to the requirements of processors and end users, both in terms of physical characteristics and the reliability and timing of supply. Processors, traders and other chain participants, in turn, can provide farmers with information, finance and training (p, viii).

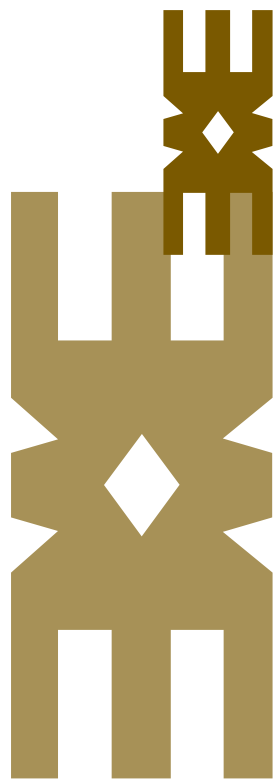
This guide makes practical recommendations on how this lesson can be incorporated into training messages for mutually beneficial outcomes for Pacific Island value chains.



Caribbean and Pacific value chains have many similarities

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Key messages for Pacific value chain training



KEY MESSAGES FOR PACIFIC VALUE CHAIN TRAINING

Seven (7) key messages are identified for practical value chain training. These come out from the experience described in the preceding chapter.

These are:

- THE NEED FOR AGRIBUSINESSES TO “PULL” PRODUCTS THROUGH THE VALUE CHAIN RATHER THAN FARMERS OR FARMER GROUPS “PUSHING” PRODUCTS THROUGH THE CHAIN
- RELATIONSHIPS AND INFORMATION FLOWS ALONG THE VALUE CHAIN ARE CRITICAL TO ESTABLISH TRUST.
- UNDERSTANDING YOUR CUSTOMER IS PARAMOUNT
- A VALUE CHAIN IS ONLY AS STRONG AS ITS WEAKEST LINK – EACH LINK HAS TO BE PROFITABLE FOR THE CHAIN TO SURVIVE
- ALL LINKS IN THE VALUE CHAIN HAVE A CRITICAL ROLE AND MUST HAVE A SUFFICIENT MARGIN TO STAY IN BUSINESS
- THE NEED TO WORK TOGETHER TO ENABLE ALL ACTORS GET A BIGGER PIECE OF “PIE” – BETTER TO FOCUS ON THE BIGGER OVERALL “PIE” THAN COMPETING FOR A BIGGER SHARE OF A SMALL “PIE”.
- COMMERCIAL AND ENVIRONMENTAL SUSTAINABILITY ARE CLOSELY LINKED



KEY TRAINING MESSAGE # 1:

The need for agribusinesses to “pull” products through the value chain, rather than farmers or farmer groups “pushing” products through the chain



Traditional supply chain (supply push) – we are focusing on the farmers producing a product and then pushing this through the chain

Sustainable value chain (demand pull) – we are focusing on delivering exactly what the consumer wants



The primary difference between a supply chain and a value chain is a fundamental shift in focus from the supply base and producers to the customer base and consumers.

A sustainable value chain pulls products through the chain rather than push products through the chain and adds value at each step. It starts with knowing what the consumer actually wants with the product moving along the chain to try and best satisfy that want.

**KEY
TRAINING
MESSAGE**
2:

**Relationships & information flows along the value
chain are critical**



An agricultural value chain is not like a factory where a product passes through a series of machines.

At each step or link on the chain there are real people.

The most successful value chains are those that invest in relationships, taking the time to understand the situation and motivating factors of the next person along the chain. When you have a good relationship with someone it is easier to work with them.

All of the actors in the value chain have certain requirements from the other actors in the chain (things that they want or need). Often information about these requirements only travels between the two actors who are directly linked.

The most successful value chains are those where information travels up and down the chain and between all of the actors.

Good information leads to better decision making.

A practical way to build relationships and share information is through a tool called 'walking the chain'.

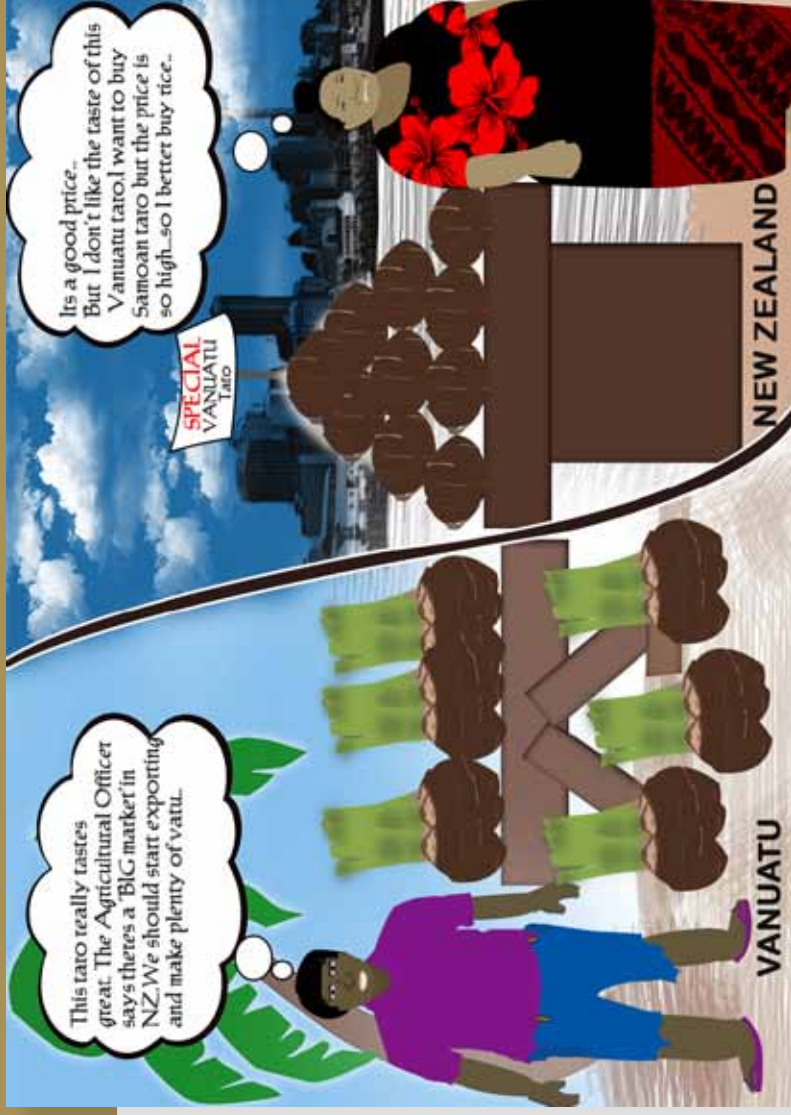


'Walking the chain' basically involves an actor from anywhere along the chain following a product from where it starts through all of the processes until it reaches the consumer and hopefully talking to lots of people along the way.

KEY TRAINING MESSAGE

3:

Understanding your customer is paramount



The market wants a certain product with particular quality features at a maximum price and you must supply them with that.

If you try to give them something else it is like trying to fit a square peg in a round hole.

Find out exactly what your market wants and then work with the actors in the value chain to provide this.



Not understanding your market is like trying to force a square peg into a round hole.

**KEY
TRAINING
MESSAGE**
4:

A value chain is only as strong as its weakest link –
each link has to be profitable for the chain to survive

Looking at the value chain carefully can allow all of the actors to see the **CRITICAL** role that each plays in delivering a product to the consumer.

A value chain is only strong and sustainable when each link is making a profit.
In a successful value chain, each actor is working together to strengthen the whole value chain.

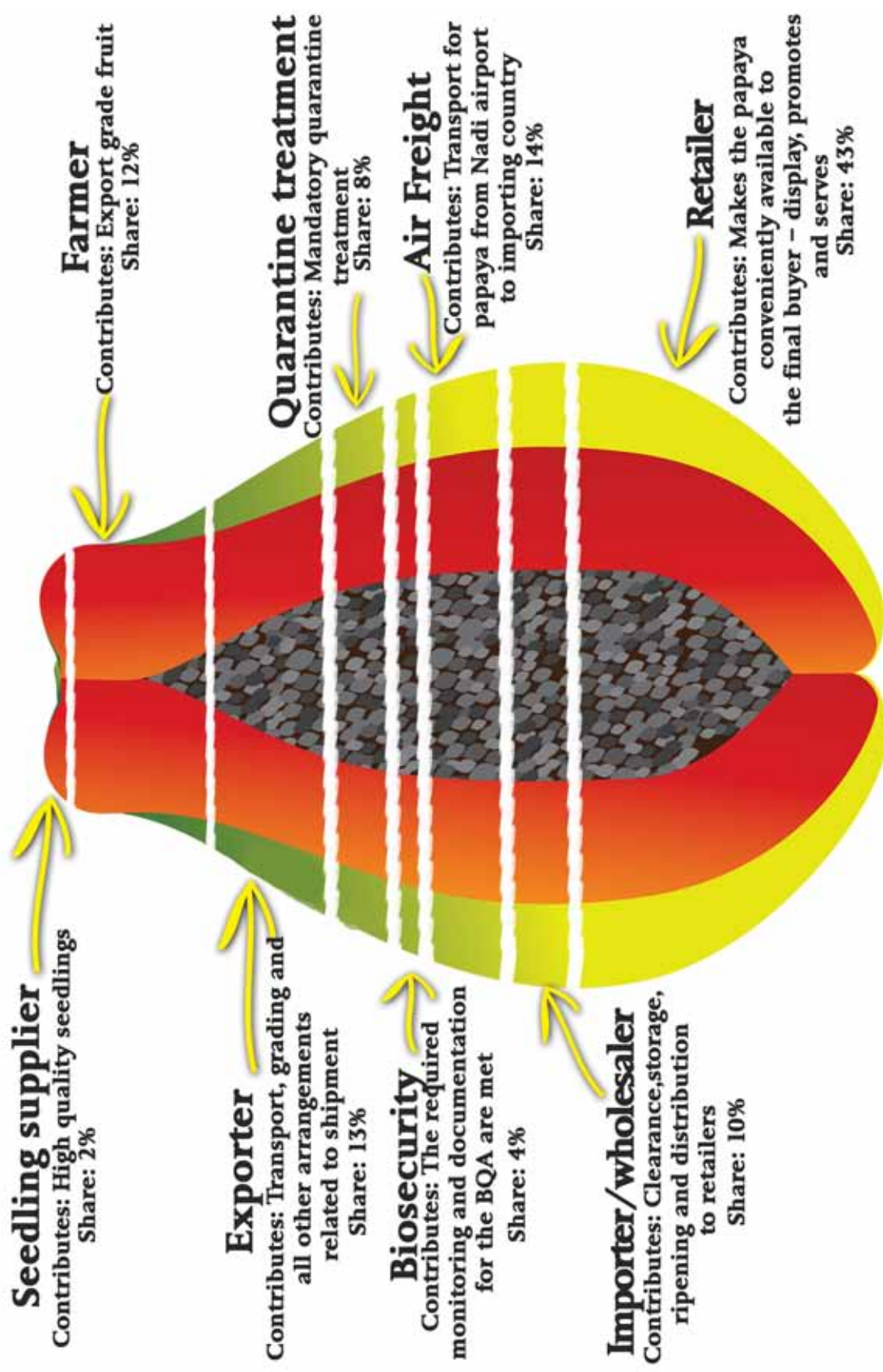


If there is a weak link in the chain, then this has the potential to affect all of the actors in the chain and therefore all of the actors should be concerned.



**KEY
TRAINING
MESSAGE
5:**

All links in the value chain have a critical role and must have a sufficient margin to stay in business



**KEY
TRAINING
MESSAGE**
6:

The need to work together to enable all actors get a bigger piece of the “pie”

It is better to focus on a bigger overall “pie” rather than competing for a bigger share of a smaller “pie”. It is the size of your slice and not your share of the pie that is important.



**Competing
for your
slice.**

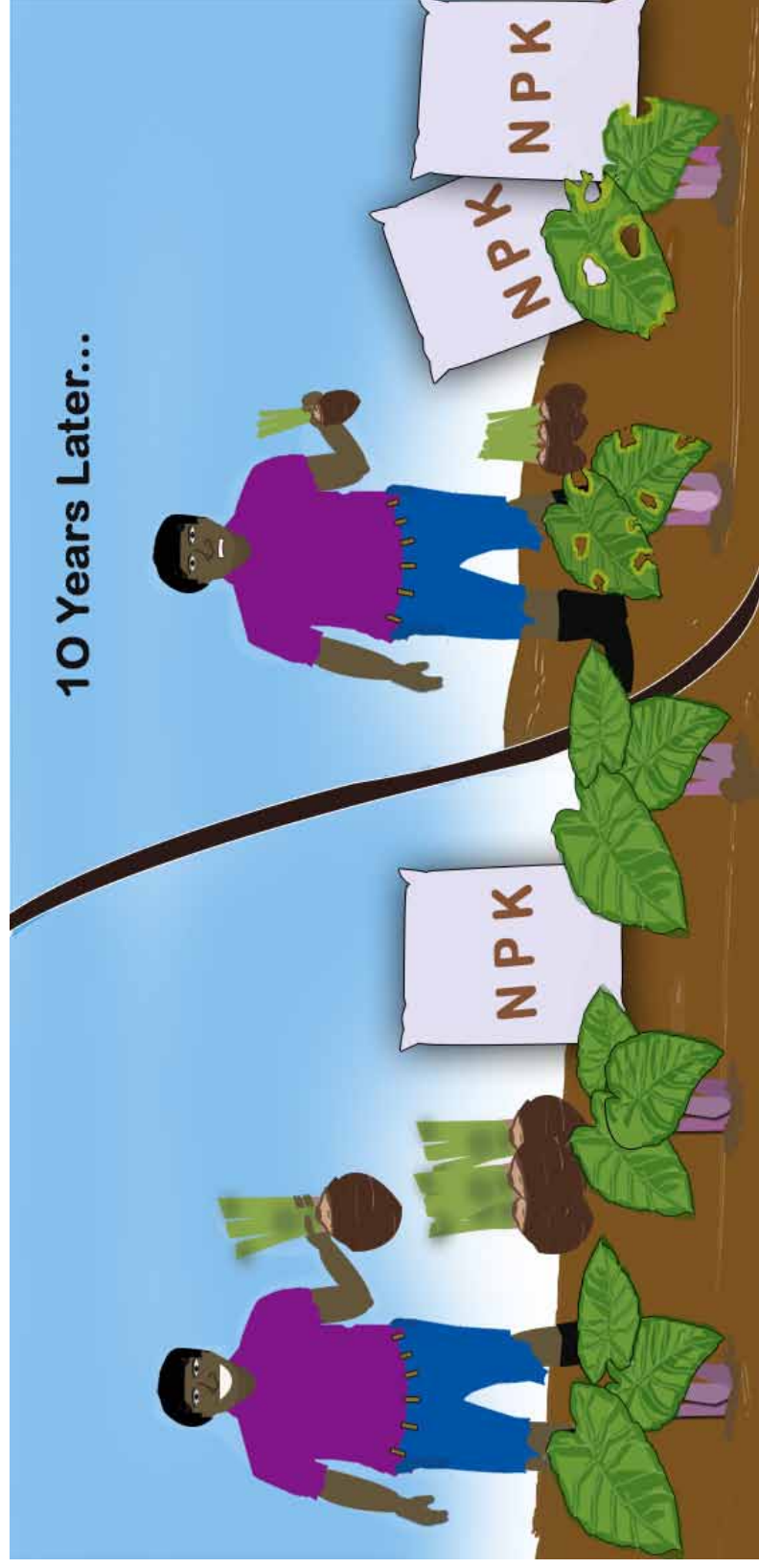


Working together for a bigger pie.

KEY TRAINING MESSAGE # 7:

Commercial and environmental sustainability are
closely linked

You might make more money in the short run if you don't follow environmentally sustainable practices but you will be out of business in the longer term, your farm and family will suffer and the value chain will not survive.



UNSUSTAINABLE TARO PRODUCTION PRACTICES

Clearing forests for monoculture taro production.
Use of burning for land clearing.
Repeated planting of taro with no fallow (rest) period for the land.
Continued high applications of inorganic mineral fertilisers (NPK).
Overall impact of these practices over time is a loss of soil fertility resulting in higher fertiliser costs, smaller taro, higher rejects and less money for the farmer.

SUSTAINABLE TARO PRODUCTION PRACTICES

Using traditional mixed cropping and agroforestry systems.
Using soil tests to identify nutrient deficiencies.
Using crop rotations and fallow (rest periods) on the farm.
Using nitrogen fixing plants for green manuring, mucuna etc.
Using soil conservation measures such as contour farming.
Addition of lime and other organic inputs on to the land.
Overall impact of these practices over time is the ability to maintain good yields, improve quality and make more money for the farmer.

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Some tools, resources and things to look out for in undertaking value chain analysis



Tools for analysing margins and profitability



The key training message: A value chain is only as strong as its weakest link – each link has to be profitable for the chain to survive.

Gross margins for farm enterprises

What is a gross margin (GM): A gross margin refers to gross income (i.e. value of production) minus the variable cost of that production.

Gross margin = Gross income - Variable costs

Variable costs are those cost that vary according to how much is produced (e.g. how many seedlings are purchased, how labour is hired etc). Whereas, fixed costs are the same regardless of how much is produced (e.g. rent for the land you are leasing, or repayment on a bank loan is the same regardless of how much is produced). Fixed costs are not included in measuring the GM for a particular enterprise – but should be included when considering the profitability of the total farm.

Farm management manuals often suggest that gross margins are expressed in terms of unit of land area (e.g. GM/hectare). However, remember Pacific Island smallholders are probably more concerned with the returns from the work effort of the household (if the household does so much work on the production of a particular farm product how much money will we earn?). Thus a better measure of “profitability” of a particular farming activity is the GM per unit of household labour effort (e.g. GM/day of household labour). This can then be compared with alternative uses of the farmers time (including leisure and meeting cultural obligations).

An example of the gross margin existing farm enterprise in value chain:

A smallholder growing export quality black pepper on the island of Malo, Vanuatu.

Model: Returns to labour from producing black pepper on the island of Malo (Vanuatu) from 300 vines (February 2014)											
Year	1	2	3	4	5	6	7	8	9	10	total
Production (kgs black dried and cleaned)	0	0	5	12	75	125	125	125	125	125	717
Sales (@ 650 vt/kg)	-	-	3,250	7,583	48,750	81,250	81,250	81,250	81,250	81,250	465,833
Cash expenditure											
materials for nursery	1,000										1,000
50% cost of material for drier			4,000		600		600		600		5,800
transportation of pepper ¹			200	200	2,075	3,325	3,325	3,325	3,325	3,325	19,100
Total	1,000	-	4,200	200	2,675	3,325	3,925	3,325	3,925	3,325	25,900
Cash flow (vt)	-1,000	-	- 950	7,383	46,075	77,925	77,325	77,925	77,325	77,925	439,933
Family labour (person days)											-
Clearing (planted with garden)	6										6
Cutting and planting support trees	3										3
Establishing and managing seedlings nursery	3										3
Planting seedlings	2										2
Mulching and compost	1	3	3	3	3	3	3	3	3	3	28
Weeding	7	7	7	7	7	7	7	7	7	7	70
Pruning support and vine		6	6	6	6	6	6	6	6	6	54
Snail control		2	2	2	2	2	2	2	2	2	18
Harvesting			0.5	1	1	1	1	1	1	1	7.5
Cleaning and drying			2	4	4	4	4	4	4	4	30
Marketing			0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	4
Sub-total	22	18	21	24	24	24	24	24	24	24	226
Average annual labour (person days)	23										
Average annual return per person day of labour (vatu)	1,951										

¹ based on a boat from Malo: 1,500vt/bag 60 Kg. (but 200 Vt/person when carrying one back pack (probably up to 10 Kg)

An example of the gross margin existing farm enterprise in value chain:

A farmer looking to plant 50 breadfruit trees for export.

Table 1: A financial model a farm household planting a 50 tree breadfruit orchard using family labor

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total
number of trees @ 9 x 9 m	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	
marketable yield per tree (# of fruit/tree)	0	0	0	15	30	50	60	100	150	150	150	150	150	150	150	150	150
marketable yield per tree (kg)	0	0	0	22.5	45	75	90	150	225	225	225	225	225	225	225	225	225
total marketable production (kg)	0	0	0	1125	2250	3750	4500	7500	11250	11250	11250	11250	11250	11250	11250	11250	11250
Sales (\$) @ \$0.42/kg 1.	0	0	0	472.5	945	1575	1890	3150	4725	4725	4725	4725	4725	4725	4725	4725	45833
Cash expenditure (\$)																	
root suckers 50 @ \$5 each	250																
Fertilizer																	
NPK 13:13:21 50kg @ \$80/bag	160	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
bait spray cost				20	20	20	20	20	20	20	20	20	20	20	20	20	20
harvesting equipment & pruning equipment																	
stick picker @ \$30 each				30													
pruning saw (@ \$45 each)		45															
plastic field bins @ \$28/ each				560	560												
Total non labor cash expenditure	410	125	80	690	660	100	100	100	100	100	100	100	100	100	100	100	3065
Gross margin (\$) excluding labor	-410	-125	-80	-217.5	285	1475	1790	3050	4625	4625	4625	4625	4625	4625	4625	4625	42768
Family labor (person days) 2																	
clearing	5																
cutting, lining and digging holes	7																
planting	1																
weeding/fertilizing	6	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
pruning	0	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2
bait spray application				10	10	10	10	10	10	10	10	10	10	10	10	10	10
harvesting sap control and packing in field baskets (150kg/day)				2.2	11	22	22	22	22	22	22	22	22	22	22	22	22
Total labor input	19	13	13	26.2	35	46	46	46	46	46	46	46	46	46	46	46	612.2
Average labor input/annum (days)	38																
Average annual gross margin per area (1 acre)	2673																
Average annual gross margin per tree (\$)	53																
Returns per family day of labor (\$/day)	70																
Footnotes																	
1. Using the current farmgate price (2014) for "wild" harvest fruit. A higher price is expected from orchard harvested fruit because of lower post-harvest losses																	
2. assumes only household labour is used																	

Key points to consider when undertaking grower gross margin analysis

- Realistic and accurate input-output estimates are essential (yields, inputs used to produce the product). This is often not the case with generic gross margin reports which results in a misleading picture of profitability. Projects and companies trying to encourage farmers to grow new crops also have a tendency to exaggerate potential yields.
- Product and input prices are always changing so GM calculations must be updated regularly.
- Returns to labour are the most important consideration for smallholder farmers in the Pacific Islands (if I do so much work how much money will I make for my household compared with what else can I be doing with my time?).
- For some products, you will need to incorporate risk (eg. some years vanilla won't flower, in some years there will be no papaya sales because of a cyclone or a flood).
- Is the enterprise profitable to the farmer when prices are low? Are the profits in the high price years sufficient to offset the low profits (or losses) in the low price years?

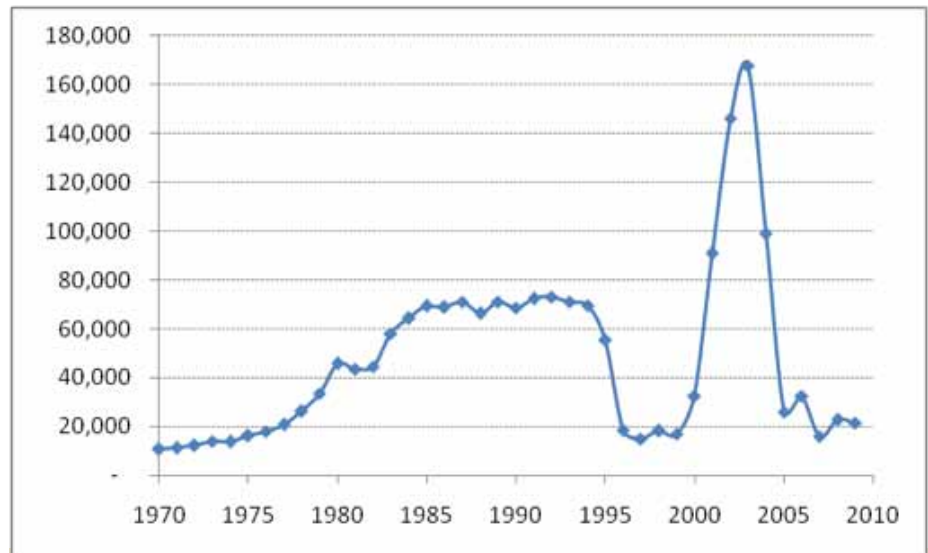
See the following example of PNG vanilla.

The PNG vanilla example.

The average world market price for vanilla in 2003 reached USD 170,000 (fob Madagascar) per tonne, up from only USD 18,000 per tonne in 1998. As a consequence, there was an unprecedented boom in smallholder-based vanilla production in Papua New Guinea (McGregor 2004).

The price paid to PNG growers increased from Kina 60/kg in 1998 to as high as Kina 750 – 800/kg in Sept 2003. World prices then collapsed. The PNG grower price is now around Kina 200 – 300 Kina kg, depending on quality.

At the time of the price peak in 2003 there were over 50,000 people growing vanilla country wide in PNG. Today there are probably less than 1,000 growers remaining and these are located in areas most agronomically suited to vanilla. Most growers left the industry when they found growing vanilla only gave a sufficient return to their effort when prices were extremely high.



World vanilla prices (average annual Madagascar fob price – Source: Public Ledger)

Marketing margins and profits

Some definitions

- **Total marketing margin:** The difference between the average price paid by consumers for the finished produce (retail price) and the price received by farmers for the equivalent quantity of the raw material of the product (farm gate price). This is expressed as a percentage.
- **Exporter marketing margin for the product:** The difference between the fob price (the price loaded on the aircraft or vessel) and the price paid to farmers for the equivalent quantity of the raw material of the product (farm gate price). This is often expressed as a percentage of the retail price.
- **Exporter “profit” for the product:** The exporting marketing margin less the cost of getting the product from the farmer onto aircraft or vessel. This is the equivalent to farmer’s gross margin and is sometimes called the exporters’ marketing gross margin.
- **Wholesaler/importer marketing margin for the product:** The difference between the price the product is sold to the retailer (the wholesale price) and the fob price for the product. This is often expressed as a percentage of the retail price.
- **Wholesaler/importer “profit” for the product:** The wholesaler/importer marketing margin less the cost of getting the product from the exporting port (airport) to the retailer.
- **Retailers marketing margin for the product:** The difference between the retail price and the price paid to the wholesaler/importer. This is often expressed as a percentage of the retail price.
- **Retailers “profit” for the product:** The retailer marketing margin less the cost of getting the products from the wholesaler into the hands of the final consumer.

Example of taro export from Taveuni, Fiji to New Zealand

The cost and returns from exporting a sea freight container of Taveuni (Fiji) taro to New Zealand (week ending Sept 27, 2013)					
	FJD/kg purchased	FJD/kg exported	FJD /30 kg bag exported	Total (FJD)	
Taro purchased from Taveuni (15 tonnes)	1.20	1.50	45.00	18,000	
Agent cost @ 15c/kg	0.15	0.19	5.63	2,250	
Fright Taveuni - Suva packing shed	0.09	0.11	3.38	1,350	
Washing and grading (12 tonnes) - 20 person day @ \$20/day		0.03	1.00	400	
Utilities (water,electricity, rental)		0.05	1.50	600	
Telecommunications		0.01	0.30	120	
Poly bags (@ \$0.6/each)		0.02	0.60	240	
Loading container - 4 person day @ \$20/day		0.01	0.20	80	
Fees (Quarantine inspection and documentation @ \$180)		0.02	0.45	180	
Container movement		0.02	0.50	200	
Allowance for possibility fumigation in NZ		0.04	1.25	500	
Fob cost		1.99	59.80	23,920	
Marketing gross margin (FJD)		0.19	5.68	2,272	
Marketing gross margin (% of fob cost)		9.5%	9.5%	9.5%	
Freight (Suva-Auckland)		1.50	45.00	3,000	
New Zealand fees (Suva - Auckland)		0.02	0.63	250	
New Zealand landed price		3.51	105.43	27,170	
New Zealand wholesale price (10% marketing margin)		3.87	116	29,887	

Key points to consider in analysing marketing margins

- **The need to provide an accurate picture of the services and cost involved.**

Often growers hear of the final selling price for their product and compare it with the farm gate price they receive. Because the gap between the two is often large (particularly for export crops) it is common for farmers to feel as if they are being “ripped off” by traders and marketers. This view is also often held and encouraged by government officials, politicians and NGO staff. As a result it is often argued, and sometimes implemented, that government bodies and NGOs should become directly involved in marketing to protect farmers from this “exploitation”. Alternatively, minimum price controls are advocated to protect the interest of farmers. If a competitive environment prevails, such accusations are not supported by facts but this perception prevails, often to the damage of all participants in the value chain.

For example, the South Pacific Trade Office previously widely distributed the wholesale price for Pacific Islands products sold in Auckland. The wholesale price of taro was usually some three times what farmers were being paid at farm gate on Taveuni. This caused considerable disquiet amongst farmers and government officials. However, the marketing gross margin table above shows a marketing margin of less than 10% (if the importer pays the freight) when all marketing services and costs are taken into account. Unlike the farmer who was paid immediately, it will be at least a month before the exporter receives payment, from which claims might be deducted. Such rates of return certainly cannot be regarded as excessive, given the risk involved and the expertise required to be a successful exporter. This type of transparent cost information makes the players along the value chain more content, which in turn enhances the performance of the value chain.

- **The need to provide an accurate picture of the risks involved.**

Account needs to be taken of the perishability of fresh produce. For example, Pacific Islands taro to be imported into Australia must be devitalised to ensure it can't be grown (Case Study 1). The physical damage inflicted transforms the product from a relatively non-perishable product to a highly perishable product. The increase in perishability precludes sea freighting taro as a realistic marketing option and substantially increases costs. Even with air freighting, devitalisation can result in complete rejection of shipments - the cost entirely borne by the exporter.

Interpreting marketing margins and “profits”

The key training message: The margin for each actor in the chain must be sufficient to cover the cost involved in transferring the product from one stage of the chain to the next and provide a reasonable return for those providing this service. The presentation of a trader’s share of the final price can give a misleading impression unless you know the costs involved.

“High” margins at any stage in the value chain suggest that the industry might be improved (increased total income and more equitable distribution of the income generated by the chain) by the entry of more participants at that particular stage. But what does ‘high’ mean?

Remember, a margin needs to sufficiently compensate the value chain actor (the farmer, marketing agent, exporter, wholesaler, etc.) for the costs incurred and the investment made. Other things being equal, margins need to be larger:

- the higher the cost incurred;
- the larger the investment made;
- the longer the time lag between the time of the investment and the income received;
- the bigger the risks involved;
- the greater the expertise and skills involved.

Cost-benefit analysis

A cost benefit analysis (CBA) identifies and puts \$ values (quantifies) all the positive factors resulting from an investment in the value chain. All these positive factors are then added up and called the benefits (B). The CBA identifies, quantifies, and subtracts all the negatives- the costs (C). The difference between the benefits (B) and the costs (C) indicates whether the planned investment or change in the value chain is worthwhile. Remember a \$ earned or spent in the future is worth less than \$ earned or spent now. Thus benefits and costs can be expressed in present value terms to allow for better comparison (this is called discounting to allow for time value of money). The discount rate (interest rate – i) reflects what the value chain actor could earn by investing the money elsewhere (e.g. putting the money in a bank savings account). It suggested that 5% is a good discount rate to use when undertaking a CBA for Pacific Island value chain analysis.



An example of a value chain CBA: A Fijian papaya farmer looking to invest in plastic crates to transport his product from the field to the exporter’s packing shed.

Objective: To reduce post-harvest damage to the farmer's papaya and thereby reduce the rate of rejects at the exporter's packing shed.

The cost of the investment: The purchase of 40 plastic crates @ a cost of \$40/crate = \$1,600. This is a fixed capital cost – there are no other costs involved.

Benefits: The farmer currently has four (4) tonnes of fruit rejected annually due to post-harvest damage (bruising, cuts etc.). This fruit would otherwise be suitable for export and could have been sold to the exporter for \$0.90/kg (\$900/tonne). Thus, his annual loss (income foregone) is \$3,600. By investing in plastic crates it is estimated that the annual loss due to post harvest damage can be reduced to only 1 tonne. Thus, the annual benefit from investing in the plastic crates is \$2,700. The expected life of the crate is 5-years. Thus, the total benefit arising from the investment in the crates is \$13,500. The present value (PV) of this benefit (discounted at an interest rate (i) of 5%) is \$11,373.

Comparing the benefits with the costs: A cash flow table is prepared to compare the benefits and costs of investing in 40 plastic crates. Over the 5-years the benefit (B) – cost (C) is \$9,900. If the cash flow is discounted by 5% the net present value (NPV) (discounted benefits minus discounted costs) is \$7,773. A better picture of how worthwhile the investment is to calculate the benefit cost ratio (B divided by C; B/C). In our example of the farmers investment in plastic crates the B/C is 3.75 and if we discount the benefits to obtain their present value the B/C is 3.16. Thus for the farmer, purchasing plastic crates is seen as a very worthwhile investment with the benefits being more than three (3) times the cost.

Year	1	2	3	4	5	total
Cost (C) of crates (\$)	3,600					3,600
Benefits (B) from using crates (\$)	2,700	2,700	2,700	2,700	2,700	13,500
Present value cost (PVC) (i=5%)	3,000					
Present value benefit (PVB) (i=5%)	11,373					
B-C	\$ 9,900	2,700	2,700	2,700	2,700	9,900
Net Present Value (NPV) - PVB minus PVC	\$ 7,773					
B/C (not discounted)	3.75					
B/C(discounted i=5)	3.16					

Useful resources

SPC/CTA Value chain portal. <http://www.aglinks.net/>

Shepherd, Andrew, 2003. Market research for agroprocessors. Marketing Extension Guide No. 3, FAO. <ftp://ftp.fao.org/docrep/fao/007/y4532e/y4532e00.pdf>

FAO 2004. Helping Small Farms Think About Better Growing and Marketing: A Reference Manual. FAO Pacific Farm Management and Market Series No 3. FAOSA Apia

McGregor, A.M. 1999. Linking market development to farming systems in the Pacific Island Pacific Islands. FAO Sub-Regional Office for the Pacific, Apia

Shepher, Andrew (1993, revised 2007) A guide to MARKETING COSTS and how to calculate them. FAO Rome

UK Department of International Development (DFID) (2008). Making Value Chains Work Better for the Poor: A Toolbook for Practitioners of Value Chain Analysis.

What to look for when analysing vulnerability and sustainability of the value chain

Some things you need to look out for in assessing vulnerability and sustainability of the value chain, include:

- Keyperson dependency
- Dependency on a single market
- Input supply weaknesses
- Environmental vulnerability

Keyperson dependency along the value chain

A major problem with small Pacific Island agro industries can be keyperson dependency (KPD) at critical points along the value chain. This is particularly the case with specialized niche businesses involving value added processing, where a small investor with the required expertise, capital and motivation established the business. The business is usually too small and unsuitable for corporate investors. Larger corporate investors are usually less subject to KPD. However, these larger corporate entities are seldom interested in investing in Pacific agriculture, with the exception of crops like oil palm that can be grown on a large scale. Value chain analysis can help identify points of KPD and help inform practical solutions. The Vanuatu spice value chain case study provides an example (Case Study 4).

Dependency on a single market

Westlake (2014) notes that agricultural value chains in Pacific Island countries may depend on a single foreign market or on export markets with similar sanitary and phytosanitary requirements. Such chains are vulnerable to a single unpredictable event which results in the loss of that market. For example in the 1980s, substantial investment was made into an improved variety mango plantation adjacent to the Nadi airport targeting the New Zealand market. However, at the time the mangoes started to come into production, New Zealand began importing bananas from Ecuador. Ecuador has the same mango season as Fiji and was able to ship high quality mangoes together with the bananas at low freight rates. This “piggy backing” meant that Fiji’s improved variety mangoes were no longer competitive.

Input supply weakness

Input supply is often a major weakness in Pacific Island value chains. Some weaknesses to look out for:

- The availability of high quality seeds and seedlings that produce the product required by the market and well suited to the growing conditions faced by farmers.
- The availability of suitable containers to transport produce from the field to the packing shed.
- The availability of high quality packaging material at affordable prices.

Example of the Fiji papaya export value chain.

Problem: A market study undertaken as part of the value chain analysis identified a substantial market in New Zealand, Australia, US and Japan for Fijian papaya that has a high level of sweetness and the flesh is red in colour. However, to satisfy and sustain this market it was essential for farmers to plant the correct seedlings and for fruit to be transported from the field to exporters packing shed in plastic crates to ensure the fruit was not damaged.

Solutions: Natures Way Cooperative:

- Introduced the “Fiji Red” certified seed scheme



- Bulk imported plastic field crates and made these available to farmers and exporters at a reasonable price



Farmer packing fresh fruit in buckets and sacks.



Farmer packing fresh fruit in crates sourced from Nature's Way Cooperative.

Environmental vulnerability

A value chain analysis may find that a particular value chain is profitable for all the actors. However, you need to determine if parts of the chain are environmentally vulnerable and what are the implications for long term sustainability of the value chain.

The example of the Fiji fresh ginger export value chain.

A Pacific Island Development Program (PIDP) study of the Fiji fresh ginger export industry found this to be a highly successful value chain that provided an example of the successful development of a non-traditional export industry (McGregor 1988). All actors along the chain received a good return from their participation. The farmer's gross margin was over \$35/person per day of household labour used in growing this short term crop. This exceeded the returns from growing most other crops at the time. The exporter's gross margin usually exceed 20% of the fob price of ginger (the price of ginger loaded on the ship in Suva). However, the PIDP study identified a major weakness in the value chain that threatened its long term sustainability. To ensure adequate drainage and to minimise labour inputs, farmers grew ginger on steep land planting up the slope (rather than planting along the contour with rows of soil conserving vetiver grass). This farming system initially provided the farmer a very high return to labour. However, within two (2) to three (3) plantings, yields fell dramatically due to soil erosion and many of these farmers are now out of business.



A farmer at Waibau, Fiji in 1988 with land prepared to plant ginger for the remunerative export market. Due to the resulting soil erosion most of this area is now obsolete for ginger and other root crops and farmers are out of business.

Assessing markets

What is a market?

The market is the consumers who purchase the product. Marketing is the process of getting the product from the farmers to the consumers.

For the purposes of this guide, the term “market” has two components (drawing on Shepherd 2003): – one deals with consumers themselves and the other deals with competitors who also supply the market :

- The term market embraces the characteristics consumers want from a product and the requirements of the retail shops and their wholesalers who service these consumers.
- Component 2 (competitors): The term “market” also embraces the actions of competitors, such as how they set their prices, organize their distribution and decide on promotion. Understanding competitors is just as important as understanding consumers.

What is market research?

Market research is the process of investigating a market in order to find out the sales prospects for a product and how to achieve success with selling the product. We need to find out about the consumers of the product and the competitors who are also supplying the product.

Presenting market research findings

Andrew Shepherd (2003) provides the following useful hints:

Arrange for research results to be written down even if you are only carrying out a small study.

Presenting research results in an organized way makes it easier to evaluate the findings of the research and enables you to easily identify inconsistencies or contradictions that require further research. The structure of a report, which does not have to be very long, will vary according to the product and market and the amount of detail required. A suggested format is:

- Brief background and description of proposed product.
- Existing products and consumer attitudes to those products.
- Strengths and weaknesses of competitors.
- Existing market size in target area, by type of outlet, by product, by container or package size, etc. with estimates of the potential market for new product(s).
- Important characteristics of the market, such as price, quality and packaging, and your ability to compete.
- Consumer response to tasting panels.
- Distribution methods recommended for your product and costs of distribution.
- Promotional techniques used by competitors.
- Promotional tools preferred by the distribution chain.
- Conclusions regarding suitability of your product for the market, with recommendations of the best ways to price, promote and distribute it.

Some information and tools for undertaking market studies

Published market data

Published market data is a good starting point for undertaking market studies. Examples of published market data:

- **Trade statistics.**

This can tell you how much is being imported and for what value, (the landed price of the product in the country) and from where is it being supplied. Monthly data will provide an indication of the seasonality of the product (see case study 5: Samoan lime exports to New Zealand). This provides basic information about your competitors. Trade statistics are usually available on-line and often for free. The Forum Secretariat's Trade and Investment Offices in Auckland and Sydney can help you obtain trade statistics.
- www.forum.org/pages.../forum-trade-offices

- **Commodity trade statistics.** These are available on a user pay basis from companies such as the Public Ledger that supply accurate prices of commodities that have a readily identified international market (eg. coffee, cocoa, coconut oil, sugar). They are not useful in supplying data for niche markets which are the interest of most Pacific Island value chains.

Consultant studies

Marketing consultants are often hired to undertake market studies. Consultants are usually hired by donor entities to undertake market studies on behalf of the entire industry. For example the EU funded Facilitating Agricultural Trade (FACT) project funded the New Zealand, Australian, US and Japan papaya market studies on behalf of Fiji and other future Pacific Island papaya industries. A particular value chain or individual exporter may hire a consultant to undertake a market study. However, this rarely happens in the Pacific Islands because of the high costs relative to the size of the enterprises involved.

Remember: A high quality consultant's report can provide a very useful guide to the market that is being targeted by the value chain. However, a consultant's study is no substitute for exporter(s) going to the market with an actual product in "hand". It can enhance the credibility and the value of a consultant's study if people who will be actually involved in selling the product are involved.

Exporters visiting market

A good consultant's market study can be a useful start and guide. However, there is no substitute for actual sellers going to the market and talking to actual buyers. An exporter can find out first-hand what the importer/wholesaler wants and can see what the competitors are doing. The importer/wholesaler can see that there is a real person with an actual product. If at all possible, give potential buyers the opportunity to see and sample your product. This personal contact is how the all-important long term relationship between buyers and sellers is created.

Remember: The Pacific Islands has a long standing reputation of being the “Land of Samples” in our traditional Pacific Rim markets. The exporter needs to establish credibility in a somewhat sceptical market. Face-to-face contact between buyer and seller can be an important first step in creating this credibility and for the exporter to be taken seriously. The Forum Secretariat’s Trade and Investment Offices in Auckland, Sydney, Tokyo and Beijing can be helpful in identifying potential buyers and arranging meetings (www.forumsec.org/pages.../forum-trade-offices) .

Trade missions and trade fairs

Government and regional agencies often organise trade mission to existing and potential markets. Such missions are usually led by Ministers of Trade or Foreign Affairs and even Prime Ministers, with senior civil servants participating. It is common for business leaders and other representatives of the private sector to participate. A broad range of industries is usually covered in these missions. Participation in such missions can be useful in terms of “networking” and making contracts. However, they tend to be too generalised and too politically orientated to be of much value for most niche market orientated Pacific Island value chains.

On the contrary, participation in industry and product focussed trade fairs can be particularly useful in evaluating and establishing a market. The value of these business orientated trade fairs is that they assemble in one place the type of business who will buy your product. As illustrated by Case Study 4 (Vanuatu Spices) participation in the annual Australian Fine Food Fair has been important for emerging Pacific Island niche market exporters wishing to penetrate the Australian market (www.finefoodaustralia.com.au/about.asp?id=53). As Jeremy Grennel, Export Services Manager for the Pacific Islands Trade and Invest notes “Such fairs are a very cost effective sales and marketing platform. With their tightly focused profiles and carefully targeted audiences they represent an ideal opportunity to match the needs of buyers and sellers (Fiji Times May 27 2014).

The Vanuatu spices experience has shown that repeated involvement in such fairs is necessary to have sustained impact.

Consumer taste panels

Once you have a reasonably good idea about what you think consumers want in your product it can sometimes be useful to conduct consumer taste panel tests to determine more precisely:

- who are your most likely buyers;
- what are they looking for in the product; and,
- how does your product compare with that of competitors.

Taste panel tests are undertaken by specialist experts following clearly defined scientific and statistical procedures. While yielding valuable information, such studies can be expensive relative to the size of small Pacific island industries. Thus its important to consider the benefits and costs of such studies. The box shows the example of the use of a consumer taste panel to evaluate the potential market for Samoan rambutan in New Zealand.

The taste panel test of the potential market for Samoan rambutan in New Zealand

In the 1990s the Samoan Fruit Tree Development Project introduced an improved variety of rambutan into Samoa. In terms of New Zealand quarantine standards, rambutan was shown to be a non-fruit fly host and was likely to be granted market access if a formal market access request was made. In advance of a request being made, formal consumer taste panel tests were undertaken to determine the actual nature of the market. (Samoa Ministry of Agriculture Forestry and Meteorology 2001).

It was expected that Samoan rambutan would be a luxury fruit sold to consumers with higher disposable income.

These were identified:

HortResearch (NZ)'s Sensory and Consumer Science Unit were commissioned to undertake a consumer acceptance assessment of Samoan rambutan amongst higher income consumers. In February 2001, 15kgs of various Samoan rambutan varieties were sent to HortResearch in Auckland under a special quarantine arrangement. The consumer acceptance panel involved 62 consumers from the Auckland area. These were mostly of European descent, of whom 21% had previously tried rambutan.

The results: Those that had previously eaten rambutan judged the samples to be "be about the same quality as previous rambutans they had experienced". Overall, rambutan received a score lying between "like slightly" and "like moderately". The opinion of the colour, appearance, flavour and texture all scored between "like slightly" and "like moderately". Most of the consumers found rambutan inconvenient to eat. These reactions would suggest that it would take time to develop the market for this new exotic fruit.

More significantly, 80% of the consumer panel indicated they would like to purchase rambutan. The major reason for purchasing rambutan would be for special occasions and most consumers would use rambutan on a "fruit platter or cheese board or as garnish/decoration". The majority of these consumers indicated that they would expect to purchase rambutan from an Asian fruit and vegetable store and would expect to pay \$NZ3.50 for a punnet of 5 rambutans (approximately \$NZ17.5/kg).

Clive Wickham of Carter and Spencer International (CSI) thought a wholesale price of \$NZ4-5/kg (retailing at \$NZ12.95/kg) would be a reasonable price for planning purposes. Wickham observed the Samoan rambutan sent to HortResearch for market testing, and commented: "The variety that is popular is the one where the seeds come away from the meat easy. Given that the market should be good". The Samoan rambutan industry now had basic price information for planning export market development.



In-store promotions

Once you are confident you have a product that meets the requirements of the consumers you are targeting in the market, consideration can be given to in store promotion to boost the demand for your product. This should be done in collaboration with your wholesaler and retailer.

Remember:

- You need to be confident of the quality of your product, including labelling and packaging. A negative reaction from consumers will be a serious set-back for the development of the value chain.
- You must have the supply to meet the jump in demand that will result from a successful in-store promotion. Not being able to meet the orders that you hope will arise, will undermine your credibility and will be a set back for the development of the value chain.

You should err of the side of caution and delay in-store promotions until you are really ready, even if donors are willing to provide funding support.

Useful resource on the subject

Shepherd, Andrew, 2003. Market research for agroprocessors. Marketing Extension Guide No. 3, FAO. <ftp://ftp.fao.org/docrep/fao/007/y4532e/y4532e00.pdf>

What to look out for in assessing competitiveness of the value chain

Defining the competitive advantage of a particular value chain

There are two types of competitive advantage for value chain producing a particular product when compared with other value chains producing the same product:

- **Type 1:** Being able to offer consumers a differentiated/better product. If customers perceive a product or service as superior or more desirable, they become more willing to pay a premium price relative to the price they will pay for competing offerings.
- **Type 2:** Being able to offer consumers a lower price because of a relatively lower-cost advantage.

The competitive advantage of Pacific Islands value chains are usually based on type 1 considerations. They tend to have a disadvantage when it comes to type 2 considerations – their costs are usually higher than competing value chains. However, both type 1 and 2 factors need to be taken into account in determining the overall competitiveness of the value chain.

For bulk commodity exports, where the going market price is received, the competitiveness of the value chain will depend entirely on cost- provided the quality requirements of the market are met.

Examples of type 1 competitive advantage

The competitive advantage of the Pacific Island agricultural value chains targeting niche export markets is often based on unique agro-climatic, physical and cultural characteristics that permit the receipt of prices that are sufficiently high for the value chain to be competitive despite other constraints that might exist.

Some key type 1 factors that Pacific Island exporters have or could base their competitiveness on are:

- **Seasonality** – For example Samoan lime exports to New Zealand (case study 5). Fiji's ginger exports to the United States and Tonga squash exports to Japan are or were built around seasonality.
- **Suitable agronomic/environmental conditions** that enable the production of a premium quality product – For example Fiji papaya (case study 2)
- **Exotic and/or desirable product origin** – The classic example for the Pacific Islands is Fiji Water. For agricultural products examples include Vanuatu spice, (case study 4), Tanna coffee and Tahitian noni



Remember: Being able to take advantage of exotic and/or desirable origin usually requires considerable investments in certification (origin, organic, "fair trade", etc.), promotion, labelling and packaging. In your value chain analysis you need to consider if the benefits of this investment are sufficient to justify the costs (benefit cost analysis).

Examples of type 2 competitive advantage

Solomon Islands virgin coconut oil (VCO).

Most PICs are developing value chains for virgin coconut oil targeting niche export markets based on premium quality and exotic product origin. Solomon Islands also has had a type 2 competitive advantage compared with other Pacific Island exporters based on lower labour costs, and thus VCO producers have been willing to accept a lower price for oil (AusAID 2006).

Samoa taro exports to New Zealand before taro leaf blight.

Samoa dominated the New Zealand market in taro prior to the arrival of taro leaf blight in 1993. Samoa produced a variety preferred by the market. However, Fiji could also produce the same variety. Samoa dominated the market because it is a lower cost producer and could offer the product to the market at a lower price. The arrival of taro leaf blight in Samoa meant that Samoa could not produce this particular variety, enabling Fiji to take over the market.

What to look out for in assessing risks in the value chain

The Pacific has a long history of value chain developments that have not been sustainable (see Shepherd et.al 2013). A number started out successfully with rapid expansion only to contract just as rapidly and in some cases to go of business altogether. Some prominent examples are:

- Fiji fresh ginger exports to the US (competitive advantage based on seasonality – competitive advantage lost due the entry of lower cost ginger becoming available in Thailand and China and disease problems in Fiji. Fiji no longer exports fresh mature ginger to the US)
- Tongan squash exports to Japan (competitive advantage based on seasonality – this was substantially reduced due largely to production problem in Tonga. A minimal amount of Tongan squash now exported to Japan)
- PNG vanilla exports (During 2003-04 PNG became the 3rd largest vanilla exporter in the world. World price collapsed and most growers left the industry and PNG is now an insignificant exporter)
- Samoan taro exports (competitive advantage based on product quality in terms of market requirements and costs of production was lost by taro leaf blight).
- Vanuatu organic cocoa exports to France (competitive advantage based on exotic and/or desirable product origin). The value chain collapsed when the relationship between the importer and cooperative collapsed and Vanuatu now only exports cocoa to the bulk markets.

Risks you need to consider in value chain analysis

This section will discuss some of the potential risks that need to be taken into account in analysing value chains and how these factors can be incorporated into the profitability analysis and enterprise planning strategies for the various actor's.

- **Market risks.** Over dependence on a single market or buyer

Example - Fiji improved-variety mango exports to New Zealand:

Fiji previously had a market for improved-variety mangoes in New Zealand based on seasonality. Fiji mangoes are available for export to New Zealand between Nov and Dec, when no other mangoes are available in New Zealand. Up until the late 1990s this provided a good market niche for Fijian exporters and a substantial investment was made in an orchard to take advantage of this seasonal niche market. From January through March mangoes were imported from the Philippines shipped in with bananas. Fiji could not compete with mangoes from the Philippines. However, Fiji lost its niche market in New Zealand when New Zealand began importing bananas from Ecuador. Ecuador also ships mangoes with bananas – but unfortunately Ecuadorian mangoes are available in November and December and Fiji lost its niche market and the investor went out of business.

- **Supply risks** (including disease and climate extremes).

Example - Samoa's taro exports:

Prior to 1993 Samoan taro dominated the New Zealand market and taro was by far Samoa's biggest export earner. However, the arrival of the disease of taro leaf blight in 1993 saw the cessation of taro exports for more than 2 years.

- **Market access risks** (establishing and maintaining markets).

Example - Fijian papaya market access to the United States:

A 2009 market study identified a remunerative market for organic papaya from Fiji in the US. As a result of this study investment was made in organic papaya production to exploit this market on the understanding that market access for Fijian papaya into the US would be quickly obtained. Fiji already had market access for papaya into New Zealand and Australia, using a US-developed quarantine treatment technology. However 5 years on market access is yet to be obtained and this investment and the organic papaya export value chain is at risk.

- **Keyperson dependency risks.**

Example - Vanuatu spices export value chain (Case Study 4)

- **Climate change and other long-term trends.**

Example - vulnerability of Vanuatu and Fiji taro production to taro leaf blight as the result of increasing minimum night time temperature.

Vanuatu and Fiji and some other Pacific island countries currently do not have the disease taro leaf blight that decimated taro production in Samoa, Solomon Islands and parts of PNG. It has been shown that the incidence of the disease is highly correlated with minimum night time temperature. Thus, with climate change there is increasing risk of this devastating disease becoming established in those countries that currently don't have the disease.

Useful resource on the subject

Taylor, Mary, McGregor, Andrew and Dawson, Brian, (2014) Vulnerability of Pacific Agriculture and Forestry to Climate Change. Secretariat of the Pacific Community, Noumea, New Caledonia.

- **Political instability.**

Example - Solomon Island cocoa and coconut oil and Bougainville cocoa exports during their respective “crises”

Strategies you need to consider to reduce risk

There are various types of strategies that can be considered. These include:

- “No regrets” investments to minimise the impact of a future calamity. Some examples:
 - Fiji papaya export value chain (Case Study 2), farmers investment in climate change mitigation measures.
 - Support for the Fiji taro export value chain (Case Study 1) in breeding of taro leaf blight resistance.

A benefit cost analysis should consider such strategies that take into account the likelihood of the future event occurring, the consequences to the value chain and the cost of the investment.

- Diversification of markets and buyers
- Succession plans to minimise keyperson dependency



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Annexes

Annex 1: The CTA Sponsored Value Chain Development Case Studies

Case Study 1: Fiji Taro Exports - Adjusting to Environmental and Market Access Imperatives

Case Study 2: Fiji papaya exports - The flagship of the Pacific Island participation in the horticultural export revolution

Case Study 3: Fiji Breadfruit Commercialization - Environmental Sustainability through the Commercializing of a Traditional Food Crop

Case Study 4: Vanuatu Spices - Reconciling Traditional Production and the Tyranny of Isolation with the Quality Demands of International Markets

Case Study 5: Samoan Fresh Lime Exports- An Emerging Value Chain Exploiting Seasonality and Favourable Quarantine Status.

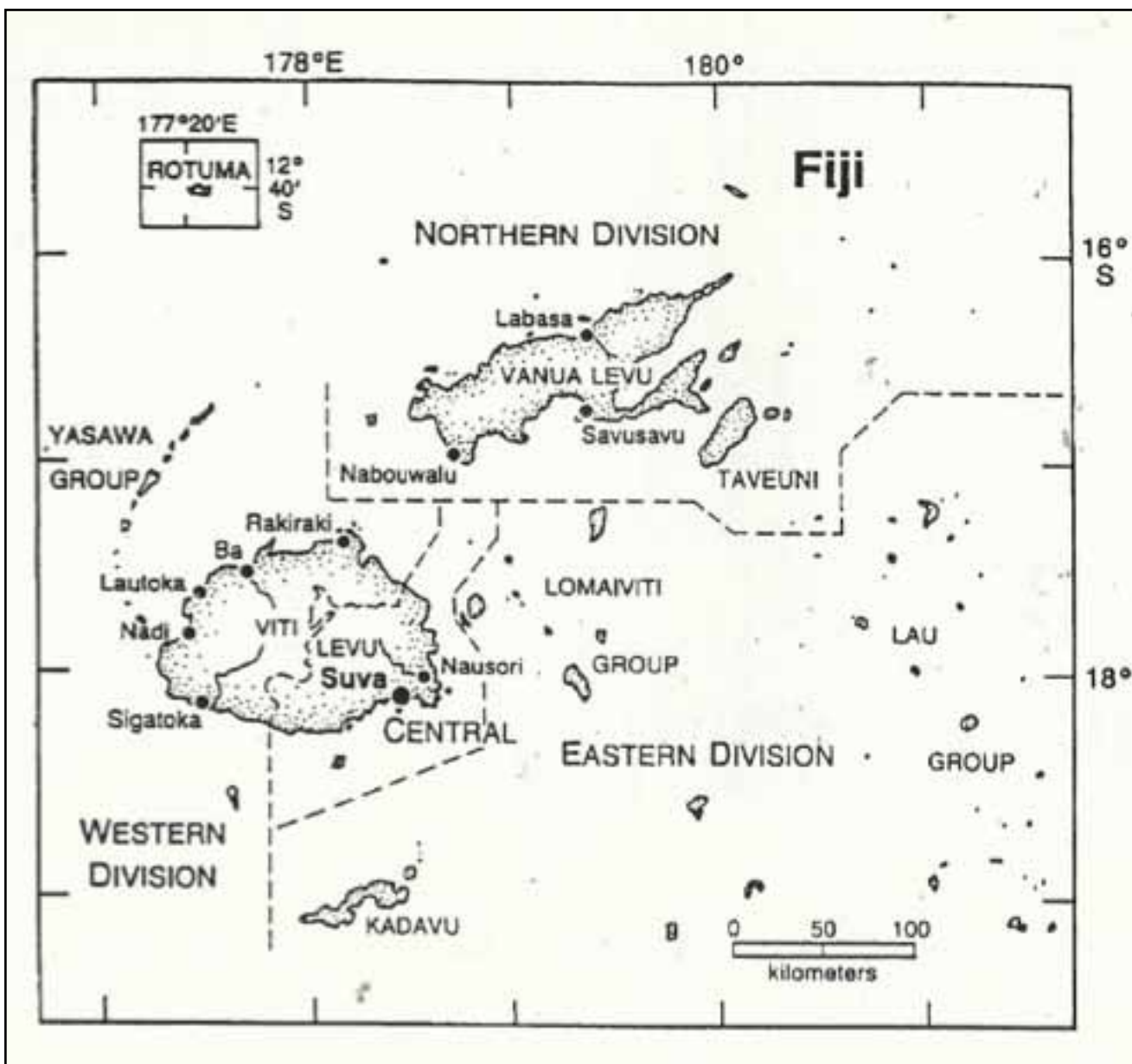
Case Study 6: Solomon Islands Floriculture - Exploiting Post Conflict Opportunities

Annex 2: Key terms and definitions

Annex 3: A selection of other value chain guides/resources

Annex 1: The CTA Sponsored Value Chain Development Case Studies

Case study 1: FIJI TARO EXPORTS - Adjusting to Environmental and Market Access Imperatives



Source: Pacific Island Development Program, East West Center, Hawaii

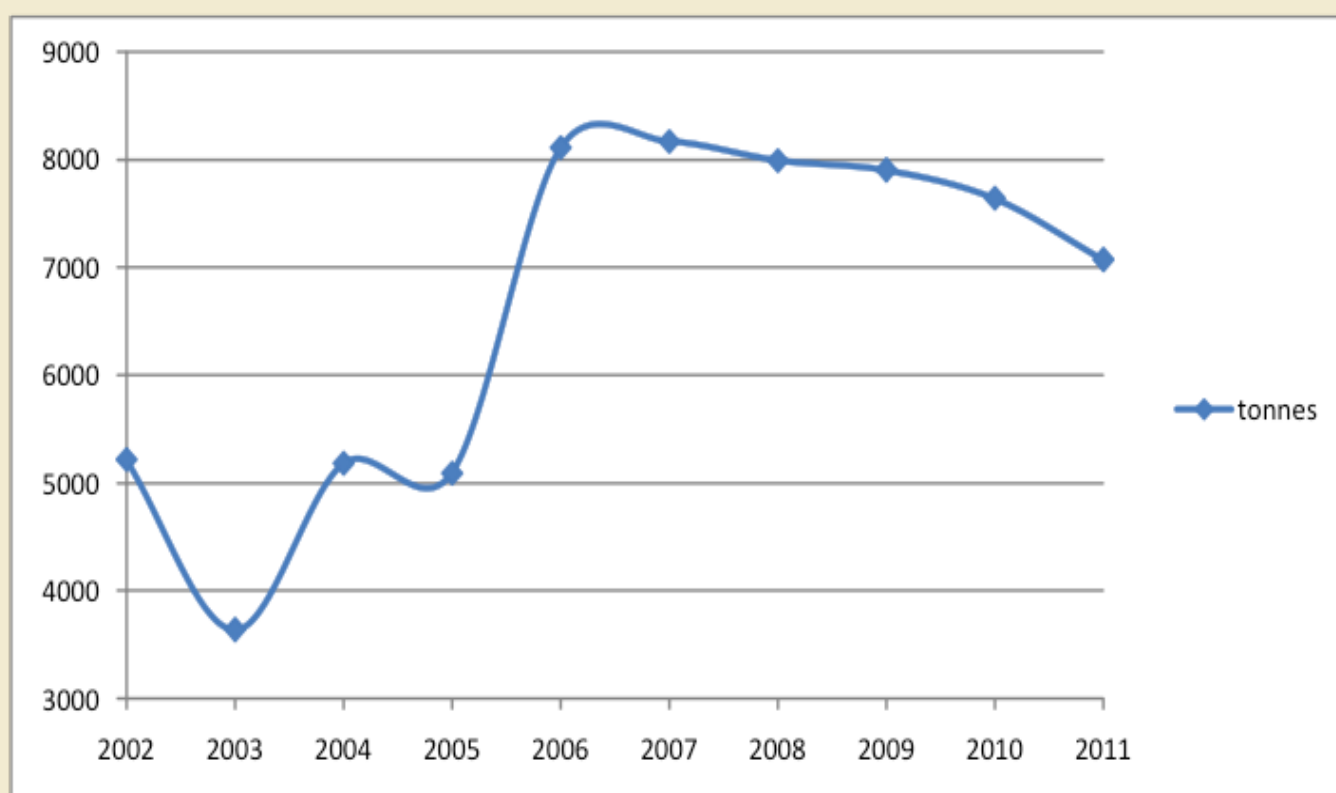
Industry background

Taro is Fiji's largest agricultural export after sugar. Annual taro exports over the last few years have hovered around 10,000 tonnes, with about 65% going to New Zealand and 30% going to Australia, and the balance to the US. The annual value of these exports is around FJD 19 – 20 million.

Until recent times, taro was a subsistence crop that was also traded on the local market. This all changed dramatically in 1993, when the Samoan taro industry was decimated by taro leaf blight and the New Zealand market suddenly became available for Fiji.

Table 4: Monthly exports of taro from Taveuni (tonnes)*

Month	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Jan	335	318	209	389	285	497	650	567	676	443
Feb	364	396	314	410	479	509	580	599	690	407
Mar	408	276	385	405	596	560	575	570	612	516
Apr	452	204	390	469	787	602	550	556	743	595
May	372	235	393	479	765	789	550	537	332	698
Jun	552	225	450	410	625	654	560	550	290	412
July	348	325	530	403	615	637	640	579	389	585
Aug	385	465	534	398	681	790	750	755	567	535
Sep	437	500	520	380	708	770	786	810	770	655
Oct	521	253	478	380	743	550	769	760	790	588
Nov	624	244	498	480	904	870	789	812	850	785
Dec	418	197	480	490	920	940	790	805	930	850
Total	5,216	3,638	5,181	5,093	8,108	8,168	7,989	7,900	7,639	7,069



Source: Rohit Lal, Agricultural Officer Taveuni

Starting from 1994, Fiji's taro exports grew rapidly. Nearly 70% of Fiji taro exports originate from the island of Taveuni. The taro from Taveuni is the pink Tausala ni Samoa variety. This is the same traditional Samoa cultivar (Taro Niue) favoured by the Samoan diaspora. After years of steady growth, exports from Taveuni have declined in recent years, in the face of declining land productivity, increasing costs and market access issues (Table 4).

In the context of Fiji, this is a significant value chain. There are an estimated 3,700 Taveuni taro farmers, with around 17,000 people directly or indirectly dependent on taro for their livelihood. The majority of these farmers (some 2,000) fall into the semi-subsistence category (5,000 -15,000 plants). There are about 750 taro farmers classified as fully commercial.

How the taro export value chain was initiated, is driven and is now evolving

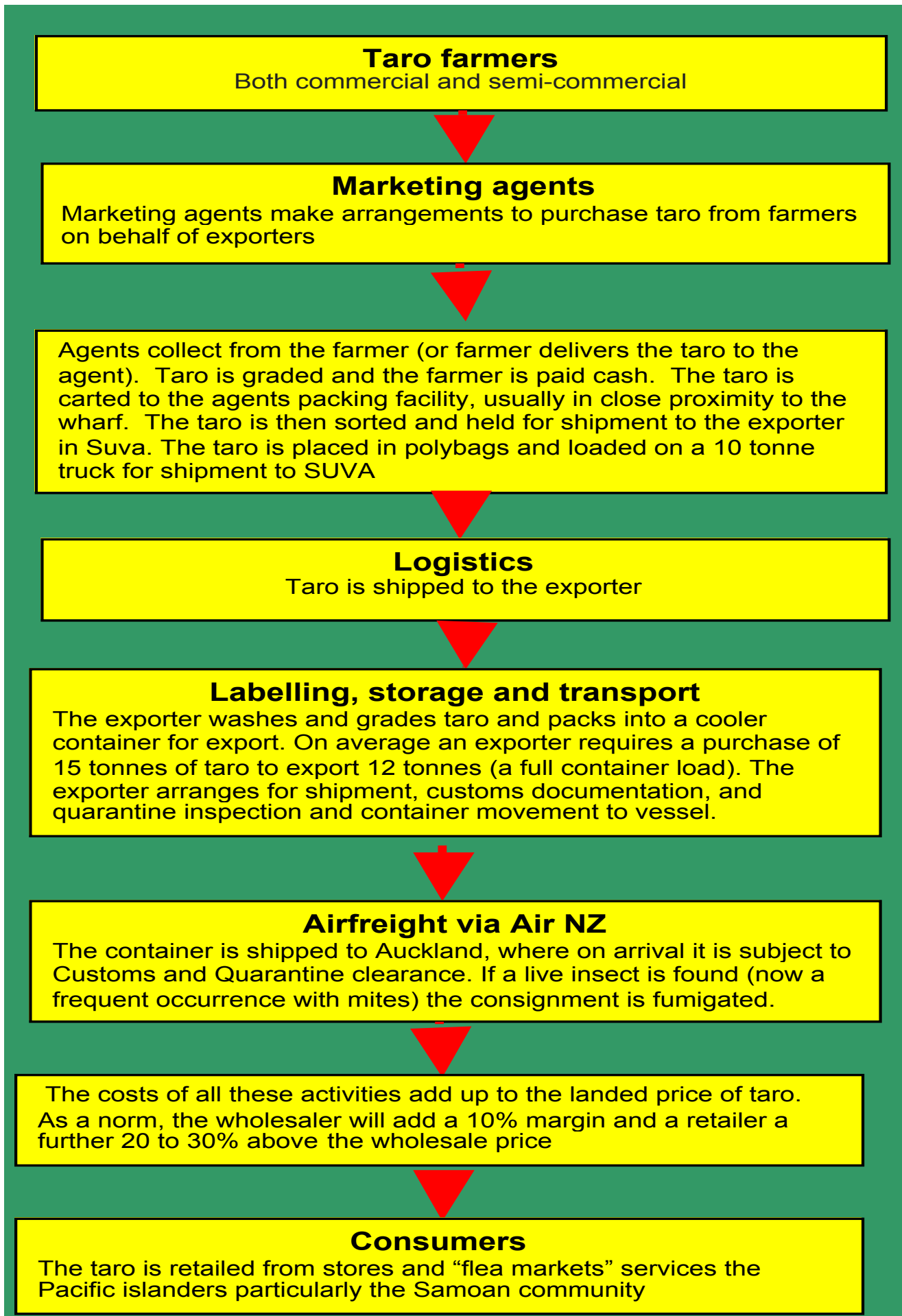
The rapid response to a large export market suddenly becoming available came from private exporters. Most of the initial taro exporters were involved in the then flourishing ginger export trade. Efforts of the government's marketing body the National Marketing Authority (NMA), and its successor parastatal entities, to become involved failed.

Root crop marketing in Fiji is characterized by a large number of marketing agents, traders and exporters. In the late 1990s, there were 12 exporters operating, supported by 30 agents and sub-agents operating on Taveuni alone. Since that time, there has been a shakeout with about half that number now operating.

The taro marketing system is well supported by a good supply of carriers, trucks and shipping to Suva. There is also more than adequate sea freight capacity to export markets from the Suva and Lautoka ports.

An outline of the taro value chain from Taveuni farmers to Samoan consumers in New Zealand is presented in figure 2, along with a pictorial representation in figure 3.

Figure 2: An outline of the value chain for Taveuni taro sold in New Zealand.





Fiji's highly competitive root crop marketing system has provided growers with access to markets at maximum prices, at least in the short term. A similar situation exists for Fiji's other fresh produce industries. This contrasts markedly with the situation in other PICs, where the absence of intermediaries is a major weakness in the fresh produce marketing chain (McGregor 1999). The competitiveness of the system is reflected in the relatively narrow marketing margins of exporters and traders. While the highly competitive marketing system has served root crop growers well in terms of obtaining maximum prices, there is a degree of market failure in terms of produce quality (McGregor and Gonemaituba 2002).

Major themes and lessons learnt from the Fiji taro value chain

Fiji's taro exports have been declining in recent years. The very survival of these exports now depends on the value chain's ability to respond to environmental and market access imperatives. These are:

- declining soil fertility – leading to decreasing productivity and escalating production costs;
- climate change and the threat of catastrophic disease; and,
- quarantine related market access impediments relating to quarantine.

Adaptation to these threats is requiring significant external technical assistance inputs. However, the identification of these external assistance needs has in varying degrees come from within the value chain itself. The value chain's response to these imperatives is discussed briefly below and is dealt with in detail in case study 1.

Environmental vulnerability - declining soil fertility

The problem

Within a few years taro production on Taveuni changed from a largely subsistence activity to a major export industry. The high returns on offer to growers saw a transformation of a subsistence garden-based cropping systems into intensive monoculture production involving land clearing and high application of chemical fertilizers. Taveuni has volcanic soils that were generally thought to be highly robust. . However, under the pressure of intensive yields soon began to fall. To maintain production (corm size) there was a need to apply ever increasing amounts of chemical fertilizer or the shifting of cultivation to new locations in higher elevation forested areas.

The experience of Eric and Magerat Narayan at Waimaqara Southern Taveuni is seen as typical.

The couple own a 5 acre freehold farm that was purchased when a large copra estate was subdivided in 1986. They started to plant Tausala taro for export in 1993, when the market became available. Eric is regarded as one of the best farmers in the area. He plants dalo in rotation with yaqona (kava), which allows for a 1 ½ year fallow period for taro. For the first decade of taro operation, he harvested 1,000 taro corms a month yielding 1.5 tonnes, of which there were virtually no rejects. However, in recent years his production from 1,000 corms has fallen to ¾ tonne of which 25% are rejected due to size. He applies the full regime of recommended inorganic (mineral) fertilizer, yet his yields continue to fall.

The value chain response to the problem

Remedial action to address the problem of declining soil fertility is now being initiated at the grower end of the value chain. A group of lead farmers are adopting radical changes in production practices and are receiving technical support from a range of government and non-government agencies.

A changing mind-set within the farming community has been directly driven by two Taveuni- based grower organizations (Teitei Taveuni and Marist Tutu Rural Training Centre). Teitei Taveuni (TT) is group of farmers who have joined together to advocate sustainable production practices. TT has secured applied research support from the Australian Centre of International Agriculture (ACIAR)'s Soil Health Project. An Australian soil science volunteer is now coordinating the TT program. Based on the farmer field school methodology, a program of "soil schools", utilizing the services of the Australian based Organic Matters Foundation (www.organicmatters.org.au), has been initiated.

The Tutu Rural Training Centre (TRTC) provides an extension and training outreach for the sustainable farming practices (McGregor and Tora 2011). The TRTC has been at the vanguard of the "soils schools" program, with financial support from Caritas Australia. Young farmers and farming couples are trained to do their own soil tests and to evaluate the results and to design corrective action. The "soil school" program is starting to empower Taveuni farmers to understand the problem and to realise they can do something about solving it.

The particular focus for the rehabilitation of depleted acid soils has been on the introduction of the legume mucuna bean (*Mucuna pruriens*) and the application of lime. The promotion of mucuna was based on the experience in Tonga where it was shown to

be successful in restoring and building up organic soil matter (Ali and Kaitu'u 2009) . Taro farmers participating in this sustainable agriculture program are now realising the benefits in terms of increased yields and lower rejects. To report again the experience of the farming couple, Eric and Magerat Narayan.

We joined the first Tutu “soil school” in 2010. The soil testing we did showed our soil had low pH and was deficient in calcium and phosphorus. We embarked on a program of planting mucuna bean prior to planting dalo. We were taught how to make compost utilising coconut husks, sea weed and poultry manure as the main raw material. A handful of compost was added to the dalo planting hole. Lime was also added to the planting hole at a rate of 30gm per hole and another application after 6 weeks. In between, we make a foliar application of “bio brew”. Lime is costing us \$1/kg in Taveuni. This is very expensive – but we still found it financially worthwhile to apply. Other farmers find this too expensive and are not willing to apply lime. Prior to joining the “soil school” program we were on the brink of abandoning taro production. Our average corm size was only 600 gms (the minimum size for export taro is 900 gm). From 2,000 plants, we could only produce 3 bags of export taro. This was after applying 45 gm NPK per planting hole. Our average corm size is now 1.2 to 1.5 kgs and we have reject rates of only 20%. We are now producing 8 to 10 tonnes of export taro annually – up from 2 to 3 tonnes 18 months ago (per com. June 2012).

Progress in restoring taro yields is being constrained by the high cost of imported lime. Farm input supply has been identified as a major constraint to value chain development across the board in the Pacific island region. Lime was quarried locally for the use of the sugar industry, in the days of the Colonial Sugar Refinery (CSR). This is no longer the case – much to the detriment of Fiji's ailing sugar industry. Furthermore, agricultural input supply companies have shown little interest in importing lime in bulk. TT is now in discussions with a cement manufacturing company regarding establishing lime manufacturing operations in Fiji. The availability of affordable lime would have major benefits for a range of Fiji agricultural industries and, in particular sugar.

As a founder of TT notes:

Lime and calcium content of soils is a forgotten chapter in the discussion of what happens when you promote more efficient agricultural practices to change subsistence growers into commercial growers. We are talking about soil structure, water-holding capacity, biological soil health etc. And it is just as important for vegetables, papaya etc as it is for dalo and sugar. High rainfall areas are of course more under pressure than areas with less rain. I honestly think we have a major problem which has been neglected in the last decades. The changed approach – as in the latest ACIAR Soil Health Project involving dalo on Taveuni – is just confirming the necessity of looking at sustainability in tropical island agriculture from a much more comprehensive angle than the current /decade-old NPK replacement fashion. It just doesn't work. Lime and calcium is an integral component of soil health (per com. Peter Kjaer May 2012).

The response to the crisis of declining soil fertility has been identified and driven by lead farmers in the taro value chain. However, critically, this response has been supported by technical and financial inputs from outside entities – in particular ACIAR, OMF, AusAID, Caritas Australia, SPC and the Fiji Ministry of Agriculture.

Environmental vulnerability - climate change and the threat of biological disaster

The problem

Taro being exported from Taveuni is genetically identical to the Samoan variety (taro Niue) that was decimated by TLB in 1993. This disease has not yet been detected in Fiji. However, the incidence and susceptibility to this disease is highly correlated to increasing minimum night time temperature (McGregor et.al. 2011). Thus the Fiji export taro industry, based on the Tausala ni Samoa variety, is highly vulnerable to the impact of climate change.

The value chain response to the problem

There was no real awareness within the Fiji taro industry and the Fiji MPI of the threat TLB posed and the proactive remedial action that needed to be taken. The turning point was report published in 2011 by the International Union for the Conservation of Nature (IUCN) "Assessing the social and economic value of germplasm and crop improvement as a climate change adaptation strategy: Samoa and Vanuatu case studies". The IUCN Report recommended replicating of Samoa's successful taro breeding programme in Fiji, where the arrival of TLB is likely to be inevitable. A breeding program to build in TLB resistance into Fijian taro has now been initiated in collaboration with the SPC's Centre for Pacific Crops and Trees (CePaCT). This has commenced with taro breeding training for Fiji Ministry of Agriculture research staff at USP Alafua in Samoa. The vulnerability of the Fiji taro industry to disease resulting from climate change was identified from outside the taro value chain. The response to the problem was also developed outside the value chain. However, as the Samoan experience has shown, a high degree of farmer involvement is necessary if the breeding program is to be successful. It is hoped that Fiji's plant breeders have learnt from this experience.

Market access vulnerability

The problem

The Australia Quarantine Inspection Service (AQIS) import protocol for Pacific islands taro requires devitalisation (to prevent propagation in Australia). The physical damage inflicted on the taro corm by the radical removal of the growing the growing points transforms the product from a relatively non-perishable product to a perishable product. The increase in perishability precludes sea freighting taro as a realistic marketing option. There is also around 15% loss of product. In 2010, the AQIS devitalisation requirement resulted in an exceptionally high rate of taro rejects.

The value chain response to the problem

In response to this market access crisis, a group of Fiji's taro exporters approached the SPC/EU Facilitating Agricultural Commodity Trade (FACT) Project for assistance. FACT undertook a study of the taro import protocols for the four markets for Pacific taro (United States, Japan, Australia and New Zealand). The study looked at their justification, application and impact on taro imports and on the PIC industries.

The specific conclusions and recommendations of the report are summarised below: (www.spc.int/lrd/index.php?option=com_docman)

- Reform of the import protocols could more than double taro exports from the PICs, resulting in significant benefits for large numbers of low-income rural people.

For the Australian market

- The current import protocol requiring devitalisation makes the export of fresh taro to Australia a high risk business and has caused Fiji taro to become non-competitive, with no prospect of market expansion.
- Devitalisation is a major underlying factor in the high incidence of corm rot experienced with Fiji taro exported to Australia.
- There is no scientific justification for the current taro devitalisation protocol.
- The United States (including Hawaii) and Japan have significantly larger domestic taro industries than Australia and do not require devitalisation for taro imports.
- The WTO/International Sanitary and Phytosanitary (SPS) Agreement principles of consistency and equivalence in phytosanitary measures and their application, are seen as relevant in this case.
- Fiji, Tonga and Vanuatu have a well-documented favourable taro disease status with the absence of virus and fungal diseases of quarantine concern. Australia, compared with the PICs, has a significantly less well documented disease status for taro.
- There is a case for these three countries to be considered a pest free/low prevalence area under International SPS standards.
- The efficacy of the current devitalisation procedures is questionable in terms of preventing propagation and the spread of disease.

For the New Zealand market

- The high frequency of fumigation for imported taro due to the interception of nematodes is not justified because the majority of nematodes found on Pacific island taro pose no threat to New Zealand agriculture. The commonly intercepted nematodes associated with Fiji taro need to be identified and, if found to be of low or no risk, then reclassified as non-regulated pests, thereby eliminating the need for fumigation.
- The quarantine status of PIC nematodes should return to its pre-2005 status, whereby they were accepted as non-pathogenic/saprophytic species of no quarantine concern and thus requiring no action.

The taro quarantine import protocol reforms recommended by the SPC/FACT study are:

- Repeal of the devitalisation protocol requirements for Pacific Island taro exports to Australia (with the exception of those countries in which taro viruses of quarantine concern have been recorded).
- Repeal of the ban on the importation of small corm taro from the Pacific Islands.
- Reclassification of commonly intercepted nematodes associated with Pacific Island taro as non-regulated pests that do not require quarantine fumigation.

In 2011, Biosecurity Australia (BA) undertook a “Review of import conditions for fresh taro corms”. The 230 page document with some 300 technical references recommended that the existing import protocol remain essentially unchanged with devitalisation requirements remaining in place. The BA made no reference to the SPC/FACT study and did not address the recommendations and conclusions of the report. It would seem that the decision for the status quo to remain was underpinned by domestic political considerations. The SPC/FACT study notes: “Despite its small size, the Australian taro

industry has been an active and vocal industry organization vigorously lobbying the AQIS and local parliamentary representatives to impose tighter restrictions on taro imports”.

As noted by the SPC/FACT study, there would seem to be strong prima facie case for the present devitalization requirement for PIC taro exports to Australia being taken to WTO. However, the “tyranny” of unequal size and available resources means there is little likelihood of the Fiji taro industry mounting a successful challenge. The reform of such trade barriers needs to be negotiated in a broader political and economic context. The current prolonged negotiations for PACER-Plus (a free trade and investment agreement between Australia, New Zealand and 14 Pacific Island countries) provides such an opportunity. This would still require a substantial technical assistance input to level the “scientific” playing field.

The problem of access for Fiji taro illustrates the difficulty faced by small island countries in exporting to larger neighbours with similar domestic industries, regardless of how small these industries are. Substantial and appropriate technical assistance is required to allow for even a modest degree of parity in dealing with quarantine related market access issues.

Case Study 2: FIJI PAPAYA EXPORTS - The flagship of the Pacific Island participation in the horticultural export revolution

Industry background

Fiji has been exporting papaya for thirty years (Figure 4). The history of these exports can be divided into two distinct eras: the government operated chemical quarantine treatment period and industry operated non-chemical quarantine treatment period. These are discussed briefly below.

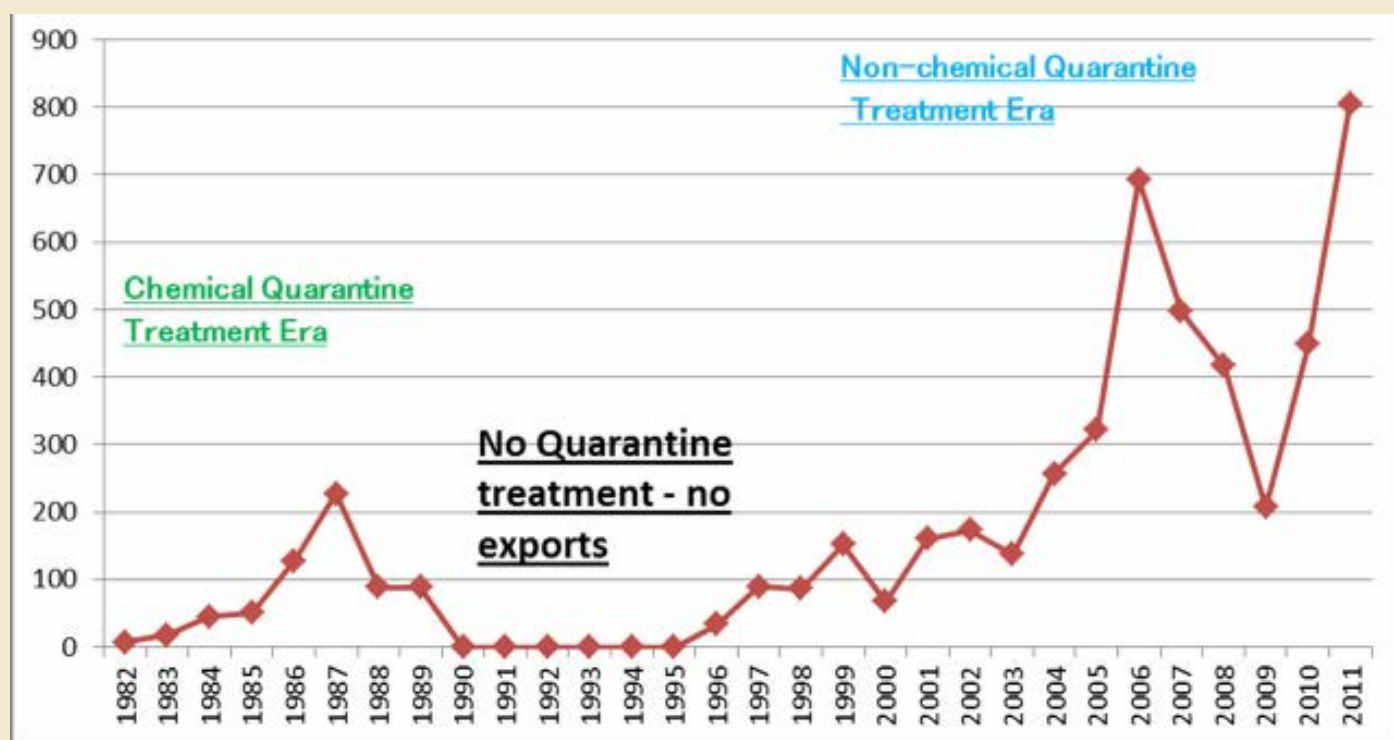
The government operated chemical quarantine treatment era

The establishment of Fiji's commercial papaya industry dates from the late 1970s, when the Ministry of Agriculture imported seed from the University of Hawaii (UH) for trialling. The first commercial planting for export began in 1984; with the Native Land Development Corporation (NLDC) establishing a commercial, vertically integrated papaya project adjacent to the Nadi international airport. To this day, this has been Fiji's most ambitious horticulture development project.

The 45 ha block allocated to papaya and mango was on land previously devoted to sugar cane. The project incorporated aid-financed expatriate management, fruit handling and storage infrastructure, and underground irrigation facilities. Solo seed was sourced from the UH. The fruit was quarantine treated for export at the Ministry of Agriculture's ethylene dibromide (EDB) facility at Nadi airport.

The project's feasibility study targeted annual production at 1,080 tonnes of papaya (NLDC 1985 p, 29). The NLDC never achieved its planting target due to financial problems unrelated to the tropical fruit venture. Nevertheless, a significant result was achieved with 200 tonnes of export quality papaya produced in 1986-87 from 15 ha with a reported gross value FJD340, 000. This result was achieved despite several cyclones in 1985. With the eventual collapse of the NLDC, their Nadi estate ceased operations in early 1988.

Figure 4: Fiji papaya exports 1982-2011 (tonnes)



The NLDC experience was able to test market Fiji papaya. The major lesson on the production side was the importance of proper site selection with respect to drainage and the need to diversify the production base to minimize the risk from hurricanes.

In parallel to the NLDC development, a smallholder papaya sector was being initiated under the auspicious of parastatal NMA. The government's expectation was that the NMA would play a "pace-setting" role for the private sector by "opening up new markets and establishing Fiji's reputation for quality" (NMA Strategic Plan 1985). It was on these erroneous grounds that the NMA was given the sole licence for exports to Japan.

The NMA distributed seedlings, which were produced at the government research station, to growers. These growers entered into an informal agreement with the NMA to sell exportable fruit at a price of 20¢/kg on-farm. The NMA was responsible for picking and packing. The arrangements were haphazard and inefficient and generated only limited expansion in exports from the many thousands of seedlings distributed. The high attrition rate can be attributed to several management factors:

- No extension support or material inputs were supplied by the NMA, while the Ministry of Agriculture's extension for papaya was minimal and diffused.
- The purchase "agreement" with growers was often not honoured by both parties.
- Disorganized and uncoordinated collection and shipping arrangements meant that mature fruit was often not collected.
- Growers frequently sold their papaya to the small exporters when offered immediate cash payment.

This overall lack of discipline has unfortunately had become endemic in Fiji's fresh produce marketing and remains to this day. In response to this situation, a request was made to FAO in 1985 for technical assistance in the preparation of a nucleus smallholder servicing project for tropical fruit. The Southern Development Company (SDC) was identified as a suitable commercial company for this purpose. The SDC was established in the early 1970s to organize and manage small, usually part-time farmers in the production

of Virginia tobacco. The company provided the market, production credit, and extension services, as well as operating a research centre. Faced with declining tobacco demand and increased technical efficiency in curing, the SDC had considerable excess capacity in management and support infrastructure. To ensure long-term viability, it sought to diversify its operations into alternative crops that could use the company's expertise and infrastructure in the management of smallholders. The FAO feasibility study concluded that papaya offered the best short-term alternative.

In late 1986, the NMA approached the SDC with a proposal to produce 350 tonnes of papaya for export. The SDC was reluctant to fully commit the company to a new high-risk commodity at a time of considerable political and economic uncertainty in Fiji. Thus, it opted in the first instance for a "pilot scheme" in which the NMA would be responsible for marketing. The first planting began in late 1987 with Hawaiian solo seedlings from the SDC nursery established at a discontinued tobacco station.

The majority of the selected farmers were current or former tobacco growers. Each grower was allocated an area between 0.20 and 0.40 ha depending on land availability and past record as a tobacco farmer. Managerial and agronomic inputs were provided using the same management principles as for tobacco production. By the beginning of 1989, approximately 8 ha of viable commercial production had been established. The Company's exports for 1989 were almost 72 tonnes (82% of Fiji's exports). Although production increased and the fruit gained ready market acceptance, there was a corporate breakdown between NMA, SDC and the market outlets in Australia. As a result, SDC ceased its involvement in the papaya industry.

The Hawaii based East West Centers Pacific Island Development Program (PIDP) undertook an assessment of SDC's involvement in the development of Fiji papaya industry. The study concluded:

These results confirm the experience of the Fiji tobacco industry that a bona-fide directed smallholder operation provides an appropriate model for horticulture commodity development in the Pacific islands. After gaining the farmers' confidence, the management company can transfer new agronomic ideas and innovation techniques to often wary peasant farmers more rapidly than government's agricultural services and itinerant marketers. It is encouraging that the pilot scheme has given confidence to a major ginger exporter, Balthans International Fiji Ltd., to enter papaya production and marketing using contracted smallholders (McGregor 1990, p 11).

Balthan International (now Produce Specialist Ltd (PSL)) still remains Fiji largest papaya exporter.

In this first era of the papaya industry development, the biggest value chain constraint was the government-operated fumigation facility. In 1989, for two months at the apex of the papaya flush, it was unserviceable while waiting for repairs by the Public Works Department. This situation caused chaos for the papaya and other horticultural export industries and further undermined Fiji's reputation as a reliable supplier.

In 1990, most of Fiji's horticultural export markets for fruit fly host products (including papaya) were lost when EDB was banned as a quarantine treatment, on the grounds that it was considered carcinogenic. Five years were to elapse before exports recommenced with a non-chemical quarantine treatment.

The non-chemical quarantine treatment era

With the loss of EDB treatment for fruit fly host products, Fiji's fresh fruit export industries were desperate to find a quarantine treatment that would be acceptable to Australia and New Zealand. With assistance from the United States Agency for International Development (USAID), Fiji embarked on an ambitious project to acquire High Temperature Forced Air (HTFA) quarantine treatment technology. This technology had been developed by the United States Department of Agriculture (USDA), for the treatment of Hawaiian papaya exports to the US mainland.

USAID's technical and financial assistance, through the Commercial Agriculture Development (CAD) Project, was conditional on the quarantine treatment facility being operated by the private sector (the industry). This represented a fundamental departure from the tradition in the Pacific Islands of government-operated quarantine facilities. Fiji MAFF had the foresight to accept the CAD Project's conditionality. This led to the transfer of HTFA quarantine treatment technology to Fiji and the creation of an industry business to operate the treatment facility. Ironically, there was significant exporter opposition to an industry operated business in favour of the continuation of government operated facility. This surprising response can be explained by the fact that the government service was free (albeit unreliable) and was subject to exporter manipulation of the process.

Despite this opposition, Nature's Way Cooperative (Fiji) Ltd (NWC) was registered on August 15th 1995, to own and operate the new quarantine treatment facility on behalf of Fiji's fruit growers and exporters. MAFF funded the HTFA building and provided the land at the Nadi international airport. The NWC facility was certified for the export of papaya to New Zealand in 1996. Unfortunately, Fiji's proactive approach to adopting the necessary technology to facilitate the export of fruit host products was not matched by the regulatory authorities in Australia and the US. It took seven years for Biosecurity Australia to approve the importation of HTFA treated papaya from Fiji. Some 15-years on, USDA APHIS is yet to give approval for the importation of HTFA treated papaya from Fiji. Such is the nature of the market access constraint for Pacific island horticultural exports.

Fiji papaya exports have grown steadily through from just six tonnes exported to New Zealand in 1996 to 800 tonnes in 2011 (Figure 4). Exports have been interrupted by natural disasters (cyclones and floods) and political disturbances (the coups of 1987 and 2000).

The current papaya value chain now consists of the following actors:

- Six seedling suppliers
- Papaya Farmers (165 registered in the Sigatoka Valley, 22 farmers along the Sigatoka coast, 12 in the Nadi-Lautoka corridor)
- Research (MPI Research Division and the NWC Fiji Papaya Project)
- Extension (MPI Extension Division, Taiwan Technical Mission (TTM))
- Domestic Traders (road side sellers, market vendors, traders)
- Transporters and handlers (NWC staff, exporter staff, Air Terminal Services (ATS), freight companies)
- Exporters (9 exporters – with 4 handling most of the papaya)
- Fiji Quarantine and Inspection Service (FQIS)
- NWC's HTFA quarantine treatment facility.

This value chain is shown schematically in Figure 5 and pictorially in Figure 6. Case study 2 presents a detailed analysis of the Fiji papaya value chain.

How the value chain was initiated, is driven and is evolving

The current development of the Fiji papaya fresh export industry is built around NWC which was formed in 1995 to undertake mandatory non-chemical quarantine treatment on behalf of Fiji's fruit export industry. The Cooperative has over 140 members, made up of growers and exporters. Around 1,300 tonnes of fruit (papaya, mango, eggplant and breadfruit) are treated annually for export.

Fiji is currently facing an economic crisis due to the demise of its sugar industry. Papaya provides one of the most promising diversification avenues for small farmers who have access to suitable land in reasonable proximity to NWC. Accordingly in 2008, NWC approached ACIAR to support an applied research project to meet the needs of this emerging industry. In 2009, the Fiji Papaya Project (FPP) located at the NWC facility commenced operations.

In the build up to the FPP, an extensive analysis of the Fiji papaya supply chain was undertaken along with market surveys to NZ, Australia, USA and Japan. These surveys identified the key inefficiencies along the value chain and the improvements that were needed. The FPP has used the results of this value chain analysis and market research to design the targeted research interventions. A number of on-farm and off-farm trials have been undertaken. The data generated is now being used by the industry or in the scaling up or replicating the trials (www.fijipapayaproject.com).

The FPP has developed a system of stakeholder collaboration and information dissemination which has been able to bring together a fragmented industry into a more cohesive body to respond to the needs of its members. The system is managed by a 13 member Technical Advisory Board (TAB), which meets quarterly to discuss the progress of research activities as well as to prioritise new activities.

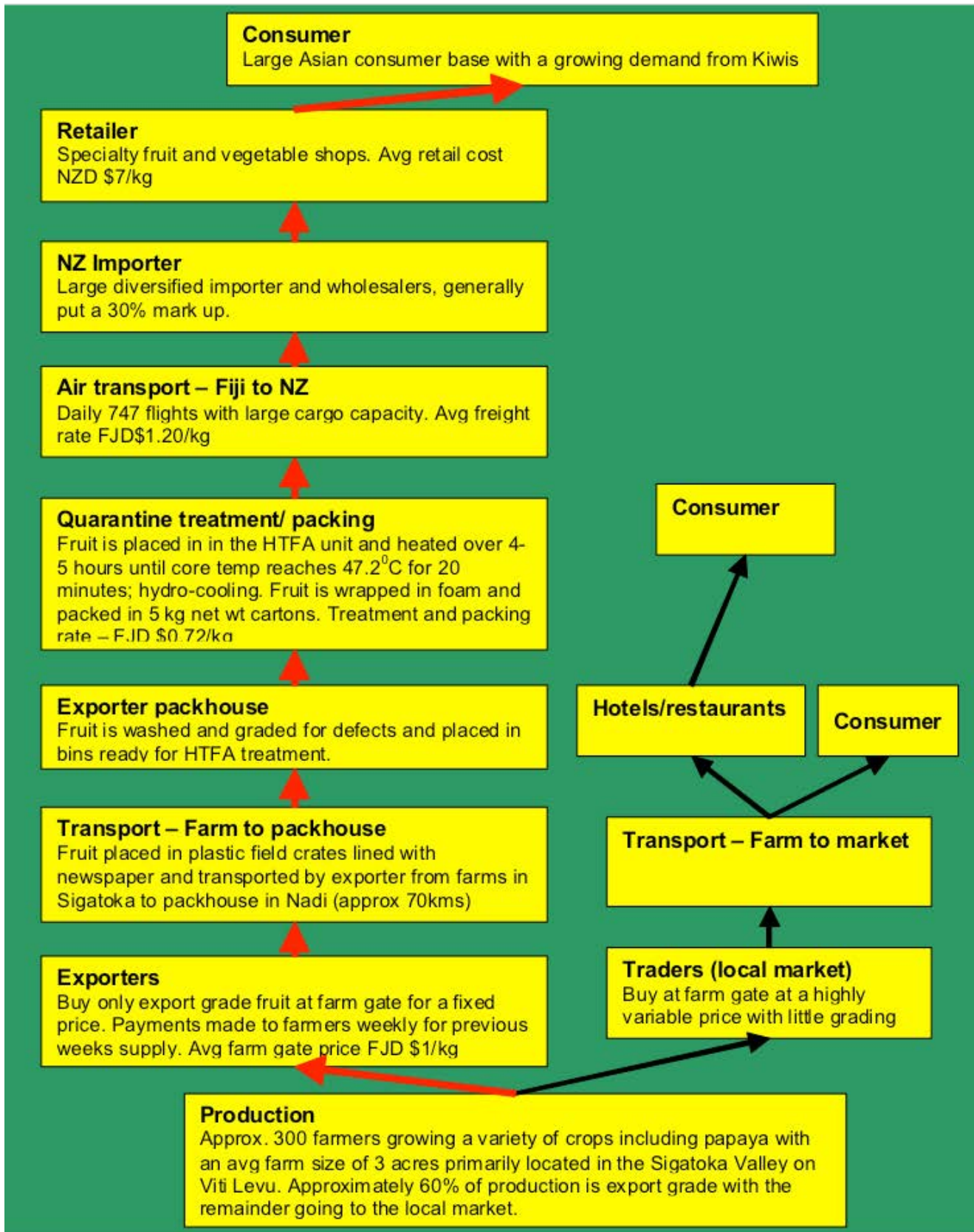
Major themes and key lessons from the Fiji papaya value chain

Fiji's papaya exports have displayed considerable growth in recent years but remains well short of realising market potential. The major themes and key lessons from the value chain's efforts to realise this potential are:

- The need for commercial industry-operated quarantine treatment.
- Public private partnerships (PPP) to access technology and capital.
- Responding to rising costs to maintain competitiveness.
- Ensuring high quality planting material – sustainable local seed supply.
- Dealing with extreme climatic events.

These are discussed briefly below and are dealt with in detail in Case Study 2.

Figure 5: An outline of the Fiji papaya value chain





The need for commercial industry-operated quarantine treatment

The problem

Most of Fiji's horticultural export markets were lost in 1990 when the chemical EDB was banned as a quarantine treatment. Fiji was faced with the challenge of developing a new quarantine treatment or forfeiting the fresh produce exports of all fruit fly hosts.

The value chain response to the problem

In a unique partnership between industry and government, Fiji embarked on an ambitious project to acquire HTFA quarantine treatment technology developed by the USDA.

The need for a public private partnership to access technology and capital

The problem

The worldwide experience is that successful commercial quarantine treatment facilities must be run as a business. However, Fiji's small exporting enterprises did not have access to technology, land, start-up capital and regulatory services to successfully run the business.

The value chain response to the problem

It was decided, despite some initial resistance from some of the major exporters, that the new HTFA quarantine facility would be owned and operated by the Fiji fresh produce export industry, through the auspices of Nature's Way Cooperative. Although run as a private enterprise, NWC has from the outset been a PPP, with the role of the two parties summarised as.

The public sector:

- Facilitated the initial transfer of specialised technology to the fruit and vegetable export industry.
- Provided start-up capital (equipment, building, land and some working capital) and contributed to expansion capital.
- Facilitated the negotiation of bilateral quarantine agreements for market access.

The private sector:

- Owns and operates the facility on behalf of the fruit and vegetable export industry. Provides a significant contribution to start-up working capital by taking shares in the business.
- Generated the retained earnings to maintain the business and to invest in future expansion.

A comparison between Fiji and Tonga provides strong supporting evidence for the appropriateness of this approach for PIC fresh produce export industries requiring quarantine treatment. Both Fiji and Tonga obtained identical treatment facilities at the same time and were recipients of the same technical assistance. The Fiji facility is owned and operated by an industry owned business. The Tonga facility was operated by the Department of Agriculture. Fiji is now exporting over 1,000 tonnes of fruit fly host products annually and has the capacity to treat 3,000 tonnes of fruit annually. Tonga exports no fruit fly host products, despite having highly capable market-orientated farmers.

Responding to rising costs to maintain competitiveness

The problem

The Fiji papaya industry over the last few years has faced escalating costs, which have undermined the industry's competitiveness. Exporters have had to deal with increasing freight, electricity, quarantine treatment, packing rates, and biosecurity charges. For several exporters, these increases are perceived to be unworkable.

The value chain response to the problem

NWC through the FPP is working with exporters at the marketing end of the supply chain to see where costs can be driven out. Areas that are being critically assessed to help alleviate the economic pressures of rising costs include:

- Use of sea freight (reduces transportation costs by nearly 60%).
- Use of newspaper as a packing material instead of the current foam (reduces packaging cost by up to 80%).

Ensuring high quality planting material - sustainable local seed supply

The problem

The Fiji papaya industry was founded on the sweet red-fleshed Solo Sunrise variety and the product is marketed as “Fiji red papaya”. Seed for this variety was supplied by the University of Hawaii (UH) Seed Lab. This variety of papaya is gynodioceous which means that it has perfect flowers which produce essentially inbred fruit. This means that seed collection is a relatively simple process that involves bagging a mature flower so that it cannot be pollinated by any other papaya varieties that may be in the area. Yet despite this relative simplicity, the Fiji industry has continued to rely on the UH for its supply of seeds.

There are several reasons why the Fiji papaya industry needs to move away from importation of papaya seed from the UH:

- Non Availability – The UH seed lab can no longer supply Fiji with papaya seed and this is seriously undermining Fiji's ability to replant after serious floods in early 2012.
- The quality of seed from Hawaii that was obtained from Hawaii is seen as inferior– Following a survey carried out by the FPP team in Hawaii, it was confirmed that there are a number of quality concerns: there is no bagging of flowers in the seed blocks to prevent cross pollination, there is no monitoring and selection process for trees, there is no commercial interest for solo sunrise in Hawaii
- Potential GMO contamination - There is a real possibility for contamination of UH seed from GMO varieties. Fiji papaya is GMO free – which provides marketing opportunities for certified organic papaya and access to the Japanese market. The GMO transgenic gene is quickly spreading to many non-GMO varieties in Hawaii .
- Potential introduction of new diseases - There are several diseases of papaya that are currently not in Fiji and are thought to be transmitted by seed .
- The industry needs to reduce costs wherever possible – The cost of importing seed from Hawaii is high. If Fiji can produce our own quality seed these costs would be reduced.

The value chain response to the problem

NWC through the FPP has been working with MPI to develop a certified seed producer scheme. The scheme is designed to ensure a steady supply of seed by encouraging enterprises to take up the role of seed producers. Past efforts where the public sector has tried to produce papaya seed for the industry have not been satisfactory. A seed producing business to deliver a high quality product is seen as the most sustainable option for local papaya seed production. MPI's appropriate role is in the area of certification and training.

Dealing with extreme climatic events

The problem

In recent years, natural disasters have had a direct impact on the Fiji papaya industry in the following ways: drought occurrences in El Niño years (causing increasing costs in labour and overall decrease in yield and quality), destruction from floods (January 2009, January and March 2012) and cyclones (most recently Cyclone Mick on December 2009 which destroyed approximately 80% of the papaya crop). Climate change is expected to increase the frequency and the severity of events.

The value chain response to the problem

NWC, through the FPP, has launched a number of natural disaster mitigation strategies, including:

- Preparation of farm budgets and gross margins that factor in extreme climatic events under a number of different simulations. This analysis provides farmers with a sound understanding of the risks associated with natural disasters and a realistic picture of the profitability of papaya growing.
- Design of measures to mitigate the impact of extreme climatic events such as the size, frequency and timing of plantings as well as making farms better prepared for natural disasters.
- Solo Sunrise varietal selection programme to include evaluation of characteristics likely to make the selections more 'climate tolerant'.
- Design and trialling of response measures to be implemented on farms immediately before or after a natural disaster to minimise the losses. A natural disaster preparedness and rehabilitation fund that utilizes retained earnings from NWC as well as donor funds.

Case Study 3: FIJI BREADFRUIT COMMERCIALIZATION - Environmental Sustainability through the Commercializing of a Traditional Food Crop

The Fiji breadfruit industry

Breadfruit (*Artocarpus altilis*), is a member of the Moraceae (fig) mulberry family. In Fiji, the breadfruit is an indigenous crop with considerable market potential – both for fresh export and for domestic processing. At present, breadfruit is a minor seasonal food staple, that represents only a small fraction of the consumption of cassava and less important than taro and sweet potato (kumala). This is in contrast to the situation in Samoa, where breadfruit is a major food staple. The large Samoan community living in New Zealand, Australia, and the US offer the main market for fresh breadfruit.

Breadfruit could become a major commercial industry. The fruit is nutritious and versatile and the trees are highly productive. The fruit can be consumed fresh (baked or boiled) or processed into high quality gluten-free flour. Breadfruit provides a medium to merge culture and commerce. The required planting material for commercial production is found on village land. Supplying of this material providing economic benefits to village communities and for the industry as a whole. The opportunities are still untapped. In the context of climate change, being able to produce substantial quantities of starch from tree crop offers considerable food security advantages. These advantages lie with zero tillage agro forestry, minimal chemical inputs and possible carbon credit links.

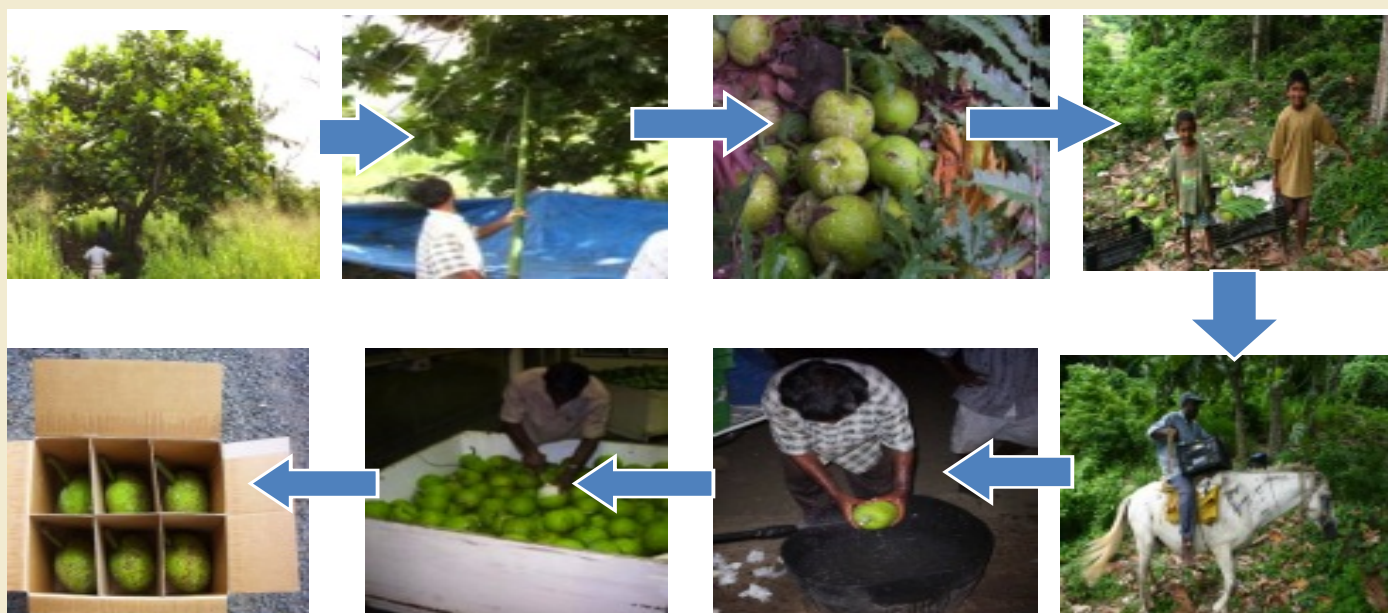
Breadfruit in Fiji is not yet grown as a crop; it is either grown "wild" in the forest, in household compounds or around villages. Fresh breadfruit was only recently given commercial recognition with the export of HTFA treated fruit to New Zealand. Yet fruit for these exports is still harvested from the "wild" compromising and disrupting the supply chain and limiting market growth.

How the value chain was initiated, is driven and is now evolving

The current value chain for fresh breadfruit dates from 2000 when the NWC HTFA quarantine facility was certified for export of breadfruit to New Zealand.

A market of 300 to 400 tonnes was identified in New Zealand, selling largely to the Samoan community. Two of Fiji's produce exporting companies were quick to respond to this opportunity and began exporting in 2001, with 5 tonnes shipped. Since that time, exports have oscillated around 10 tonnes annually. The value chain for National Exports, the leading breadfruit exporter, is pictorially presented in Figure 7. Case study 3 analyses the company's value chain in detail. All the breadfruit currently exported has been "wild" harvested from trees found in breadfruit "forests" or from trees found around villages. This creates major production, harvesting and post-harvest handling constraints.

Figure 7: A pictorial representation of the value chain for National Exports breadfruit exports to New Zealand



Over a decade of exports has confirmed this highly perishable fruit could be successfully quarantine treated and air freighted to New Zealand, where premium prices are obtained.

It is clear that achieving anywhere near breadfruit's market potential will require concerted effort in two main areas:

- moving from wild harvesting of fruit to growing breadfruit as a crop; and,
- introducing appropriate quality control and post-harvest handling procedures.

To facilitate the transition from a wild harvest subsistence crop to a commercial industry based on fresh exports and processing, NWC obtained assistance from the ACIAR Pacific Agriculture Research Development Initiative (PARDI). The PARDI Pacific Breadfruit Project (PBP) commenced in 2011. The PBP is assisting in bridging the gap between a subsistence and commercial industry.

This involves applied research in three inter-related areas:

- identifying varieties that will enable year-round production and develop systems for propagating them;
- developing best practices for the establishment and management of small scale commercial breadfruit orchards;
- establishing harvesting and post-harvest systems to meet export market requirements.

A Technical Advisory Board (TAB) also operates for the PBP, which runs in parallel to the FPP's TAB. Both are housed at NWC.

Major themes and key lessons from the development of the Fiji breadfruit value chain

Breadfruit, of all the value chains reviewed in this report, is undergoing the most radical transformation. The major themes and lessons learnt from this transformation are:

- The transition from wild harvest to smallholder commercial orchards
- Technology and systems to successfully export a highly perishable fresh food product.
- Ensuring year round production
- Progressing to value-added processing

These are discussed briefly below and are dealt with in detail in case study 3.

Transitioning from wild harvest to smallholder commercial orchards

The problem

The existing “wild harvest” value chain was found to be uneconomical for the following reasons:

- Compliance with mandatory bait-spraying requirements for fruit fly control is difficult and expensive for scattered trees.
- Harvesting from tall wild trees is difficult, dangerous, and expensive and leads to considerable damage to delicate fruit.
- Continuity of supply is not possible with the short seasonal availability of fruit.
- There is insufficient supply to develop export and processing markets.

The value chain response to the problem

It was quickly discovered that the development of a commercial breadfruit industry will depend on harvesting fruit from small orchards.

The establishment of breadfruit orchards allows for the:

- creation of a sufficient and accessible production base of required varieties through the adoption of appropriate agronomic techniques (propagation, pruning and fertilizing);
- efficient control of fruit flies to meet regulatory quarantine requirements (more efficient and lower cost bait spraying);
- harvesting that is easier, less dangerous, less damaging to fruit, and provide for better sap control; and,
- substantial reduction in post-harvest losses through improved fruit selection and better packing.

The PBP is working with industry stakeholders to transform the breadfruit value chain from “wild harvest” to orchard production in the following ways:

- Providing training that addresses the information gaps related to planting material, available varieties, plant nutrition, crop cycle and production patterns. Collecting market data related to breadfruit seasonality and pricing. Presentation of this data would allow farmers to make more informed decisions about planning production and the use of inputs such as protein bait.
- Establishing a network of village-based suppliers of planting material in the form of root suckers and marcotted branches.

- Developing efficient ways to apply protein bait application in accordance with the Bilateral Quarantine Agreement (BQA) breadfruit export pathway.

Technology and systems to successfully export a highly perishable food product

The problem

Breadfruit is inedible when it is fully ripe. Once the fruit has been harvested, ripening commences immediately. The transition from firm to soft happens quickly, with breadfruit going soft in a matter of hours. If softening happens when breadfruit is still with the wholesaler or retailer, claims for compensation can be expected against the exporters and future orders may be curtailed.

The value chain's response to the problem

Breadfruit ideally should be harvested early in the morning, or late in the afternoon, to avoid build up of field heat. However, harvesting and treatment schedules need to be linked with airline schedules. Also the harvesting of breadfruit from wild scattered trees is a labour intensive activity. Thus, it is inevitable that at least some of the fruit will be harvested during periods of full sun.

The use of plastic crates, introduced by NWC, is now a standard procedure and this protects the fruit from bruising and skin blemishes.

It is important that as soon as the breadfruit is harvested, it be placed in the shade. This is to avoid the heating up of the fruit and sun burn. The skin of breadfruit is extremely sensitive and as little as 10 minutes of exposure to the sun is sufficient to cause sun burn damage. Placing of leaves over the fruit can be a temporary protection from the sun until the bins are placed in full shade.

Breadfruit for export is sorted and graded at the exporter's packing shed. It is then taken to the NWC facility for quarantine treatment and packing. Due to its perishability, breadfruit needs to be harvested from locations that are within two hours drive of the international airport and that preferably have good road access.

Ensuring year round production

The problem

The viability and the size of the future breadfruit industry will depend on the extent the breadfruit season can be extended. Achieving year-round production is the "holy grail" for the development of a commercial industry.

The value chain response to the problem

The MPI Research Division is currently collecting and testing varieties from throughout Fiji, with the view of extending the seasonal availability of acceptable varieties that have good eating and keeping qualities and tolerance to HTFA quarantine treatment. The PBP is implementing small scale field trials to determine the diverse fruiting patterns of the two main commercial varieties. Over time, new varieties from the entire Pacific island region will come on stream for testing for SPC/CePaCT tissue culture collection.

The transition to processing

The problem

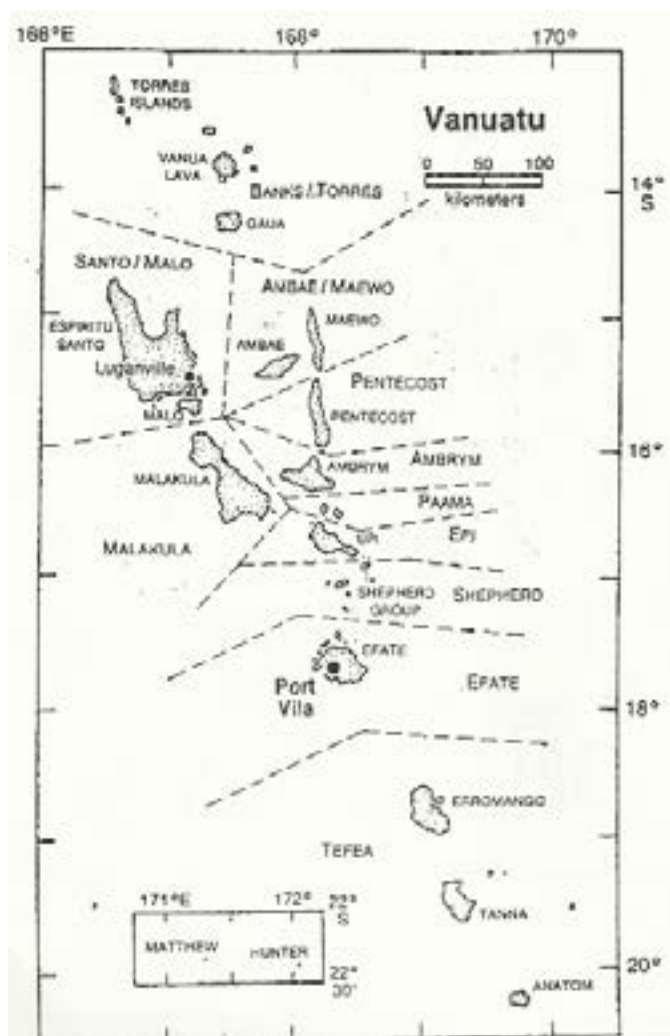
The greatest market potential for breadfruit lies in processing and, in particular, in the production of high quality gluten free flour. However, processing of any scale is unlikely to occur until substantial quantities of raw material are available at competitive prices. It would be uneconomical to go into the business of value adding unless you have a strong production base, which will be the basis of a steady supply chain.

The value chain's response to the problem

NWC's PBP is focusing on the development of small commercial breadfruit orchards and on extending the breadfruit fruiting season. It is envisaged that a significant volume of export reject fruit that would then be available at a low price, and would provide the basis for establishing a processing industry. It will take time for the results of this research to be commercially applied materialise. In the meantime, the PBP is promoting home and cottage industry processing of breadfruit and in particular, the manufacture of breadfruit chips and frozen products.

Case Study 4: VANUATU SPICES

- Reconciling Traditional Production and the Tyranny of Isolation with the Quality Demands of International Markets



The Vanuatu spice industry

Spices are a minor industry in Vanuatu – but important for isolated area. Around 300 households now supply Venui Vanilla (VV), the only commercial processor and exporter.

These village based farmers are mainly in remote locations such as Big Bay, North and North East Ambae, North and North West Malekula, Malo, Aneityum and Tanna. All of these spices are organically produced. However, only a third is certified organic because of the high logistical costs involved. The farmers who miss out on the price premiums on offer are most deserving and often produce the best quality vanilla. This “tyranny of isolation” is a common problem for value chain development in the Pacific islands.

Vanilla is not a difficult crop – it is different from other cash crops (copra and cocoa) with which Melanesian farmers are familiar. Only farmers willing to understand these differences will become successful vanilla farmers. The transition requires considerable training and extension support which would

normally not be available to village farmers, particularly those living in remote locations.

Vanuatu's premium-quality cured vanilla beans, vanilla extract and vanilla paste are exported to markets in Australia, New Zealand, New Caledonia and Japan. Peppercorn is also exported to New Caledonia (Table 5). The total FOB value of these exports is around 9.5 million VT. Vanuatu spices are not competitive in the larger markets of Europe and North America because of exceptionally high transportation costs. The same will be true for other PICs.

Table 5: Vanuatu spice exports 2011*

	Local	Australia		New Zealand		New Caledonia		Japan		TOTAL	
	Conventional	Conventional	Organic	Conventional	Organic	Conventional	Organic	Conventional	Organic	Conventional	Organic
Vanilla beans (kg)	128,500	0	92,400	0	22,000	55,500	0	280,000	0	464.0	114.4
Value (Vatu)	963,750	0	757,680	0	180,400	416,250	0	2,100,000	0	3,480,000	938,080
Vanilla Extract (kg)	124,000	0	173,200	640,000	245,000	7,000	0	0	0	771.0	418.2
Value (Vatu)	396,800	0	623,520	2,048,000	882,000	22,400	0	0	0	2,070,400	1,505,520
Vanilla Paste (kg)	73,500	0	49,600	0	6,000	18,600	0	0	0	92.1	48.6
Value (Vatu)	235,200	0	173,600	0	21,000	59,520	0	0	0	294,720	194,600
Peppercorn (kg)	305,000	0	16,000	0	6,000	349,000	0	0	50,000	654.0	72.0
Value (Vatu)	282,900	0	16,800	0	6,300	342,020	0	0	52,500	624,920	75,600
Vatu total	1,894,900	0	1,571,600	2,048,000	1,089,700	840,190	0	2,100,000	52,500	6,883,090	2,731,800
Vatu Org + conventional	1,894,900	1,571,600		3,137,300		840,190		2,152,500		9,596,890	

Source: McGregor and Bianchessi 2012

How the value chain was initiated, is driven and is now evolving

The Vanuatu spices export value chain began in 1987 with the establishment of Venui Vanilla at South Santo. It soon became evident that the South Santo location was not climatically well suited to vanilla production, with a low rate of flowering experienced. Thus the company decided to expand the production to outgrowers in more suitable areas. To facilitate the outgrower programme, a long-lasting partnership was established with an NGO, the Farm Support Association (FSA) and its Spices Network. VV and the FSA jointly provided training and curing equipment and slowly the production started to increase. Meanwhile, VV fine-tuned a processing method that was able to supply high-quality vanilla from isolated locations using basic low cost equipment.

Vanilla was first marketed locally. An encouraging market response prompted VV to add other spices – peppercorn (green and black), ginger, turmeric and chilli. Volumes were small but the quality was exceptionally high. Importantly, further value adding of vanilla beans (vanilla essence and vanilla paste) was introduced to the product line.

By the mid-1990s, production exceeded the local demand, and a search for an appropriate overseas buyer was initiated. The turning point for export marketing came in 1997, when VV was invited by the South Pacific Trade Commission to participate in the Melbourne and Sydney Fine Food Fairs. Three consecutive years of participation were an irreplaceable opportunity to study packaging, labels, prices and market requirements. A contract with one buyer/distributor for the Melbourne area was initiated in 1997 and it is still continues today, 15 years later.

Viable export marketing required a greater volume than was being supplied at the time. Accordingly, suitable outgrowers were identified, Ambae and Malekula, to whom training and extension services were provided through FSA and the Spices Network.

Today, VV exports vanilla extract (conventional) to three ice cream companies in New Zealand, vanilla extract, paste and beans (organic) to Australia, vanilla and peppercorn (conventional) to New Caledonia and occasionally vanilla and peppercorn to Japan. The volume and value of VV's sales in 2011 is presented in Table 5. A very promising niche/gourmet market for organic vanilla and peppercorn in France is under discussion but exceptionally high freight costs may jeopardise the deal. The Vanuatu spices chain is shown schematically in Figure 8 and pictorially in Figure 9.

Figure 8: A schematic map of the Vanuatu spices value chain

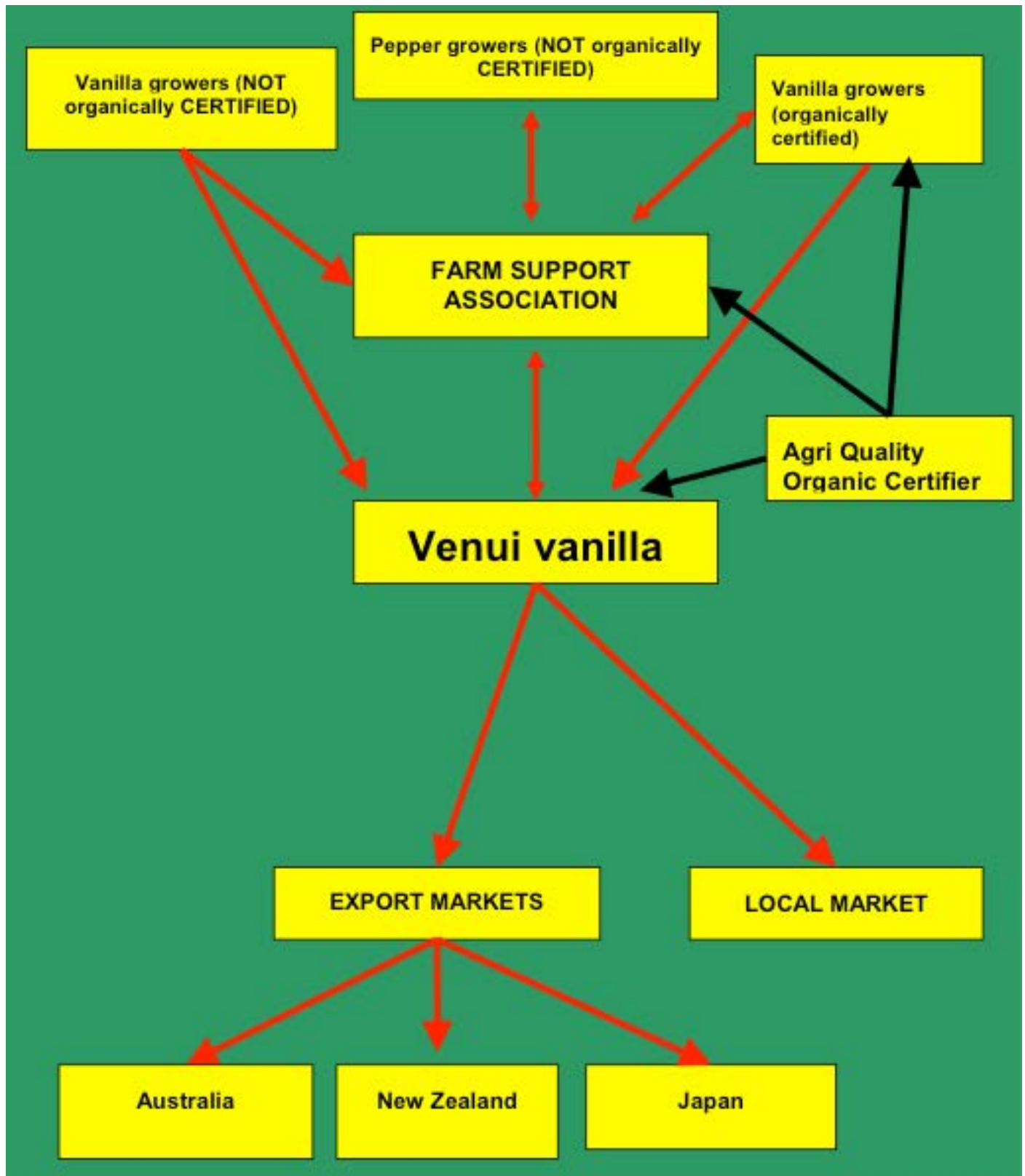
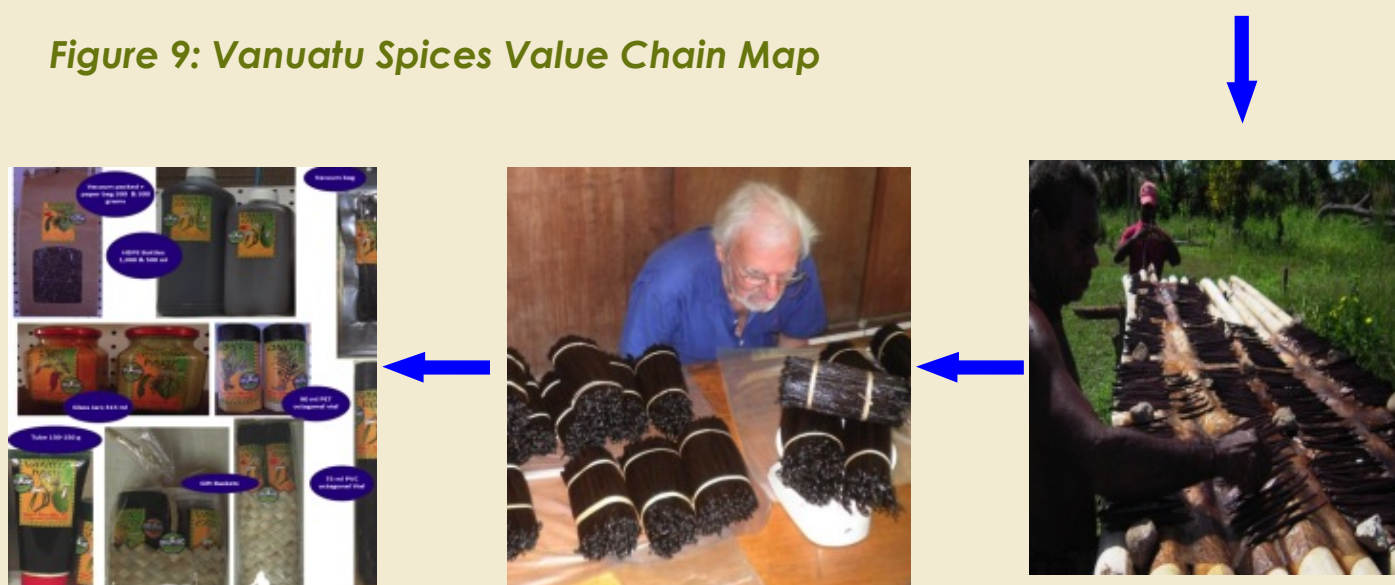




Figure 9: Vanuatu Spices Value Chain Map



Major themes and key lessons learnt from the Vanuatu spices value chain

The major themes and key lessons to emerge from the 25 years of experience from the Vanuatu spices value chain are:

- Premium quality products are imperative for commercial viability for producers from remote locations. There is no place for bulk or second grade products.
- Farmers in remote locations can produce high quality spices provided they receive appropriate support and have confidence in the buyers.
- There is a need for agribusiness to “pull” products through the value chain.
- Strategic partnerships are important.
- The important role of organic certification in accessing markets.
- Over 95% of the market for organic products is in Europe and North America – however, Vanuatu is excluded from these markets because of high transportation costs.
- The role of certification is changing

These are discussed briefly below and presented in detail in the Vanuatu spices value chain case study, case study 4.

High quality value added products, an imperative for commercial viability

The case study shows that value added products are a must for Vanuatu to compete in the highly competitive international vanilla market. It is unlikely that a Pacific island vanilla business could be viable in the long term, based solely on the export of premium quality beans. Less than 50% of the vanilla produced can be sold as premium beans in the retail market. The remaining beans (short, oversplit, blemished) are still top-quality beans (in terms of their vanillin content) but need to be processed to access the market. VV has specialised in the manufacture of high-quality vanilla extract and vanilla paste, which have become the mainstay for the export business.

“Pulling” products through the value chain

The experience of the Vanuatu spices value chain has shown that Pacific island smallholders, with the right organisation and support, can successfully produce export quality product. However, success requires the involvement of companies such as VV who are willing to be proactively involved in the development of these industries, including making significant long term investment. These are the enterprises that “pull” products through the value chain, in contrast to “pushing” products through the chain by suppliers from isolated rural areas. Unfortunately, donors tend to be biased toward supporting the bottom end of the value chain by funding community/village based projects that aim at “pushing” products to market. This is reflected in the current vogue of “Fair Trade” certification which tends to bypass existing agribusinesses, to the detriment of village-based smallholders.

Farmers in remote locations can produce high quality spices provided they receive appropriate support and have confidence in the buyer

The worldwide experience has been that vanilla farming has been successful in areas where no other opportunities were available due to difficult market access. Vanuatu is no exception. Most farmers choosing vanilla or pepper are located in isolated areas, on islands with poor transportation links and communications. Some of VV’s best vanilla is sourced from such locations. A typical farm plot averages 100 to 200 vanilla and/or peppercorn plants (approximately ¼ of a Ha). The relatively small income earned is essential for these isolated rural communities. With 300 to 400 spice farmers, the production will never reach the volume necessary to enter the bulk world spice market.

These isolated growers need to have the confidence of an assured market and appropriate information on the required market requirements. VV has been able to provide this through a partnership with the FSA and the Spices Network.

Vanilla demonstrates the benefits to farmers that can be achieved by improved sustainable production practices. The Spices Network has provided the internal control system (ICS) required for organic certification. However, beside the ICS, the network supplies its members with up-to-date technical information and training material, and provides field coaching, plus practical training through the use of pilot plots and the active participation of selected lead farmers.

Farmers looking to participate in the Spices Network must adhere to production and quality standards that are significantly higher than those required by the organic certifying agency. An important secondary benefit of FSA’s field involvement for organic certification has been the improvement in vanilla productivity and quality. As a result, participating village smallholders have been able to produce world-class quality vanilla

beans. This in the longer term has, perhaps, been more important than the organic certification itself.

The importance of strategic partnerships

Without the strategic relationship between VV and FSA, the Vanuatu spices value chain would have certainly withered on the vine. In the Pacific islands context, it is not realistic to expect the limited government extension service to perform this role. The Vanuatu Department of Agriculture has been supportive of these arrangements, which has been important for their long standing success.

The role of certified organics in accessing markets

For VV, with such a limited supply of spices the only available marketing option was to sell to demanding niche markets. Certified organics was a part of VV's marketing strategy to access these niche markets. The specifics of the marketing strategy are:

- Premium quality requirements– there is no market for second grade as there is for bulk commodities such as copra and cocoa
- Higher prices for farmers to ensure quality products are delivered
- Attractive packaging and labels that feature the exotic origin and beauty of Vanuatu
- Organic certification as a marketing bonus that has provided recognition, facilitating entry into these demanding markets.

The experience of the Vanuatu spices value chain is that organic certification has not resulted in any direct price premiums. However, organic certification has proven critical in securing market access. Certification proved to be an important tool in providing credibility to a company marketing vanilla from a remote Pacific island location. A new buyer in Australia and New Zealand tends to have more trust in a company with an international certification, even if they are not particularly interested in organic products. To obtain certification, a company must demonstrate traceability of all purchased products, cleanness of transportation and storage, and true labelling. Together with a well maintained webpage, the certification is a good marketing tool, even if only 30% of VV's suppliers are certified.

For the Vanuatu spices value chain, after 15 years of experience, the following conclusions can be reached regarding organic certification:

- The organic certification has proven to be a marketing tool rather than a means of providing access to organic markets.
- There is no extra premium for organic spices – at least in regional markets.
- The only price premium is for consistent high quality.
- The high-cost and complicated requirements of existing certification systems mean that there are questionable net benefits accruing along the spices value chain.

The changing role of certification

Organic certification has been used as a form of quality assurance. Other forms of certification, such as Hazard Analysis Critical Control Point (HACCP) food safety certification, would achieve the same result and provide wider acceptability.

Over the last few years, HACCP certification has become increasingly important for companies exporting processed products for human consumption. For VV food safety

certification has become a tempting alternative to organic certification. Given high costs involved, a small Pacific island agro processing business cannot afford the proliferation of certifications being sought by the market. While the organic certification is more sought-after by the retail-packaged market, the HACCP certification is a better guarantee for importing companies purchasing bulk vanilla beans, extract or paste for manufacturing purposes (ice cream, chocolate, yoghurt and other products).

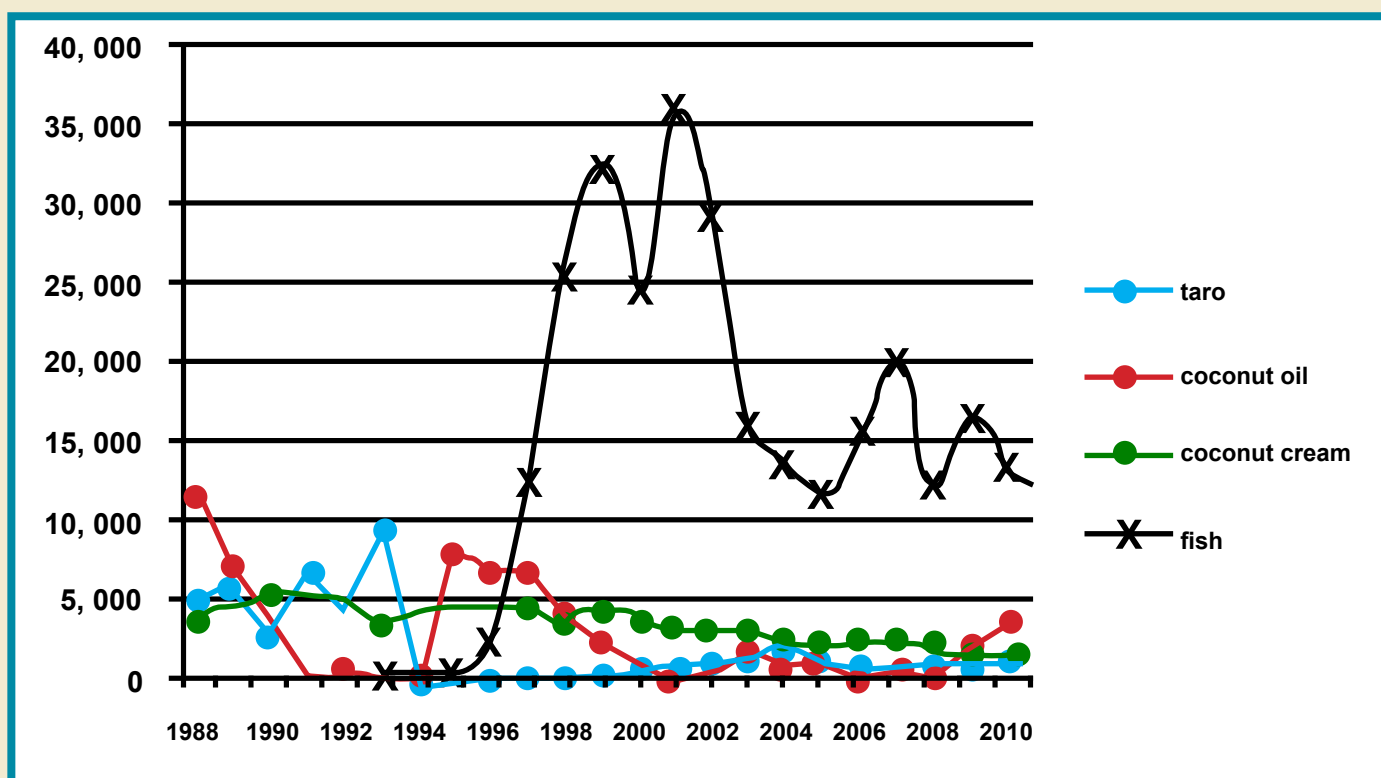
HACCP may become obligatory in the near future for enterprises exporting processed products for human consumption. It is likely that VV will have to substitute HACCP certification for organic certification unless the cost and the administrative burden of the latter can be substantially reduced. Considering the limited production, to have more than one certification will be uneconomical until the off-shore certification agencies move to 'one-step certification' where Organic, Fairtrade and Food Safety Guarantees are inspected and certified in one session.

Case Study 5: SAMOAN FRESH LIME EXPORTS - An Emerging Value Chain Exploiting Seasonality and Favourable Quarantine Status.

The Samoan lime export industry

Samoa has some 17,000 farming families operating small holdings on a largely semi-commercial/ semi-subsistence basis. A feature of the Group 2 PICs (the middle sized countries of Polynesia have more modest land resources) is the low level of export earnings. In 1993, Samoa's taro exports accounted for over 95% of all export earnings. Thus, with the demise of the industry with taro leaf blight, Samoa's total exports collapsed. For a while, fresh tuna was able to fill some of the vacuum left by taro (Figure 9). However, no agricultural product has come close to replacing taro. It was in this economic environment that Samoa was looking for alternative export earners.

Figure 10: Samoa's main export earners ('000 tala)



*Source: Central Bank of Samoa Statistics

Tahitian limes emerged as a prospect in late 2009, when approval was received to export limes to New Zealand. Around 200 tonnes of limes are imported annually by New Zealand, with average total annual cif value of NZD 1 million (Table 6). Imports from Samoa represent less than 2% of this total. The United States is by far the largest supplier, followed by Australia, New Caledonia and Vanuatu. Samoan limes have been able to command a significant price premium.

Table 6: Samoa's lime exports to New Zealand, 2010

	Aug	Sept	Oct	Nov	Dec
Imports from Samoa (kgs)	344	0	449	778	418
Total imports (kgs)	5,812	17,744	20,387	44,436	33,941
Samoan imports as a % of total	6%	0%	2%	2%	1%
Cif value Samoan (NZD)	4,361	0	5,263	9,117	4,690
NZD Samoan imports (NZD/kg)	12.68		11.72	11.72	11.22
Average value of import (NZD/kg)	9.97	7.40	7.56	7.30	8.12

***Data provided by Pacific Islands Trade and Investment Commission from Statistics New Zealand**

This market opportunity for Samoa is based on a seasonal niche (September through February) based on the non-availability of local production during the winter months. While, currently, lime exports are very small, expanding these 5 to 10 tonnes per month is seen as readily achievable and would result in a worthwhile export industry. Annual exports of around 50 tonnes would present a market share for Samoa of around 25%.

How the value chain was initiated, is driven and is evolving

Tahitian lime was introduced to Samoan smallholders by the UNDP/Ministry of Agriculture Fruit Tree Development Project in the late 1990s. The basis of identifying fresh lime (West Indian and Tahitian) as a good export opportunity was the expectation that New Zealand would accept limes from Samoa as a non-host. Also Samoa was known to be free of the bacterial disease citrus canker (*Xanthomona saxonopodis*) - a disease of major quarantine concern to New Zealand. In 1999 and 2000, non-host testing was conducted against Samoa's two fruit flies regarded as a quarantine pest by New Zealand (*Bactrocera kirki* and *B. xanthodes*). Limes were shown to be a non-host to these pests in accordance with test guidelines outlined by New Zealand MAF.

A non-host protocol (NHP) is the preferred mechanism for exporting fresh fruit. It avoids the high cost and management problems associated with quarantine treatment and other pest control measures (bait spraying). A NHP also means small shipments are feasible and these can grow in line with market development and an increasing production base.

Tahitian limes were identified to have the following positive market indicators with respect to the New Zealand market:

- accepted as non-fruit fly host for the New Zealand market;
- perform well under Samoan conditions – good yields and year-round production;
- reasonable production base already in place;
- production could be increased through pruning and improved management of existing trees;

- has a six to eight week shelf-life thus there is an opportunity to use sea freight;
- can be shipped at the same temperature as taro, thus an opportunity to “piggy back” relatively small consignments with taro exports;
- Tahitian lime has minimal pests and diseases ;
- not greatly affected by fruit piercing moth;
- New Caledonia and Vanuatu are the only Pacific island competitors;
- Australia excluded on quarantine grounds.
- New Zealand-grown Tahitian limes are only available between April and August; and
- Small but growing market for Tahitian lime amongst the general New Zealand population (including “gin and tonic” market in the hotel sector).

The Samoa non-host data for Tahitian limes was submitted to NZ MAF in 2001 as part of a market access request. Approval was given eight years later, which is symptomatic of the long delays in achieving market access even when there is no political element involved. There is no immediate interest by private sector exporters in taking advantage of this new opportunity. Major New Zealand produce importers, Turners and Growers (NZ) Ltd, approached the Samoan Farmers Association (SFA) in 2009 seeking supplies of Tahitian limes during the New Zealand winter.

The SFA is a farmer organisation with around 300 members, comprising individual farming families and village groups. There are also a small but growing number of agribusiness members. In early 2010, the SFA agreed to take on the task of initiating the development of this new export industry. This has involved direct participation along the entire value chain. This included:

- harvesting the fruit from the farmers' trees;
- cleaning the fruit to meet the requirements of the bilateral quarantine agreement;
- grading the fruit to ensure that it meets market and NZ quarantine requirements; and,
- transporting packed fruit to the airport and arranging the documentation for the shipment.

Exports began in August 2010 (Table 6). The limes are supplied by 20 farmers who are scattered around the island of Upolu – with one grower supplying 50% of the quantity exported. The value chain is shown pictorially in Figure 10.

The SFA involvement in the lime value chain is highly labour intensive and demanding on the Association's scarce resources. On its present scale, this is not seen as a commercially viable activity for SFA. However, the Association deems this involvement as necessary to develop a new export market on behalf of its members. The SFA plans to phase out this direct marketing activity as soon as satisfactory private sector marketing arrangements can be put into place – thereby releasing the Association's resources to facilitate the development of other market opportunities. It remains to be seen if this occurs.



Major themes and key lessons from the emerging Samoan lime value chain

The major themes and key lessons seen from this still emerging value chain are:

- Taking advantage of seasonality and favourable quarantine status.
- The role of a farmer organization in the developing of a value chain.
- The challenge of making new value chain sustainable.

Taking advantage of seasonality and favourable quarantine status

The Pacific islands face major constraints in the export of high value horticultural products – these relate particularly to diseconomies of scale, isolation and associated transportation difficulties and market access issues. These disadvantages can in some instances be offset by advantages in the form of seasonal niches and favourable quarantine status.

The best known examples of exploiting seasonal niche markets are Fiji's fresh ginger exports to the United States and Tongan squash exports to Japan. For more than a decade, Fiji's ginger industry (southern hemisphere) and Hawaii's ginger industry (northern hemisphere) combined to supply US west coast markets with fresh ginger throughout the year (McGregor 1988). At that time there were no other competitive southern hemisphere producers and Fijian ginger faced no quarantine barriers in the United States. This has now changed with the entry into the market of low cost producers from China and Thailand.

Japan consumes over 200,000 tonnes of butternut squash (*cucurbita maxima*) annually. For a short period between November and the end of January, squash in Japan is in short supply. During this window domestic squash season has ended, the California and Mexico season is winding down and production in New Zealand has not yet started. In 1987, Tongan and New Zealand entrepreneurs determined that the peak production season for squash grown on Tongatapu coincided with peak demand for imports in Japan. Further, Tonga's fruit fly status would allow export to Japan without quarantine treatment (Sefanaia 1989). Squash exports to Japan rapidly became Tonga's major industry, which prompted some commentators to refer to the Tongan model of agricultural led growth (Sturton 1992). However, overtime in the face of production and environmental problems, the Tongan squash industry has declined to a shadow of its former self.

The fledgling Samoan lime exports to New Zealand are based on a similar combination of seasonality and quarantine status. This value chain is unlikely to reach the level of exports achieved by Fijian ginger or Tongan squash. However, the prospects for sustainability are probably better. Small orchards of lime trees do not face the same land degradation problems as those experienced by ginger and squash. Further, this small market niche is likely to be far more robust in face of competition from other supply sources.

The role of a farmer organization in developing a value chain

The structure of Pacific islands agriculture is such that the development of horticultural export industries is best served by small farmers under the direction of commercial exporters and processors. However, for a variety of reasons there has often been reluctance on the part of the private sector to develop new export industries. This has sometime promoted the involvement of parastatal agencies in the development of these industries (McGregor, Halapua and Sturton 1992). This government involvement has often been under the guise that "they would develop the market and then pass it on to the private sector". The reality is that government agencies in the Pacific islands have proven particularly inept in the development of horticultural exports with little inclination to pass on markets to the private sector.

In the case of the Samoan lime exports, it is a farmer organisation, which has stepped in to initiate the development of a new market. This is seen as a "second best" option to agribusiness exporting from the outset. The SFA Strategic Plan (2012-16) has as an objective "the transfer of Tahitian limes exporting to a suitable private sector entity by the end of 2013". After withdrawing from the direct marketing of lime, it is still SFA's intention to continue to be involved in industry development. In so doing, it would be performing a similar function as the Vanuatu FSA and the Spices Network.

Requirement to make the value chain sustainable

Samoa fresh lime export value chain as it stands is probably not sustainable – the scale is too small, transportation costs are too high and the services provided by the SFA are too labour intensive. Under the auspices of SFA, a program is underway to achieve long term sustainability of the value chain, involving:

- The identification of lead farmers and the supply of quality grafted planting material and provision of technical advice in pruning and post-harvest handling.
- The transfer of quality control and grading requirement to lead farmers.
- The transition from air freight to sea freight to take advantage of desirable shelf-life and quarantine properties of Tahitian lime.

Case Study 6: SOLOMON ISLANDS FLORICULTURE - Exploiting Post Conflict Opportunities

The Solomon Islands floriculture industry

The floricultural industry in the Solomon Islands is a recent development. Keys to the growth of the industry have been its small scale nature; flowers can be grown on small parcels of land, and the value chain is very short. The small-scale nature of production and the low capital requirement are also incentives for smallholders to become florists. The industry is unusual in that it has grown to its current size without any input from government although there has been donor involvement.

The Solomon Islands floricultural supply chains are generally very short (Figure 11). At the growing level, around 500 households, in and around the capital of Honiara, are involved with the regular production of flowers for income generation. The next level of supply consists of florists.



Figure 12: A pictorial representation of the Solomon Islands floriculture value chain



Florists are important drivers in the floricultural value chain. The demand for cut flowers this stage comes primarily from weddings and funerals. At present, floral arrangements are the most high value and tradable products in the Solomon Islands floriculture chain which explains the increase in florists. Florists in the context of Solomon Islands are those who have the skills to add value to cut flowers through flower arrangement. The flower growers are selling products, while the florists are selling services. There is no “flower shop” in Honiara. Florists, operating from their own homes, using cut flowers that come

from several sources - their own backyard, backyard growers belonging to their personal network and Honiara Central Market on Saturdays. According to a Vinning and Maedia 2009 report entitled "Solomon Islands Blooming Flower Industry", the major sources of demand are businesses, churches, government departments and the general public for special occasions. The report also states that the prices of flowers are generally high compared with those of Fiji.

How the value chain was initiated, is driven and is now evolving

Growing flowers for sale began in Honiara around 15 years ago. At the end of 1998, ethnic tensions on the main island of Guadalcanal rapidly escalated. There was resentment at influence of settlers from other islands and their occupation of land in and around Honiara. The settlers, mostly from nearby Malaita, were drawn to Honiara and its environs by comparatively greater economic opportunities. Violent clashes involving rival militant groups erupted. In July 2003, in response to the unrest, the Regional Assistance Mission to Solomon Islands (RAMSI) sent more than 2,200 armed services personnel, police and public servants into Solomon Islands. By December 2003, more than half of the troops had been withdrawn, and more of them departed in early 2004. Today, the RAMSI force in the Solomon Islands consists of more than 400 people from 15 different countries, with the majority coming from Australia and New Zealand.

The RAMSI presence stimulated economic activity in Honiara, including the purchase of flowers primarily by the wives of expatriate personnel. The floriculture value chain responded to this demand. Once established the chain is now sustained by the local Solomon island population and is becoming less dependent on expatriate buyers. It provides a good example of supply of products such as flowers generating its own demand.

Major themes and lessons for the Solomon Islands floriculture value chain

A "demand pull" value chain with local florists as the main drivers

The problem

With the sudden arrival of a large number of expatriates in Honiara, there emerged a significant demand for floriculture products. This demand was further enhanced by church groups, business houses and a growing local 'flower culture'. The virtually non-existent floriculture industry was in no position to meet this jump in demand.

The value chain response to the problem

Seeing the demand, more and more villagers began to bring small numbers of flowers to the Honiara Central Market along with their other produce. Entrepreneurial individuals with an interest in flowers began making flower arrangements and promoting them to potential clients. In mid-2006, the Honiara City Council allocated space at the Honiara Central Market to flowers. Business started very slowly with just the four producers. The situation was enhanced in mid-2008 when the Market Manager fenced off the flower area, thereby improving security and enhancing the notion of a clearly defined dedicated space. There now exist around 40 flower growers, who regularly use Honiara Central Market as their main outlet. Florists are key drivers in the floricultural supply chains in Solomon Islands. Flowers once arranged become tradable products to meet a need rather than a want. Florists in the context of Solomon Islands are those who have the skills to add value to cut flowers through flower arrangement.

A lot of people making a little bit of money, a basis for sustainability.

The problem

Although the market for cut flowers in and around Honiara has increased from nothing to what it is today, it still remains very small in economic terms. On this basis, there has been no major investment in commercial flower production.

The value chain response to the problem

There has been a significant increase in the number of smallholder producers of growing flowers and decorative foliage around their homes or food gardens. None of these producers earn a living solely from floriculture. They continue to produce flowers even when there are lulls in the market. The varieties of flowers grown and the small scale nature of production means that becoming a new grower or expanding production requires little or no capital investment. Similarly, the informal florist/flower arranging business has very few overheads, with people working on a part-time basis out of their own homes. This has allowed farmers or working people to take on flower arranging as a small business.

Accessing appropriate technical assistance and support – linking with Pacific island enterprises

The problem

As the floriculture industry began to develop, a need was identified for technical assistance and support. However, this support had to match the small scale of production and level of business experience of the stakeholders.

The value chain response to the problem

The early flower enthusiasts and aspiring entrepreneurs began to lobby anyone who would listen to get some support for floriculture. The first technical inputs came in the early 1990s when the International Labour Organisation (ILO)/USP provided the service of Jimmy Montu from Fiji. Jimmy for more than a decade provided training in floral art through the region. Being one of the founders of Fiji's floriculture industry, as a florist and grower, Jimmy Montu knew what it meant to start small and how to connect with his Pacific counterparts. This low key low budget program has a major impact on floriculture development in the Solomon Islands and other small PICs.

More recently, AusAID gave direct support to developing value chains in the Solomon Islands through the Value Chain Enhancement through Enterprise Development (VCEED) Project. The focus of this initiative was to provide technical assistance and training to emerging Solomon Island value chains using successful enterprises from other Pacific islands as service providers and mentors. The program involved Vanuatu's Venui Vanilla (vanilla) and Tanna Coffee (coffee). For the floriculture value chain this assistance was provided by Fiji's South Sea Orchids (SSO) and Tadra Flowers (TF). SSO has operated a floriculture out grower program and wholesale market for more than two decades. TF is Fiji's leading florist.

The approach of using Pacific island value chain enterprises for assistance and mentoring was a major departure from the norm of training and technical inputs coming from

outside the region. This approach proved successful because those providing the advice could identify the context within which they were operating. This Pacific enterprise to Pacific enterprise approach warrants replication in the development of value chains throughout the region. Unfortunately, AusAID prematurely ended VCEED in favour of a far less focused and development theory “making markets work for poor” approach.

Scaling up – determining the most appropriate model for the Solomon Islands

The problem

The Solomon Island floriculture industry still remains very small. The challenge is to scale the industry up to a level that makes a significant contribution to the economy and to livelihoods.

The value chain response to the problem

The appropriate model for industry growth still remains unclear. Vinning and Maedia (2009) identified three potential growth paths for the Solomon Islands floricultural industry:

- The Kenya and Ecuador route by concentrating on developing the export industry
- The Hawaii route by concentrating on developing the tourism sector
- The Fiji route by concentrating on developing the domestic industry.

Vinning and Maedia concluded for Solomon Islands concentrate in short to medium term that the “Fiji route” was the most appropriate, using the SSO out grower approach as the appropriate model.

Despite this recommendation, there are ongoing donor driven efforts to develop the floriculture sector which have focused on exports. This included a recent study visit of florists and growers to markets in Brisbane, Australia. A small industry exporting to Australia will face large, and probably, insurmountable quarantine market access constraints.

Annex 2:

Key terms and definitions

Agricultural value chain - A way of describing the different 'links' along a chain required to take a product from the farm to the end consumer.

Cash flow – The difference between the flow of money over time from selling the product or the service and the flow of money spent on producing the product or service.

Competitive advantage of a particular value chain compared with other value chain producing the same product - Being able to offer consumers a differentiated/better product; and being able to offer consumers a lower price because of a relative lower-cost advantage.

Cost benefit analysis (CBA) – A process for calculating and comparing benefits and costs over time that are expected to arise from the proposed investment in the value chain.

Demand – How much consumers are willing to pay for the product at the market price.

Exporter marketing margin - The difference between the fob price (the price loaded on the aircraft or vessel) and the price paid to farmers (or trader) for the equivalent quantity of raw material that went into the product.

Exporter “profit” for the product - The exporting marketing margin less the cost of getting the product from the farmer onto the aircraft or vessel.

Farm gate price – The price farmers receive for their product if they sold it at their farm rather than further along the value chain.

Fixed costs – Those costs that are the same regardless of how much is produced. For example land rent or the cost of a building.

Gross margin for a farm enterprise - gross income (i.e. value of production) expressed in monetary terms minus the variable cost of that production.

Market – The consumers who purchase the product.

Marketing - The process of getting the product from the farm to the consumers.

Market research - The process of investigating a market in order to find out the sales prospects for a product and how to achieve success with it.

Niche markets - A niche market is small part of the overall market on which a specific product is focusing. For example the market for organically certified cocoa is a small part of the overall market for cocoa.

Opportunity cost – The money that could be earned from the resources used to produce the product or service if they were used to produce something else. For example the opportunity cost of a farmer’s labour used in growing a particular crop is what he or she could earn using this labour to grow a different crop or the wages that could be earned working off the farm.

Key terms and definitions

Price taker value chain - A value chain that has no influence on the final market price of the product. For example a Pacific Island exporter selling cocoa to the world market has no influence on the price.

Retailers marketing margin for the product - The difference between the retail price and the price paid to the wholesaler/importer.

Retailers “profit” for the product - The retailer marketing margin less the cost of getting the products from the wholesaler into the hands of the final consumer.

Risk – What could go wrong. For example your crop being destroyed by a natural disaster.

Technology – Using knowledge of tools, machines, techniques to solve a problem or improve a pre-existing solution to a problem. For example, the use of plastic crates are a technology to overcome the problem of product bruising.

Value chain actors - The people at each link along the chain required to move a product from the farm to the consumer.

Main actors - those who buy and sell the product as it moves along the chain. For example a farmer is a main actor.

Supporting actors - those who provide services to facilitate the movement of the product along the chain. For example a transport company is a supporting actor.

Value chain analysis – A way of looking at every step and actor along the value chain to identify both weaknesses to be resolved and opportunities for increasing profits for all involved in the chain.

Value chain map – A value chain map is a way of taking what is seen regarding the value chain and put it into a pictorial form that is more easily understood.

Variable costs - Those costs that vary according to how much is produced. For example the cost of labour is a variable cost.

Wholesaler/importer marketing margin for the product - The difference between the price the product is sold to the retailer (the wholesale price) and the fob price for the product.

Wholesaler/importer “profit” for the product - The wholesaler/importer marketing margin less the cost of getting the product from the exporting port (airport) to the retailer.

Annex 3:

A selection of other value chain guides/resources

Methodological guideline	Lead authors	Sponsoring organization
Participatory market chain approach (CIP 2006)	Thomas Bernet, Graham Thiele, Thomas Zschocke	International Potato Center (CIP)
Guidelines for rapid appraisals of agrifood chain performance in developing countries (FAO 2007)	Carlos A. da Silva, Hildo M. de Souza Filho	Food and Agriculture Organization of the United Nations (FAO)
Participatory market chain analysis for smallholder producers (CIAT 2007)	Mark Lundy, Veronica Gottret, Carlos Ostertag, Rupert Best, Shaun Ferris	International Center for Tropical Agriculture (CIAT)
The operational guide for the making markets work for the poor (M4P) approach (DFID 2008)	Springfield Centre (specific authors are not specified)	Department for International Development (DFID), Swiss Agency for Development and Cooperation (SDC)
Chain-wide learning for inclusive agrifood market development (IIED 2008)	Sonja Vermeulen, Jim Woodhill, Felicity Proctor, Rik Delnoye	International Institute for Environment and Development (IIED)
Making VC work better for the poor: A toolkit for practitioners of value chain analysis (M4P 2008)	Tim Purcell, Stephen Gniel, Rudy van Gent	Making Markets Work Better for the Poor (M4P) Project, UK Department for International Development (DFID)
ValueLinks manual (GTZ 2008)	Andreas Springer-Heinze	German Agency for Technical Cooperation (GTZ), now German Agency for International Cooperation (GIZ)
VC development for decent work (ILO 2009)	Matthias L. Herr, Tapera J. Muzira	International Labour Organization (ILO)
Building competitiveness in Africa's agriculture: A guide to value chain concepts and applications (World Bank 2010)	Martin Webber, Patrick Labaste	World Bank
Pro-poor VC development: 25 guiding questions for designing and implementing agroindustry projects (UNIDO 2011)	Lone Riisgaard, Stefano Ponte	UN Industrial Development Organization (UNIDO), International Fund for Agricultural Development (IFAD), Danish Institute for International Studies (DIIS)
Value chain development wiki (USAID no date)	Not specified	United States Agency for International Development (USAID)

¹CIAT's guide for value chain development was first published in Spanish in 2003. A revised version was published in 2007 in English and Spanish. The revised English version was assessed for this review.

²The guide reviewed here, UNIDO (2011), is part of a toolkit of value chain development for understanding and diagnosing value chains. See http://www.unido.org/fileadmin/user_media/MDGs/IVC_Diagnostic_Tool.pdf.

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