

DEVELOPING SUSTAINABLE,
GREEN AND INCLUSIVE
AGRICULTURAL VALUE CHAINS
**IN THE CARIBBEAN
AND THE PACIFIC
ISLANDS**

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based on case studies by
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Koko Siga Pacific (Pacific Islands)

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FOREWORD

This book presents the findings of two reports commissioned by the ACP/EU Technical Centre for Agricultural and Rural Cooperation (CTA), with funding from FAO. During 2012 nine case studies of value chains were implemented in seven countries in the Caribbean and Pacific regions.

The present book aims to draw comparisons between value chains in these two regions that have much in common. The Pacific is entirely and the Caribbean largely made up of island nations with relatively small populations. The two regions have sought to promote intra-regional agricultural trade, although with only limited success. Meanwhile, both are becoming increasingly dependent on food imports, in some cases with negative impacts on nutrition. Both have witnessed sizable emigration and, as a consequence, have large diasporas that offer potential markets for products from the islands. At the same time, they encounter significant Sanitary and Phytosanitary (SPS) and logistical problems when trying to supply those diasporas and other extra-regional markets.

The book reviews a wide range of factors affecting commercial value chain development in the two regions, with emphasis being placed on how the chains studied have maximised the inclusion of smallholders and on identifying ways in which they have been able to address sustainability concerns. The case studies used, which refer to chains supplying domestic, regional and international markets, aimed to draw lessons on both the critical success factors for and the constraints on entrepreneurial initiative and commercial viability.

We trust that the publication will prove useful not only to governments but also to private companies, as well as to those supporting value chain development, such as donors and NGOs. The need to clarify public sector strategies and priorities for fostering development of value chains is essential for both the Caribbean and the Pacific. The agricultural sector is an important source of income for the poorer populations in these regions, and efficient value chains can make a major contribution to improving their livelihoods.

FAO and CTA share an interest in taking stock of approaches for the development of environmentally sustainable value chains that are also economically viable; and we were pleased to have the opportunity to partner on this work, thus continuing the many years of fruitful collaboration between our two organisations.

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ACRONYMS

ACIAR	Australian Centre for International Agricultural Research
ANEM	National Association of Mango Exporters (Haiti)
APHIS	US Department of Agriculture Animal and Plant Health Inspection Service
ASPVEFS	Association of Fruit Producers and Sellers from the South (Haiti)
BA	Biosecurity Australia
BCGA	Belize Citrus Growers Association
BCM	Belize Citrus Mutual
BHL	Bank Holdings Limited (Barbados)
BQA	Bilateral quarantine agreement
BSJ	Bureau of Standards Jamaica
CAIC	Caribbean Chamber of Industry and Commerce
CARDI	Caribbean Agricultural Research and Development Institute
CARICOM	Caribbean Community
CARIRI	Caribbean Industrial Research Institute
CARISEC	CARICOM Secretariat
CBOT	Chicago Board of Trade
CDC	Commonwealth Development Corporation
CEDA	Caribbean Export Development Agency
CEP	Caribbean Egg Processors Ltd.
CET	Common external tariff
CPBL	Citrus Products of Belize Limited
CPJL	Caribbean Producers Jamaica Limited
CREI	BCGA Citrus Research and Education Institute (Belize)
CTA	ACP/EU Technical Centre for Agricultural and Rural Cooperation
EDB	Ethyl Dibromide
FAO	The Food and Agriculture Organization of the United Nations
FPP	Fiji Papaya Project
FSA	Farmers Support Association (Vanuatu)
FTO	Fair trade organisation
GAPD	Grace Agro Processors Division (Jamaica)
GCC	Grenada Cocoa Company
GK	Grace Kennedy Group (Jamaica)
GKFS	GK Foods and Services Limited (Jamaica)
GPPL	Gray's Pepper Products Limited (Jamaica)
HACCP	Hazard Analysis Critical Control Point

HTFA	High Temperature Forced Air Quarantine Treatment
IDB	Inter-American Development Bank
IFOAM	International Federation of Organic Agriculture Movements
IQF	Individually quick freezing
ISO	International Standards Organization
HTFA	High temperature forced air
HWT	Hot water treatment
JEFA	Jamaica Egg Farmers Association
JMB	JMB S.A. (Haiti)
LEL	Liquid Eggs Limited (Jamaica)
MARNDR	Ministry of Agriculture, Natural Resources and Rural Development (Haiti)
NGO	Non-governmental organization
NWC	Nature's Way Cooperative (Fiji) Ltd
OCFCS	Grenada Organic Farmers Co-operative Society Ltd
OMF	Organic Matters Foundation
ORE	Organization for the Rehabilitation of the Environment (Haiti)
PIC	Pacific island country
PPP	Public-private partnership
RAMSI	Regional Assistance Mission to the Solomon Islands
RoRo	Roll-on roll-off
SPC	Secretariat of the Pacific Community
SPS	Sanitary and Phytosanitary
TLB	Taro leaf blight
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
VV	Venui Vanilla (Vanuatu)

Executive Summary

1. Introduction

This paper summarises and integrates two reports on agricultural commodity chains prepared in early 2013 as part of a study of ACP value chains. The reports were funded by FAO and commissioned by the ACP/EU Technical Centre for Agricultural and Rural Cooperation (CTA).

The two original reports cover a total of nine value chains in seven countries in the Caribbean and Pacific regions. The chains were all established through private sector initiative and have proved to be sustainable or to have the potential to be so. All nine chains refer to the output of a single crop or livestock product in a single country and, in most cases, to that part of output which is exported or which passes through a set of one or more exporters.

2. The case studies

Citrus/Belize *Coverage:* the national export value chain for frozen orange and grapefruit juice concentrate. *Focus:* the roles played by the Belize Citrus Growers Association and by Citrus Products of Belize Limited, which owns and operates the nation's two main citrus processing plants.

Cocoa/Grenada *Coverage:* the output of the Grenada Organic Cocoa Farmers Cooperative Society. *Focus:* the cooperative and the Grenada Chocolate Company, which initiated the domestic manufacture and export of organic chocolate products.

Hot Peppers/Jamaica *Coverage:* hot peppers grown by small and medium-scale farmers and processed and exported by the Grace Kennedy Group. *Focus:* the establishment of contract farming to supply a new processing facility for the production of hot pepper mash.

Eggs/Jamaica *Coverage:* eggs produced by members of the Jamaica Egg Farmers Association and processed into liquid eggs for use principally in the domestic hospitality industry. *Focus:* producer-led value addition aimed at domestic sales expansion through import substitution.

Mangoes/Haiti *Coverage:* fresh mangoes and frozen mango pieces exported by JMB S.A. *Focus:* the role of the Association of Fruit Producers and Sellers from the South and value addition and quarantine treatment by JMB.

Taro/Fiji *Coverage:* fresh taro produced for export on the Fijian island of Taveuni. *Focus:* the triggering of rapid production growth by crop failure in Samoa, reversing the environmental damage on the island of Taveuni caused by this growth, and Australia's protection of its taro growers.

Papaya/Fiji *Coverage:* papaya grown on Fiji for export in fresh form. *Focus:* the means by which Fiji re-established an export market by creating Nature's Way Cooperative to run a quarantine treatment facility and the impact of this on the development and structure of the value chain.

Vanilla/Vanuatu *Coverage:* the national export value chain for vanilla. *Focus:* the roles of the sole exporting enterprise Venui Vanilla and its partnership with an NGO, the Farmers Support Agency, in establishing a viable chain for a high value commodity produced and processed by remote farmers.

Flowers/Solomon Islands *Coverage:* cut flowers produced in the vicinity of the national capital, Honiara. *Focus:* the free-market response to a sudden increase in demand for cut flowers and flower arrangements.

3. Main findings

- A key feature of the case studies is that market forces have driven the use of green investments and practices and the adoption of organisational structures that have green outcomes. This is because:
 - in farming, natural resources are an essential factor of production and the long-term viability of production consequently depends on their conservation
 - many means of raising profitability also incidentally conserve natural resources
 - green processing and transport practices are used as marketing tools to expand export sales and raise export prices.

- The case studies demonstrate that value chains for agricultural commodities can function more efficiently and effectively when small-scale farmers develop closer 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.
- Agricultural value chains in the Caribbean and especially in Pacific Island countries may depend on a single foreign national market or on export markets with similar sanitary and phytosanitary requirements. The viability of such chains is vulnerable to a single unpredictable event which results in the loss of market access.
- The unique agro-climatic, physical and cultural characteristics of the case study countries have enabled them to successfully exploit niche export markets through being able to (a) supply at times of high seasonal prices, (b) provide products with unique physical qualities, and (c) differentiate products through marketing which emphasises their exotic origins.
- Preferential access to the European Union and to regional markets protected by a common external tariff can be an important positive factor in the development of agricultural value chains.
- The diasporas of small island nations provide important export markets for traditional agricultural food commodities and products which are not produced in their adopted country. Where they are produced in the adopted country, market access may be inhibited by protective measures that are extremely difficult for the exporting country to challenge successfully.
- The case studies demonstrate that the adoption of new technologies can be a key factor in value chain development and, in some circumstances, a necessary condition for such development. The adoption of new technologies in the case study value chains has allowed lost export markets to be re-established, new high value products to be manufactured viably on a small-scale, waste products to be turned into valuable goods, and products to be processed that replace imports and expand domestic sales.



Introduction

1. Background

In 2012 the ACP/EU Technical Centre for Agricultural and Rural Cooperation (CTA) commissioned studies of agricultural value chains in West, Central and East Africa, the Caribbean, and the Pacific.¹ These studies, which were commissioned at the request of and funded by FAO, focused on issues relating to green and inclusive chains that were established through private sector initiative and which have proved to be sustainable or have the potential to be sustainable.

A report for each region was prepared in early 2013. This report summarises and integrates the findings of the reports that cover the Caribbean and Pacific regions, focusing on innovative and otherwise interesting aspects of chain structure and development.

2. The Nature of the Value Chains Covered by the Case Studies

2.1 The concept of value chains

There are as many definitions of 'agricultural commodity value chains' as there are studies purporting to refer to such chains. The term 'chain' refers to the fact that most agricultural commodities are subjected to a sequence of activities prior to final consumption, such as post-harvest cleaning and sorting, grading, storing, transporting, processing, packaging, transporting, wholesaling and retailing. 'Value' refers to the fact that value is added by these activities as the commodity and products derived from it move down the chain.

¹ *Value Chain Assessment for Uganda, Kenya and Tanzania*, Paul Wagubi, December 2012. *Appraisal of Value Chain Development in West and Central Africa*, Victor Antwi, October 2012. *An Assessment of Agri-Food Value Chains in the Caribbean*, Robert A. Best, October 2012. *Appraisal of Value Chain Development in the Pacific Islands*, Koko Siga Pacific, July 2012.

A value chain, as opposed to a simple supply chain, involves collaboration between enterprises within the chain aimed at improving their efficiency and competitiveness. Chains tend to be more efficient and the net income which they generate tends to be more equitably distributed when they are well governed and managed and embody a two-way flow of information both vertically and horizontally. It is also important that procedures, such as price formation and commodity grading, are as transparent as possible and that individuals and enterprises operating within the chain develop dependable relationships founded on trust.²

The case studies covered in this report have in common the fact that they refer to the output of a single crop or livestock product grown or produced in a single country and cover activities from production through to the point of final consumption and use. In most cases the studies refer to only a part of the national output of the crop/livestock product in question, either focussing only on that part exported or that part which passes through a subset of one or more processors or exporters. Throughout, for each case study, we use the term 'value chain' to refer to the network of paths and businesses that are the focus of the study.

2.2 Value chain selection

The value chains were selected for study because they were established and developed principally by the private sector and have interesting inclusive, green and other characteristics. This non-random selection means that the chains studied cannot be taken as representative of the regions as a whole. Thus no attempt is made to draw definitive conclusions on differences between regions. The main aim of this report is to discuss interesting features and findings and to illustrate them with reference to one or more of the case studies.

The Caribbean report covers the value chains for four crops and one livestock commodity (eggs). These were selected for study from an initial list of 10, with the aim of covering chains with differing governance structures and diverse technological, product and market configurations. The crops and products derived from them are principally exported. The eggs are sold domestically in fresh and processed form. The Pacific Islands report is based on analysis of the value chains for four export crops, three of which are principally exported. The fourth value chain is for domestically marketed cut flowers. Descriptors of the case studies in the two regions are given in Table 1.

² Notwithstanding this, at points in chains where prices are determined by competition, it is essential that competition is free and fair and that cooperation does not extend to price-distorting collusion.

2.3 Characteristics of the selected value chains

Other than for Belize, all the case studies in the two regions refer to commodities produced in small island nations.³ It will be seen from Table 1 that these states differ significantly in terms of total land area, land use, population, population density and GDP per capita. In the Pacific, the three nations covered by the case studies consist of sets of islands, whereas in the Caribbean they comprise single islands or contiguous land areas.

It should be noted that each of the Caribbean case studies focuses on that part of the total output of the selected crop that at one point in the value chain passes through a single commercial entity. The Pacific studies, other than that of floriculture in the Solomon Islands, tend to cover most or all national exports of the commodity studied.⁴

3 Haiti shares the island of Hispaniola with the Dominican Republic.

4 Some of which are processed and/or exported by a single entity.

TABLE 1: CASE STUDY DESCRIPTORS

Raw commodity	Main product retailed/ exported	Producing country		
			Total land area (km ²)	% used for agriculture
Caribbean				
Mangoes	Fresh branded, IQF, dried	Haiti	27,560	64.2
Citrus	Concentrate, essential oil, feed	Belize	22,806	6.9
Eggs	Eggs: fresh, liquid	Jamaica	10,831	41.5
Peppers	Sauces, mash	Jamaica	10,831	41.5
Cocoa	Chocolate bars	Grenada	344	32.4
Pacific Islands				
Taro	Fresh taro	Fiji	18,274	23.4
Papaya	Fresh papaya	Fiji	18,274	23.4
Vanilla	Vanilla beans/concentrate	Vanuatu	12,189	15.3
Flowers	Flowers	Solomon Islands	27,986	3.3

Sources: Total land area: World Bank <http://data.worldbank.org/indicator/AG.LND.TOTL.K2>
 Percentage of land used for agriculture in 2011 (including permanent pasture): World Bank <http://data.worldbank.org/indicator/AG.LND.AGRI.ZS/countries>
 Population: World Atlas <http://www.worldatlas.com/aatlas/populations/ctypoppls.htm#.UjyRxcasjvY>
 GDP per capita in 2012: World Bank <http://data.worldbank.org/indicator/NY.GDPPCARCD>

Population (2012 est.)	2012 GDP per capita (current US\$)	Main destinations	Dominant grower(s)
10,188,000	771	USA	Small
357,000	4,577	USA, EU, Japan	Large
2,730,000	5,472	Domestic	Large
2,700,000	5,472	US, EU, CARICOM	Small
104,000	7,845	US, EU, domestic	Large
854,000	4,438	New Zealand, Australia	Small
854,000	4,438	New Zealand, Australia	Small
246,000	3,176	Aus. NZ. Japan, domestic	Small
536,000	1,835	Domestic	Small



THE CASE STUDIES

Gulf of Mexico



MEXICO

BELIZE

CUBA

JAMAICA

GUATEMALA

HONDURAS

NICARAGUA

COSTA RICA

PANAMA

**NORTH
PACIFIC
OCEAN**

Caribbean

THE BAHAMAS

Freeport
Great Abaco
New Providence
Nassau
Andros Island
Eleuthera
Great Exuma

Yucatan Channel

Cozumel
Isla Cozumel

Havana

Isla de la Juventud

George Town
Cayman Islands (U.K.)

SWAN ISLANDS (HONDURAS)

ISLAS DE LA BAHIA

Guatemala City

Tegucigalpa

San Salvador
EL SALVADOR

San Jose

Cayos Miskitos

Isla de la Providencia (COLUMBIA)

Isla de San Andres (COLUMBIA)

Panama Canal
Panama City

RAGGED ISLANDS (BARBUDOS)

HAMAS



THE CARIBBEAN CASE STUDIES



Caribbean Sea

COLOMBIA

Bogota

GUYANA

BRASIL



MEXICO

Banco Chinchorro
Cayo Lobos

Sergio Buitrón

Chetumal

Nicolás Bravo

Pachacan

Chetumal Bay

Corozal Sarteneja

San Narciso

Libertad

Xealok

Tres Garantías

Buena Vista

Little Belize

COROZAL

San Jose

San Estevan

Yo Creek

Orange Walk

Guinea Grass

La Union

August Pine Ridge

Neustadt

Blue Creek Village

Shipyard

Maskall

San Pedro

ORANGE WALK

Crooked Tree

Bermudian Landing

Burrell Boom

Gallon Jug

Hattieville

BELIZE

Ladyville

Belize City

TURNEFFE ISLANDS

Central Lagoon

Spanish Lookout

Valley of Peace

Belmopan

Roaring Creek

La Democracia

Gales Point

Ciudad Melchor de Mencias

San Ignacio

Benque Viejo del Carmen

San Antonio

Middlesex

Mullins River

Inner or Main Channel

CAYO

Dangriga

STANN CREEK

Hopkins

BELIZE

Riversdale

Caribbean Sea

Independence

Placencia Village

Big Creek

TOLEDO

Gulf of Honduras

San Antonio

Big Fall

Monkey River Town

Jalacte

Punta Gorda

Barranco

Livingston

Puerto Cortez

Omoa

Barroca

Tela

Modesto Méndez

Puerto Barrios

HONDURAS



1

Belize

The Citrus Products of Belize Value Chain



1.1 National and international context

1.1.1 Belize's physical and socio-economic characteristics

Belize is the only non-island country covered by the Caribbean-Pacific case studies. It is located in Central America adjacent to the Caribbean, bordered by Mexico to the North and Guatemala to the West and South. Its total land area is a little smaller than that of Haiti and a little larger than that of Jamaica. The majority of the country's land is forested, with about 20% used for agriculture. Belize has the lowest population density in Central America, only some 13% of that of Jamaica and less than 4% of that of Haiti. Its GDP per capita is slightly less than that of Jamaica and similar to Fiji.

More than half the population of Belize now lives in urban areas. Less than a quarter of the national labour force works in agriculture. Some 97% of all agricultural labour is male.

Virtually all agricultural production in Belize comprises food crops. Of these, citrus has the highest total farm-gate value, followed by sugar, bananas, maize, aquaculture and poultry. Oranges and grapefruit are the main types of citrus grown. The weight of national grapefruit production is about one quarter that of oranges.

1.1.2 The world citrus market

Brazil is the world's largest producer of fresh oranges and orange juice, followed by the USA. Brazil dominates world trade in orange juice, accounting for 80% of global exports by producing countries. The USA both imports and exports significant quantities of orange juice, accounting in total for about 10% of global trade. Belize's neighbour, Mexico, is the third largest exporter. Globally, the EU is by far the largest importer.

The USA is the main market for Belizean orange juice, followed by the Caribbean, the EU and Japan. Belizean production and exports of orange juice are small by world standards. In 2011, its exports were less than 3% of those of Brazil.⁵

5 All data in this sub-section refer to tonnage. Most world trade in orange juice is in the form of unfrozen concentrate, whereas some 97% of Belizean exports are in frozen form. Consequently Belize is a fairly large player in the global frozen orange concentrate market, with exports equal to about 12% of those of Brazil.

In recent years the annual global production of fresh grapefruit juice has been around 5 million tons. About half of this is produced and consumed in China. The USA, South Africa and Turkey are the largest exporters. The EU is by far the largest importer, followed by Russia and Japan.

Belizean exports of grapefruit juice are more significant globally than for orange juice. In 2011, its estimated exports were equal to 11% of those of the largest exporter, the USA⁶.

1.2 The citrus products of Belize value chain

1.2.1 Production

The citrus industry is an important foreign exchange earner for Belize, generating around BZ\$60 million (US\$30 million) per year, some 10% of national merchandise export earnings. Citrus growing supports the livelihoods of around 500 farm families and 2,000 hired workers, plus a further 12,000 casual labourers who are employed during the harvest season.

The first citrus plantation in Belize was established in 1913 and the first citrus processing plant in 1948. The national citrus area peaked at almost 30,000 hectares in 1999. After falling steeply to a low of under 15,000 hectares in 2002 and 2003, there has been a moderate recovery in recent years to around 18,000 hectares. Of this, around 85% is Valencia oranges and 15% grapefruit.⁷

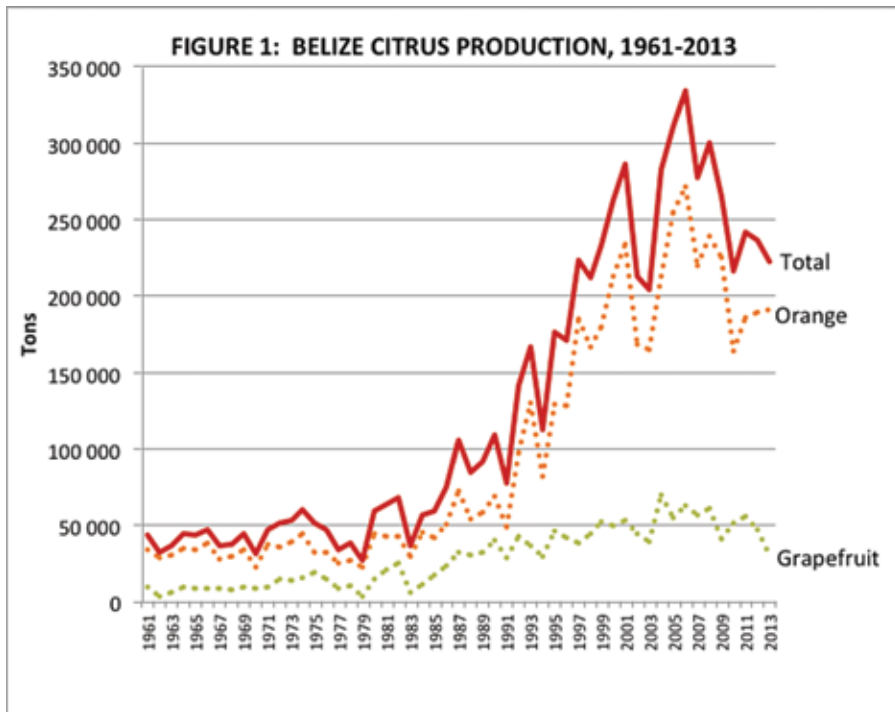
Citrus production peaked in 2006 at 335,000 tons. Production in 2013 is projected to be some 213,000 tons, down from 237,000 tons in 2012 (Figure 1).

The industry is dominated by relatively large estates, with 32 farms of over 300 acres (121 ha) accounting for nearly 70% of the total citrus acreage. The remaining acreage is located mainly on some 500 medium and small-scale farms, the majority of which have 3-10 acres planted to citrus. In addition, there are many small farms that have a few backyard citrus trees or small groves.

Until recently all medium and large-scale commercial growers were members of the Belize Citrus Growers Association (BCGA). Small-scale growers with from

6 All the trade data in this section are from the UN Comtrade Database for 2011. Comparisons are with Brazil and the USA rather than with global trade due to incomplete global data. (<http://comtrade.un.org/db/mr/rfCommoditiesList.aspx?px=H1&cc=2009>).

7 These percentages are of harvested area. Source: FAOSTAT, FAO Statistics Division 2013, 01 July 2013.



Source: FAOSTAT, FAO Statistics Division 2013, 01 July 2013

TABLE 2: SIZE STRUCTURE OF CITRUS PLANTATIONS

	No. of farms	Total hectares	% of total
Above 121 ha	32	12,633	12,633
Above 121 ha	32	12,633	12,633
Above 121 ha	32	12,633	12,633
Below 20 ha	32	12,633	12,633
Total	32	12,633	12,633

one to three acres of citrus are registered as non-voting provisional BCGA members. In July 2009 a group of large citrus growers, which accounts for about 40% of the national crop, established an alternative to BCGA: Belize Citrus Mutual (BCM). This group decided to separate completely from BCGA in 2012.

The cornerstone of BCGA's support for small and medium-scale growers is its majority ownership of Citrus Products of Belize Limited (CPBL), the company to which small-scale farmers sell their citrus (see sub-section 2.2, below). BCGA negotiates annually the prices at which CPBL purchases citrus. Payment per box is made according to a formula that reflects the brix⁸ and the percentage of solids in the delivered fruit. For each delivery, farmers receive a set of payments. An advance is paid on delivery equivalent to 65% of the estimated final price negotiated between BCGA and CPBL prior to the start of the harvest on the basis of a submission by CPBL. One or more further payments is made to growers during the crop year, raising the total unit payment to the agreed final estimate. BCGA monitors Chicago Board of Trade (CBOT) futures prices for frozen concentrate orange juice and requests revision of the final price estimate should the CBOT price deviate during the delivery season by more than 10% from that used in the original CPBL submission. Once agreed on the basis of a new submission by CPBL, the revised estimated price is then reflected fully in the prices which CPBL pays to growers.

The representation of small-scale farmers in both BCGA and on the Board of CPBL (through BCGA's membership of the Board) means that small farmers can sell their fresh citrus on the same terms and at the same price as the main estates.

In addition to receiving the negotiated price, growers benefit from the following set of programmes and services provided by BCGA and CPBL:

- Production and logistics scheduling through a Harvest Committee supported technically by the CPBL Fruit Logistics Department.
- Machinery services for mainly small-scale growers to weed groves mechanically and to transport fruit to a processing plant.
- Input supply stores where growers can purchase agro-chemicals and diesel fuel at cost price.
- Access to various lines of credit at subsidised interest rates, including loans of up to one month at zero interest.
- HLB (citrus greening) control and management.⁹

⁸ A measure of the sucrose content of citrus juice and other aqueous solutions.

⁹ Huanglongbing (HLB) is a bacterial disease that attacks the vascular system of plants.

- Support from the BCGA Citrus Research and Education Institute (CREI), including:
 - advice on grove management practices
 - certified nurseries that provide improved and disease-free planting material
 - information and training on the control of pests and diseases
 - soil and foliar nutrition testing.
- Advocacy on matters affecting the interests of growers.

Funding for these services is provided from BCGA fees levied on fresh fruit deliveries to the factory, from a Social Security Revolving Loan Fund, and by low interest loans from the European Investment Bank and the Development Finance Corporation earmarked to finance the replanting of groves with disease-resistant rootstock.

The large estates which are members of BCM are currently not paying the BCGA cess. This has reduced BCGA's income significantly and is constraining its activities, especially those of CREI. These estates have also contracted out of the HLB Control Programme, reducing its effectiveness.

1.2.2 Processing

The canning of orange and grapefruit juice in Belize began in 1935. The first large scale processing plant was established in 1948 by the Citrus Company of Belize Ltd. and a second was erected nearby in 1963 by Belize Food Products Ltd. The processing industry subsequently grew and developed through the creation of additional companies. In 2001, the industry was unified both horizontally and vertically and brought under single ownership through a programme of acquisition by the Commonwealth Development Corporation (CDC). This eventually led to the creation of a single company, Citrus Products of Belize Ltd. (CPBL), in which the Belize Citrus Growers Association (BCGA) acquired a 99.78% shareholding in October 2002.¹⁰ In 2006, the Barbados-based company, Bank Holdings Ltd (BHL), acquired 41.93% of CPBL's shares. It added a further 4.66% in 2010. These BHL investments were aimed at leaving BCGA as the majority owner while giving CPBL the capacity to develop and market value-added products in the Caribbean region. However, subsequent investment by CPBL into new equipment to add value to its prod-

¹⁰ BCGA made this acquisition through its investment arm, Belize Citrus Growers Association Investment Company Ltd, which it established in 2000.

ucts, establish an animal feed production facility and a power co-generation capacity has been financed by loans to be repaid out of future profits, rather than from BHL's injection of capital.

CPBL and its subsidiaries currently own a number of citrus farms, two citrus processing plants which produce citrus concentrate and essential oils, a bottling plant, and a feed and essential oils plant that also provides waste by-products to a cogeneration plant that supplies power to one of the fresh citrus processing plants. CPBL produces a wide range of products, some of which are customer-branded and packed ready for retailing. These include orange and grapefruit concentrated and frozen, freeze-concentrated and not-from-concentrate juice, squash, pulp cells, cold pressed oil, and oil phase essence.

CPBL now has an estimated total annual processing capacity of some 400,000 tons of fresh citrus. This is well above its recent levels of annual throughput. In 2013, its plants are expected to operate at only some 56% of capacity. The company made losses of BZ\$10million in 2010 and BZ\$11 million in 2011, but recorded a small profit in 2012.¹¹

1.2.3 Exporting

Belizean citrus concentrate has a taste profile and composition that reflects the subtropical ecosystem in which the fruits are grown. This profile, coupled with a naturally sweet, high acid-brix ratio, allows CPBL to gain access to and sell at a price premium in markets that are sensitive to the addition of sugar and other sweeteners. In these markets, bottlers and packers blend Belizean concentrate with bulk concentrates to meet customers' specifications.

Small amounts of CPBL's products are sold in the domestic market with the lion's share being exported to CARICOM nations, the USA, the EU and Japan.

The competitiveness of exports has been enhanced through a set of Government measures, including:

- granting CPBL EPZ status, providing 'no tax status', and the exemption of duties on imported merchandise, such as packaging material and processing equipment
- Belize's membership of CARICOM; this allows it to benefit from the

¹¹ The BZ\$ is pegged to the US\$ at a rate of BZ\$ 1.0 = US\$ 0.5.

community's trade measures, such as the 35% regional external CET which gives protection to CPBL's products in CARICOM markets

- Belize's participation in the Lomé Caribbean Basin Initiative, which allows duty free access to EU countries
- the 2010 Belize-Guatemala Partial Scope Agreement, which allows CPBL to export its products to the Guatemalan market at reduced rates of import duty.

In addition, CPBL has obtained ISO 14001:1996 certification, its citrus value chain is certified as food safe through ISO 9000 (which includes HACCP and Kosher compliance), and it is eligible to sell its products as Almost Pesticide Free. This has allowed it to supply both orange and grapefruit juice profitably to distant markets, notably the EU and Japan.

1.2.4 The full value chain

The value chain is relatively straightforward, in that input supply is largely in the hands of BCGA and all processing of the fresh fruits is undertaken by a single umbrella company, CPBL, which is the sole supplier of processed citrus products to both the domestic and export market.

There are substantial economies of scale in the making of citrus products, especially in the processing and transportation of concentrate. Despite its proximity to Mexico and the USA, which are two of the world's largest citrus producers, and competition from very low-cost Brazilian production and export of bulk consignments of orange juice, the industry in Belize has been able to survive and, until the last few years, expand its exports strongly. This has been achieved through a combination of (a) the beneficial impact of the preferential trade measures listed in sub-section 2.3, above, (b) exploitation of the unique taste characteristics of Belizean citrus to provide consignments for mixing with lower-priced concentrates, and (c) through the adoption of remunerative green strategies, including the productive use of the by-products of processing.

Continuation of these strategies is likely to make the CPBL value chain sustainable provided all the key players in the national citrus sector revert to working in harmony towards common goals.

1.3 Innovative and interesting features

1.3.1 The inclusion of small-scale growers in the value chain

The production of citrus in Belize is dominated by relatively large estates. However, the industry, through the BCGA, has traditionally provided a wide range of services to all growers, with some targeted principally at small-scale growers. The industry's support of small and medium-scale growers stems from:

- the commercial need of CPBL to increase national production to raise throughput and reduce unit processing costs
- the desire of a grower-owned industry to use the industry as the foundation for the development of local communities in producing areas.

The recent creation of BCM in effect means that small-scale growers are now institutionally more integrated into the value chain than are a set of large growers. However, the creation and actions of BCM have harmed small-scale farmers by weakening BCGA.

1.3.2 The introduction of green chain initiatives driven by the concurrence of benefits

Although the industry does not make any products certified as organic, it has adopted measures to reduce the use of agro-chemicals, to use fuel and natural resources more efficiently, to minimise the output of waste products and to lessen pollution. These measures have included:

- raising the efficiency of citrus production through the adoption of biological pest control methods and reduced use of chemicals, improved nutrition testing and management, and the payment of farmers on the basis of the weight of marketable product rather than total weight of the delivered fruit
- adopting production planning and scheduling to reduce post-harvest costs and losses
- maximising use of the byproducts of processing through the extraction of essential oils, the use of wet residue to make compost that is provided to small-scale farmers free of charge, the manufacture of animal feed, and the drying of remaining residues for use as fuel for the generation of electricity

- reducing the pollution of rivers and other environmental contamination by making productive use of byproducts and through treating liquid waste using an effluent pond system to reduce its biological and chemical oxygen demand¹²
- the recycling of water used in processing
- switching from bunker sea fuel to sweet crude oil and improving the logistics of fruit and product haulage to reduce carbon emissions.

Virtually all these measures have a positive impact on the environment while simultaneously enhancing CPBLs profitability. For example, the extraction of essential citrus oils has (a) allowed CPBL to provide concentrate to exacting taste specifications through the reintroduction of the oil into consignments tailored to individual orders and (b) prevented release of the oil into local rivers where, together with the release of effluent with high biological and chemical oxygen demand, it formerly led to significant fish kill. The measures have also meant that it has been technically easier to treat the remaining liquid waste at a lower cost simply by using a system of effluent ponds, with the result that growers and other members of their community no longer face the unpleasant odour and local pollution previously caused by the dumping of untreated effluent.

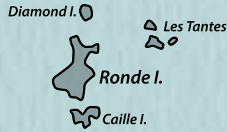
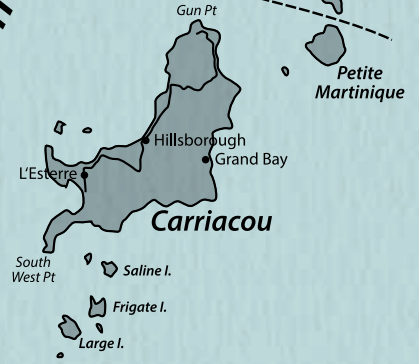
¹² See William Usher, *The Use of Effective Microorganism Technology (EM) in the Waste Water Treatment Ponds of Belize Sugar Industry Limited*, undated. http://www.fundases.org/userfiles/file/7.%20BELIZE%20EM_Presentation_Summary_BSI_Wastewater_Treatment.pdf

**SAINT VINCENT
AND THE
GRENADINES**

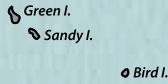
Caribbean

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London Bridge



Caribbean

GRENADA

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2

Grenada

The Value Chain of the Grenada Organic
Cocoa Farmers Co-operative Society Limited



2.1 National context

Grenada is the most southerly of the Windward Islands, located about 140 km to the north of Venezuela and 2,500 km to the south-east of Florida. It is by far the smallest of the case-study countries with a land area of 344 sq km, less than 11,000 ha of agricultural land, and a population of just 110,000. Annual GDP per capita in Grenada is approximately US\$7,850. The country's economy is based largely on tourism, with agriculture accounting for only approximately 6% of GDP.

The island comprises a set of inactive volcanoes, circled by sloping land suitable for cultivation.¹³ Well over 90% of agricultural land is planted to permanent crops.¹⁴ Grenada is on the southern periphery of the hurricane belt and suffered devastating damage in 2004 and 2005 that destroyed most of its tree crops. The national economy has largely recovered, but at the expense of accumulating a large public-debt burden. There has been a partial recovery in tree-crop production.

Agriculture was originally plantation-based but is now undertaken mainly by smallholders. Grenada's main merchandise exports are nutmeg and mace, bananas, cocoa, fruits and vegetables. Its main export partners are other Caribbean Islands. Grenada imports substantial amounts of grains for processing into flour and feed. Small amounts of staple foodstuffs are grown on the island, including banana, sweet potato, cassava, yam, peas, maize, cabbage, golden apple and mango.

Cocoa, once an important plantation crop, has fallen in importance. Production capacity has yet to recover fully from damage by the 2004 and 2005 hurricanes. It is currently produced principally on small and medium-sized holdings.

2.2 The Grenada Organic Cocoa Farmers Co-operative Society Ltd value chain

2.2.1 Coverage of the chain

This case study refers to the value chain for organic cocoa produced by the

¹³ Fourth National Report of Grenada to the Convention on Biological Diversity, undated.

¹⁴ Grenada Agricultural Census, 1995. This would seem to be the latest comprehensive survey of agriculture in Grenada.

Grenada Organic Cocoa Farmers Cooperative Society (OCFCS), fermented and dried at a single facility, and manufactured into high-value chocolate products by the Grenada Chocolate Company (GCC). The value chain is very small, comprising only some 13 farms and a total of about 60 Grenadian stakeholders. GCC is one of the world's smallest chocolate manufactures, accounting for about one hundred-thousandth (0.001%) of world production.

2.2.2 Production

The OCFCS currently comprises 13 growers who farm 150 acres of organically certified cocoa. These growers include the large Belmont Estate, which joined the cooperative after converting 100 acres of its cocoa trees into organic production. Belmont Estate is a 500-acre plantation which was established in the 17th century to grow coffee. It switched to sugar production in the 18th century and has grown cocoa and nutmeg since the 19th century. The estate recently moved into cruise-ship based agro-tourism centred around its cocoa operations. One OCFCS member is the London-based Rococo Chocolates Ltd., which acquired a small Grenadian cocoa farm in 2007 as a joint venture with the founder of the GCC. The other OCFCS members farm from 2-10 acres of cocoa each and account for about 25% of the cocoa processed by GCC. The OCFCS farms account for about one-third of the total area planted to cocoa on Grenada. They are substantially larger than most agricultural holdings on the island, the majority of which are of less than two acres. Farmers are paid on a timely basis for their organic deliveries at a price substantially above that paid to traditional cocoa farmers for their deliveries to the Grenada Cocoa Board (recently EC\$ 2.00/lb vs. EC\$ 1.40/lb).¹⁵

2.2.3 Processing

Prior to Belmont Estate joining OCFCS, all of the members' cocoa production was dried and fermented by GCC. After Belmont joined, GCC entered into an agreement for it to take over this function at its fermentary, one of three located on Grenada. The transport of wet beans to the factory is provided by GCC free of charge.

2.2.4 Manufacturing

The key player in the establishment and development of the chain was the

¹⁵ All exports of cocoa beans must pass through the Grenada Cocoa Board. OCFCS members' cocoa is not subject to this provision since it is exported by GCC in the form of manufactured products.

late Mott Green, an appropriate technology activist.¹⁶ Some 15 years ago, in partnership with another American and a Grenadian cocoa farmer, he raised the funds to establish GCC. He then commenced refurbishing antique processing equipment dating from the early 1900s and custom-building small-scale processing technology suited to the manufacture of cocoa products in Grenada. In 2004 he began purchasing organic beans from small farmers and in 2007 established his own 10-acre cocoa plot in partnership with Rococco Chocolates Ltd.

The GCC processing factory is located in the heart of Grenada's cocoa growing area. The factory is partially powered by a solar energy facility and employs highly labour-intensive processes based on traditional methods, which result in high-quality products with their own distinctive taste characteristics. All OCFCS members have shares in GCC.¹⁷ The company employs 13 staff, of which one is a farm supervisor, who, with two other workers, comprise a field crew which provides a set of services to the cooperative which, in turn, supplies technical advice to OCFCS farmers. These services are provided by GCC without charge. All the factory workers receive equal pay set at a level above that paid to most agricultural workers in Grenada.

The output of GCC has grown from an initial two tons of product per annum in the early 2000s to a current level of 22 tons. The GCC product range now includes six different organic chocolate bars with a chocolate content of 60-100%, over ten different organic chocolate bonbons filled with mixtures based on tropical fruits, and fine organic cocoa. The chocolate has a unique flavour valued by gourmet consumers, which derives from both the distinctive taste characteristics of the beans, the oversight of the fermentation process by the chocolate manufacturer, and the skilled manual manufacturing methods employed.

2.2.5 Marketing and markets

The chocolate is marketed as a unique product whose taste characteristics stem from Grenada's high-quality, fine-flavoured cocoa varieties grown in a volcanic Caribbean *terroir*, unadulterated by bulk cocoas grown in the major producing countries, and which has been organically grown, processed and manufactured in a socially and environmentally responsible manner. Most sales are made domestically during the Grenada tourist season. GCC's products are also exported to speciality dark chocolate retailers based in

¹⁶ Mott Green died in a working accident in Grenada on 1st June 2013.

¹⁷ Mott Green, *The Secret Caribbean* with Trevor McDonald, BBC TV.

New York and London, which sell gourmet products through websites with delivery by courier. The company's products are also retailed in Europe after distribution through a growing network of wholesalers.

In 2012, to further publicise GCC's products, Mott Green shipped a consignment of GCC chocolate from Grenada to England in a Dutch-owned square-rigged wooden sailing ship, allowing the consignment to be marketed as the world's first carbon-neutral freighted chocolate.

All GCC production is certified as organic and GCC has nurtured a strong fair and ethical trade image. Organic certification is carried out by a CERES-certified body which undertakes annual audits and training in keeping with USDA and EC regulations. The products have packaging which identifies them as organic and differentiates them from bulk and other gourmet chocolate by emphasising their exotic Grenadian origin. Mott Green reinforced their position in the market by skilfully publicising their organic and ethical origins. This has allowed sale at high prices to tourists in Grenada and at eye wateringly high prices by the two USA and UK-based specialist retailers.¹⁸

2.3 Innovative and interesting features

2.3.1 Mode of increased value addition

This chain differs from the chains for the rest of Grenada's cocoa output in that, rather than being exported after fermentation and drying, the beans are manufactured in Grenada into high-value finished products packed in a form ready for retailing. The resulting value addition within Grenada is several times the gross FOB value of a similar tonnage of non-organic beans exported in raw form.

The total value of retail sales in Grenada and abroad is sufficient to cover the costs of manufacture, processing and marketing and the provision of free advice and services to farmers, while leaving a surplus that allows the payment of a higher farm-gate price than is obtained by other Grenadian

¹⁸ For example, Rococo Chocolate was selling GCC chocolate bars transported to England under sail at an 'introductory' price of £12.95 per 100 grams compared with UK supermarket prices of £0.30 per 100 grams of low-quality 'value' chocolate bars and £1.00 for branded bars with 74% cocoa content. See: <http://www.guardian.co.uk/environment/blog/2012/may/11/carbon-neutral-chocolate> <http://www.tesco.com/groceries/Product/Search/Default.aspx?searchBox=plain+dark+chocolate&newSort=true&search.x=-1682&search.y=-63&search=Search>

growers.¹⁹ Thus, in addition to creating jobs in manufacturing and domestic retailing, establishment of the chain has improved the livelihoods of a small number of farm households and workers engaged in fermenting, manufacturing and retailing.

2.3.2 The use of green and environmentally friendly methods to create niche markets

The small size of GCC output has allowed the relatively small demand generated by cruise-based tourism in Grenada to provide the core market for the firm's output, which has served as a foundation for GCC to exploit niche markets for gourmet chocolate in developed countries. GCC initially accessed the local tourist market at Grenada's cruise ship complex and subsequently partnered with Belmont Estate in a mutually beneficial relationship in which Belmont has diversified into agro-tourism linked to the cocoa value chain and GCC has used this agro tourism as a means of expanding its sales of manufactured chocolate products. The green, environmentally friendly and socially responsible nature of the value chain, in turn, has been used by GCC to expand into high-value e-commerce export markets.

Given the small size of national cocoa production, it would seem possible that the chain could be duplicated on a small-scale in other cocoa producing countries which similarly have a combination of (a) well defined *terroirs* that serve as a basis for differentiation and (b) domestic tourist-based niche markets or a sufficiently large number of high-income, green and socially responsible households prepared to pay very high prices for speciality cocoa products.

2.3.3 The importance to chain establishment and growth of the long-term commitment of a single, altruistic, multi-skilled entrepreneur

Establishment and development of the value chain was driven for more than a decade by the late Mott Green. Importantly, he was a multi-skilled entrepreneur, with the ability to identify the opportunity to develop such a chain, the technical and management skills to design, fabricate and install the necessary plant and equipment, and the persistence to maintain and operate the machinery and continuously refine and promote the product. These skills were allied with a high degree of altruism which motivated him to develop a 'green'

19 In addition to higher farm-gate prices, the use of organic methods eliminates expenditure by growers on agricultural chemicals. The intensive advice provided by GCC staff also reportedly results in higher per-acre yields than achieved by Grenada's other small-scale cocoa farmers. However, organic production requires a higher labour input, possibly leading to no net advantage over other Grenadian cocoa farmers in terms of net return to labour.

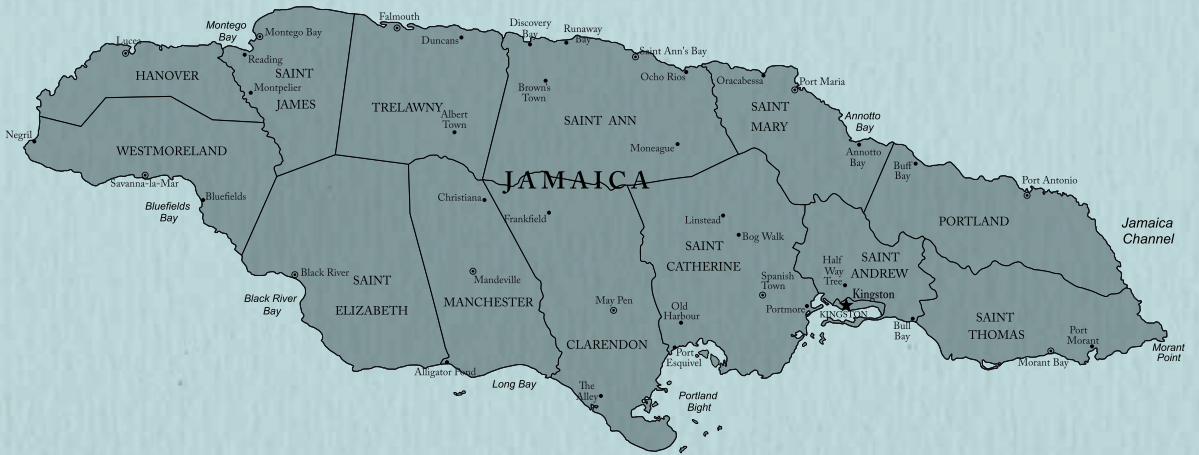
chain in which a close-knit set of participants were treated fairly. Given its very small size, it is unlikely that the chain could have been commercially sustainable had the necessary skills been provided by several salaried staff or by hiring consultants. Thus, success of the chain was highly dependent on the chain being initiated and developed by a multi-talented person able to provide the necessary wide range of hands-on skills at low cost.

2.3.4 The need for small-scale chain leaders to utilise business alliances

Small stakeholders frequently turn to NGOs or donors to provide financial support for value-chain development. In practice it is invariably more effective to build alliances with commercial enterprises that have established capacity rather than seeking to create such capacity from scratch. This is well demonstrated by the success of GCC which depended, *inter alia*, on the ability of Mott Green to make alliances with the following diverse set of people and enterprises:

- a US partner who provided initial loan support
- farmers who were willing to switch to organic production
- Belmont Estate which provided well managed fermentation facilities and links to cruise ship tourism
- chocolate retailers prepared to share their e-commerce platforms
- a UK customer prepared to own a 10-acre farm jointly
- Fairtransport Limited with whom he shipped cocoa to Europe on the brigantine sailing ship 'Tres Hombres'.

Caribbean Sea



Caribbean Sea



3

Jamaica

The Grace Agro Processors
Hot Pepper Value Chain



3.1 National context

Jamaica is located in the western Caribbean, 145km to the south of Cuba and 191km to the west of Haiti. It is the second most populous of the case-study countries (after Haiti) and is third in terms of both total and *arable* land area (after Haiti and Fiji). In 2012 Jamaica had a per capita GDP of some US\$5,472, the second highest of the case study countries, after Grenada.

Jamaica consists of fertile coastal plains and a rugged interior, with a mountainous spine rising to 2,256 metres. The climate is tropical. Agriculture accounts for about 20% of the national labour force but for only some 6% of GDP. In the interior, the main agricultural activity is the small-scale production of foodstuffs. Large-scale plantations dominate the more fertile coastal areas. In total, there are about 190,000 small farms of less than five acres. Jamaica's main crops are sugarcane, bananas, coffee, citrus, yams, ackees²⁰, and vegetables. The main livestock outputs are poultry meat, pork and milk. Cereals, which comprise an important source of calories, are almost wholly imported.

Of its population of 2.7 million, over 900,000 live in the capital, Kingston. Extensive emigration, principally in the second half of the last century, has led to a large Jamaican diaspora. This is thought to number over 2 million, of which the majority are in the UK, the USA and Canada.

Jamaica's main exports are alumina and bauxite. Sugar and rum account for about 40% of the value of exports derived from domestic agricultural production, followed by yams and other root crops, coffee and ackees. Jamaica's main export partners are the USA, Canada, the United Kingdom and the Netherlands. Roughly half of the country's merchandise imports comprise petroleum, other minerals and chemicals. Its other main imports are vehicles, other manufactured goods, cereals for milling and other foodstuffs.

3.2 The Grace Agro Processors Hot Pepper value chain

3.2.1 Definition, scale and background

This case study refers to peppers which are grown by a small number of small and medium scale Jamaican farmers and sold to the Grace Agro Processors

²⁰ *Blighia sapida*, a fruit used widely in Jamaican cuisine.

Division (GAPD) of GK Foods and Services Ltd (GKFS), a wholly-owned subsidiary of the Food Division of the Grace Kennedy Group (GK) of companies.

Over a period of almost a century, GK has evolved from a small mercantile firm founded in 1922 into an international food and financial services conglomerate with companies located in Jamaica, elsewhere in the Caribbean region, North America and Europe. Food processing and distribution currently account for about two-thirds of the group's revenue with the remainder deriving from a set of banking and finance companies, insurance and remittance services, and an investment in the marketing of building materials. Central to GK's global food distribution strategy is the 'Grace' brand which has strong recognition amongst the Jamaican and other West Indian diaspora and allows GK to source a significant share of its product portfolio through co-packing agreements across the world. The Jamaican hot pepper value chain is a very small part of the GK's total operations, accounting for only a fraction of one percent of the Group's assets and gross income.²¹

3.2.2 Production

Habanero and Scotch Bonnet peppers have traditionally been grown in Jamaica on a small scale due to the labour-intensive nature of harvesting.

The Agro Grace Processors hot pepper value chain was established in 2009 when GAPD first arranged for farms to produce hot peppers to be processed at Southern Fruits and Food Processors Ltd into pepper mash and then into Grace pepper sauce (see subsection 3.2.3, below). In 2012, when GAPD's new agri-processing plant in Hounslow was operational, 15 small and medium-sized farms in two localities were contracted by GAPD to grow peppers on a total of approximately 25 acres. The pepper plots on these farms ranged from 0.5-5.0 acres, with an average of about two acres. In 2013, 25-35 farmers were growing a total of 50 acres of peppers for the company. To support this operation, GAPD has assisted a farmer to establish a commercial seedling nursery by providing him with technical agronomic support and inputs with deferred payment.

The contracts between farmers and GAPD provide for:

²¹ Data are not readily available for direct verification of this statement. However, the small size of GK's pepper operation compared with the activities of the whole group are evident from the fact that GAPD spent only JA\$80 million on the purchasing of peppers in 2012 compared with total GK Group revenues of JA\$64 billion. GAPD investment to equip and establish its pepper mash plant was JA\$43 million compared with 2012 GK Group assets of JA\$ 106 billion (Source of GK Group data: GK Group Annual Report 2012.) Note that the small share of its pepper operations is in part due to GK's co-packing arrangements with processors in Jamaica, Belize and the UK which ship branded product directly to the market.

- the supply of inputs from Agro Grace farm and gardening supply branches at discounted prices and with deferred payment
- a requirement that the farmer has access to water and has installed drip irrigation
- technical assistance with the help of the Rural Agricultural Development Authority (RADA)
- the quantities to be delivered
- clear production/delivery schedules
- a pre-set producer price
- procurement standards that cover ripeness, grades, and maximum pesticide levels.

GADP pays the same producer prices as other buyers, adjusting them every 14 months. Payments are made directly to farmers' accounts usually within one or two weeks of delivery. Contracts are generally honoured, with a low-level of side-selling.

3.2.3 Processing

Prior to manufacturing into finished sauces and other products ready for bottling or packing, freshly harvested peppers are processed into hot pepper mash. This involves mechanical crushing of the peppers, the addition of salt and a period of fermentation in closed containers. The resulting hot pepper is storable and can be traded internationally prior to its use in the making of hot pepper sauces and other products

Until 2011, GK processed its pepper, jerk and condiment end products through an evolving series of supply chain arrangements. In the 1990s, it began to make these products at the processing plant of a long-established specialised Jamaican spice processor, Gray's Pepper Products Ltd (GPPL). GPPL managed the supply of fresh peppers to the plant, buying them without contracts from Jamaican small-scale farmers, many of whom had long-standing relationships with the company. GPPL converted these peppers into mash which it then transformed into GK packed/bottled and labelled products according to GK's specifications.

In the mid 2000s, a combination of hurricanes and droughts reduced national pepper production, forcing GK to import pepper mash from Costa Rica for the co-packers manufacturing GK products. This continued until 2008, when GK Group subsidiary GK Food Services Ltd. entered into a contract with the Jamaican firm Southern Fruits and Food Processors Ltd for the supply of mash based on Caribbean pepper varieties which have taste profiles more suited to consumer demand.

In 2011 GAPD commissioned its own post-harvest and packaging plant in Hounslow in the south-west of Jamaica to pack pre-cut vegetables and tubers. This was housed together with a newly established plant for processing hot pepper mash. These facilities are located in a building provided by the government on a 10-year lease, positioned amidst 3,500 acres of fertile land with irrigation facilities.²² The mash plant has the capacity to crush 40,000lbs of peppers per week, roughly half the capacity of GPPL's plant. In 2012 this plant operated at only 20% of capacity. Its utilisation is projected to increase to 40% of capacity in 2013, as GAPD contracts additional growers of hot pepper.

Hot pepper sauces are made by adding vinegar to the mash together with a range of other ingredients which give individual brands their unique taste. Mash from GAPD's plant continues to be processed into GK labelled finished products through co-packing arrangements with other Jamaican firms, which include GPPL, Southern Fruits and two other food processing firms, King Pepper and Spur Tree, each of which also produces its own pepper products under manufacturers' brands as well as distributors' brands owned by its customers.

In 2007, GK acquired Enco Products Ltd, a UK company specialising in supplying the UK Caribbean food market which currently has four of the UK's top five Caribbean brands of hot sauce in its product portfolio. GK exports pepper mash produced by GAPD to Enco to be used in the manufacture of these hot sauces. GK's acquisition of Enco Products reflected its approach to expansion, which is to enter new country markets through local distributors and then, as the local market grows, take a view on strategic acquisitions.

3.2.4 Marketing

In addition to using its hot pepper mash for the manufacture of its own products in Jamaica and the UK, GAPD sells its mash to the four

²² Construction of this building was financed under the Improving Jamaica's Agricultural Productivity programme (IJAP). The IJAP is funded by the Canadian International Development Agency (CIDA) in partnership with the Government of Jamaica and the Inter-American Institute for Cooperation on Agriculture (IICA).

abovementioned Jamaican processing companies and also supplies a processing company in the Caribbean island of St. Lucia.

GK pepper products made in Jamaica are sold domestically through wholesalers and directly to large-scale retailers. GK distributes the Grace brand and GK-owned brands including pepper-based products, to its principals in over 40 countries. In Jamaica, Canada, Belize and the United Kingdom it sells through its subsidiaries located in these countries. In the rest of the world, its products are marketed by its subsidiary Grace Foods International and sold through its network of independent distributors.

Foreign demand for GK's products has traditionally been centred on the Jamaican diaspora and the diaspora of other Caribbean islands, but is progressively extending into mainstream markets, where it faces competition from global brands, such as Heinz and McCormick, which are expanding their product lines into jerk and items seasoned with hot pepper.

3.3 Innovative and interesting features

3.3.1 Value chain governance by the GK Group

The GK group:

- obtains its basic raw material through contracting and organising a set of hot pepper growers
- processes hot peppers into mash at its Jamaican processing plant
- contracts Jamaican packers to manufacture and pack its products
- manufactures and distributes a set of own-brand hot pepper products at a plant in the UK and
- distributes own-branded products made in Jamaica within the domestic and export markets.

Thus, its involvement in the value chain is exceptionally comprehensive, spanning its full length, from cooperating with the Caribbean Agricultural and Research Development Institute (CARDI) in the supply of pepper seed with taste profiles required by customers through to retailing final products at its own supermarkets in Jamaica and distributing through wholesalers in over-

seas markets. Its establishment of a pepper mash processing capacity and its associated contracting of pepper growers means that GK management is now in a position to plan and integrate activities at all stages of the chain. A high level of information flows along the chain in both directions and increasingly efforts are being made to align the chain to meet market requirements. GK coordinates and seeks to improve the competitiveness of the chain at a set of different levels and using different means:

- The volume, characteristics and timing of peppers entering the chain are affected by the relationship it maintains with CARDI, GAPD support for breeding, its technical advice to farmers, and the set of provisions in its supply contracts with them.
- It holds quarterly meetings with all its contract farmers and attends farmer cooperative society meetings when issues arise relating to pepper and fresh cut vegetables.
- It has a long history of working with co-packers of pepper products to coordinate and plan their activities in line with its needs.
- Finally, through its board of directors, it is able to communicate with other units of the GK group which supply the value chain with market information, inputs and finance.

3.3.2 The ability of the GK Group to take on a risky processing activity

GK's decision to establish its own pepper mash production capacity in Jamaica was necessarily risky, given the seasonality of domestic production, Jamaica's history of unstable annual pepper production, and the need to find a market for output in excess of that needed for the domestic production of its own GK-branded pepper products. The large size of the GK Group meant that it had the capacity both to reduce the size of the risk involved and to bear the risk that remained.

GK's other activities in Jamaica meant that it also had an advantage over smaller, single activity companies in that it had the necessary experience and a pre-established capacity to take measures to reduce the risk of raw material supply failure. The foundation for this was GAPD's prior experience of the contract farming of other crops, which allowed it to successfully contract a set of farmers to grow and deliver peppers in such a manner as to assure a steady supply of high quality fresh peppers to the plant (see sub-section 3.2.2, above). The likelihood of default by farmers was minimised through

contractual provisions relating to input supply, the timely delivery of extension advice and input supplies, and prompt payment, each of which was backed by the GK Group's financial strength and facilitated by a delivery capacity based on its pre-existing activities in Jamaica.

GK's established position within the Jamaican economy and its strong domestic marketing capacity also meant that the government turned to it as the most suitable enterprise to which to lease the large building complex that now houses both its hot pepper mash processing plant and facilities for packing fresh produce. Being able to lease rather than needing to purchase such a facility further reduced the amount of capital GK needed to invest in the venture, thereby reducing further the risk involved.

The large and diversified nature of the GK group's activities meant that the total cost of the venture was small compared with the group's total assets and that the success or otherwise of the venture was unlikely to be systematically correlated with the financial performance of the group as a whole. Thus, although the venture of itself carried a certain amount of risk, it did not represent a significant risk for the group. In the event, the mash processing plant has yet to work at more than a fraction of its rated capacity and, in the short-term until capacity increases, this may place a small financial burden on the group.



4

Jamaica

The Jamaica Egg Farmers Association/
Caribbean Egg Processors Value Chain



4.1 National context

Sub-section 3.1, above, contains a short description of the physical and socio-economic characteristics of Jamaica.

In the first half of the last decade, Jamaican egg consumption per capita was low by international standards²³ and the domestic production of fresh eggs was facing increasing competition from imports of processed liquid and dried egg products. These were preferred by the hospitality and agro-processing sectors which considered them both safer and more convenient.

4.2 Jamaica Egg Farmers Association/Caribbean Egg Processors value chain

4.2.1 Value chain definition and scale

This case study refers to eggs produced by the 50 members of the Jamaica Egg Farmers Association (JEFA), which are sold fresh or processed within Jamaica, with very small amounts exported fresh to CARICOM countries.

4.2.2 Production

Currently, some 132 million eggs are produced commercially each year in Jamaica by 500 farmers. Members of the Jamaica Egg Farmers Association (JEFA) account for about three-quarters of this output. JEFA, which was formed in 1998 and now has in excess of 50 members, is registered as a not-for-profit limited liability company. The remaining 25% of national egg output is produced by over 400 small and medium-sized backyard farmers and a few large-scale farmers who are not members of JEFA.²⁴ Most of these small and medium farmers contribute to JEFA revenue through service fees levied at the point of sale of inputs and, in turn, benefit from services provided by JEFA.²⁵

23 Eggs accounted for some 0.3%, 0.9% and 0.7% of the human consumption of, respectively, calories, protein and fats, and only 1.6-1.7% of the calories, protein and fats provided by livestock products. See: FAOSTAT, <http://faostat3.fao.org/home/index.html#DOWNLOAD>

24 Many other households also keep poultry to produce eggs for home consumption and informal sale.

25 Jamaica's large integrated poultry companies own two feed mills and two hatcheries, a part of the output of which is sold to commercial poultry farmers and feed depots (which on-sell to backyard and small-scale farmers). A service fee is added to the price of each sale and passed on to JEFA. In addition to their wish to promote rural development in Jamaica, this support of small producers by large operations makes commercial sense because small producers account for some 20% of the sales of their input supply operations.

4.2.3 Processing

In 2004, to counter the downward trend in demand for domestically produced eggs, around ten members of JEFA, with co-funding from the Jamaica Business Development Corporation (JBDC), developed a plan to commence egg processing in Jamaica. In the same year, these members invested in an egg inspection, grading and storage unit using finance provided under the Jamaica Business Recovery Programme (JBRP).²⁶ This unit is located in Kitson Town, some 20 km to the West of the national capital, Kingston, and comprises an egg grading machine and a 40-foot refrigerated reefer container. The latter facilitates the receiving, grading, packaging and shipping of eggs and also provides additional storage capacity at times of surplus. The main purpose of the unit was to handle and assure the quality of the output of the ten farmers, who had a total of some 45,000 layer hens producing 4.6 million eggs annually.²⁷ The group of ten farmers runs the packhouse and also accepts eggs from other nearby farmers. On delivery, eggs are graded using the Jamaica Egg Standards, which JEFA played a key role in developing together with the Bureau of Standards Jamaica (BSJ). JEFA has also played a pivotal role in establishing the CARICOM Table Egg Standards.

In 2007, with strong support from JEFA, 30 members of the association took the initiative to establish an egg processing company, Caribbean Egg Processors Limited (CEP), as a joint venture with Caribbean Producers Jamaica Limited (CPJL).

CPJL was founded in 1994 to service the hospitality industry as an integrated food service distributor. It has subsequently added a merchandising service for the retail trade and now has its own branded ranges of fruit juice and dairy, meat and seafood products, which it processes and packs at its Montego Bay Freeport complex.

CEP is owned equally by CPJL and Liquid Eggs Limited (LEL), a company established by the 30 JEFA members for this purpose.²⁸ The CEP Board is chaired by JEFA and comprises representatives of JEFA (farming), CPJL (marketing), CEP (processing), and large private agro-processors (input supplies and services). This wide membership provides a platform for dialogue on means of improving the competitiveness of the domestic egg industry and

²⁶ The JBRP was a one-year USAID-funded vehicle for providing technical assistance, training and grants to assist the recovery of producers in the horticulture, poultry, fishing and craft manufacturing sectors, which were devastated by Hurricane Ivan.

²⁷ See the 18 December 2005 report by the Jamaica Information Service. <http://www.jis.gov.jm/news/archive/7633-agriculture-egg-farmers-in-kitson-town-get-storage-unit>.

²⁸ JEFA, itself, did not invest in LEL.

of furthering the development of an efficient egg processing sector able to compete effectively with imports.

CEP has a US\$500,000 fully automated processing plant at Montego Bay. It purchases the eggs which it processes through the JEFA packhouse, primarily from the farmers who have shares in the company. When there is a shortfall from these shareholders, the packhouse provides eggs from other suppliers, including small farmers.

The plant initially produced food-service packed pasteurised liquefied whole eggs, egg whites and egg yolk. Pasteurisation takes place within a HACCP-standard environment to reduce the risk of contamination prior to packing into 1.8 litre containers. All CEP products are subjected to batch-by-batch testing. Liquefied eggs are preferred by the hospitality, food service and commercial food industry since they eliminate the need to crack eggshells in a busy commercial environment, aid hygiene during food preparation, and have a shelf life of 30-45 days when stored at the recommended temperature of 0-5 Celsius.

Once established, CEP rapidly captured 60% of the hospitality market. In 2012, to dilute its dependence on this market which is subject to the vagaries of the tourist industry, CEP extended its product line into 720 ml retail-packed liquid eggs for the supermarket trade. In October 2013, it also commenced delivering liquid eggs to Nutrition Products Limited, the contractor for the Ministry of Education's school feeding programme. These will replace imported butter oil in the production of nutri-buns, both saving foreign exchange and improving the nutritional content of the buns.

CEP had a gross revenue of US\$400,000 in 2011. It employs eight staff, including a manager and laboratory technician. Although CEP sales have grown, it has yet to operate at above 50% of its capacity to liquefy 18,000 eggs per hour.

4.2.4 Marketing

Fresh eggs are sold by the packhouse to CEP and to food retailers. Processed CEP products are sold by CPJL to hospitality and food service firms and are retailed through CPJL's outlets and supermarkets.

4.3 Innovative and interesting features

4.3.1 Market expansion through import substitution based on adding value

JEFA faced the problem of expanding its members' sales of eggs in the face of stagnant domestic demand and growing competition from processed egg imports. Rather than simply promoting domestic demand for fresh in-shell eggs, JEFA members decided to add value to its members' output and compete with processed imports. It did this by first investing in an egg grading, packaging and storage facility to strengthen the supply chain for fresh eggs and followed this up by investing in a liquid egg processing plant, the only such plant in the Caribbean.

JEFA and its members have achieved the following:

- formed a new company (LEL) as a basis for a joint venture (CEP) with a well-established company (CPJL) that was perfectly placed to successfully market liquid eggs through its existing food distribution network
- ensured that the Board of CEP is chaired by JEFA
- worked with CPJL to successfully establish a liquid egg processing facility and market its output
- generated the following benefits for Jamaica:
 - expanded the market for domestically produced eggs and reduced foreign exchange expenditure on imported processed eggs
 - improved the national balance of payments and increased domestic value added and employment
 - further improved the national balance of payments and improved child nutrition by enabling imported butter oil to be replaced with liquid eggs in nutri-buns distributed through the school feeding programme
 - reduced through pasteurisation the risk of salmonella infection.



Caribbean Sea

Northwest

Northwest

North

Northeast

Gulf of Gonâve

Artibonite

Center

Republic of Dominica

West

West

Grand Anse

Nippes

Southeast

South



5

Haiti

The JMB SA Mango Value Chain



5.1 National context

5.1.1 Haiti's physical and socio-economic characteristics

Haiti occupies 36% of the land area of Hispaniola, the second largest Caribbean island. It lies about 100km south-east of the largest Caribbean island, Cuba. The capital, Port-au-Prince, is some 1,200km south-east of Miami. Haiti is bordered in the east by the Dominican Republic, which occupies the remainder of Hispaniola. Haiti's largely mountainous terrain has been subjected to widespread deforestation and is heavily eroded. The country's population of 10.1 million is the second largest in the Caribbean (after the 11.2 million of Cuba), and is much larger than that of any of the other Caribbean-Pacific case-study countries.

Haiti is the poorest country in the Americas and by far the poorest of the case-study countries. It suffered a severe earthquake in 2010, which killed over 200,000 people and caused major damage to the nation's infrastructure. There are large Haitian diaspora in the Dominican Republic, the USA, France, Canada, and the Bahamas. It is thought that in total there are about 2 million Haitians living abroad.

The main foodstuffs produced domestically are starchy roots, pulses, fruits and vegetables. Almost half of the calories and proteins in the national diet are derived from cereals, of which over half comprises imported wheat and rice. Haiti's three main agricultural exports are essential oils, cocoa and mangoes/mangosteens/guavas.

5.1.2 Haitian mango production and exports

Mangoes are the main fruit produced in Haiti. A total of about 140 varieties are grown nationally. Mangoes were traditionally grown in the West, Artibonite and Central Departments and more recently in the South and South-East Departments. This regional spread and Haiti's diverse micro-climates enable mangoes to be harvested nationally for over 11 months of the year, compared with 5 months in Mexico and just 8-12 weeks in many producing countries. The long harvest season allows Haiti to export mangoes during seasonal peaks in international prices when there is little supply from other sources.²⁹

²⁹ Producers, with support from the Government and exporters, aim to maximise output during high price seasons through variety selection and changes in cultural practices, such as modified pruning and subjecting trees to water stress.

The majority of the country's output is grown on small farms where mango trees are scattered amongst food crops. These farms use little or no chemical inputs. There is a small but emerging set of growers with mango orchards of between 2 and 10 hectares. These tend to employ more advanced cultural methods that include pruning and the use of the recommended spacing of trees. Haiti's large population means that the majority of national mango output is consumed domestically.

In 2007, the US Government banned the importation of Haitian mangoes following the discovery of fruit flies in shipments. The reopening of the market was contingent on the implementation of a detection and control program in producing areas and the heat treatment of the fruits prior to export.

Currently, Haiti exports approximately two million 10lb boxes (approximately 10,000 tons). 'Madame Francique' is the sole variety which can currently be exported to the United States because, unlike other varieties, its quality is unaffected by heat treatment.³⁰ Madame Francique comprises about 15 percent of national mango production, of which some 25 to 33 percent is exported. In the US market, these mangoes earn up to a 50 % premium over their major competitor, the Ataulfo variety from Chiapas, Mexico. Some 2% of Haiti's mango exports are currently certified as organic.

5.2 The JMB S.A. mango value chain

5.2.1 Value chain definition and scale

This case study refers to mangoes that are exported in fresh or processed form by a single enterprise, JMB S.A. It is one of the largest Haitian exporters of fresh mangoes and other tropical fruits and vegetables to North America. Its annual fresh mango exports to the USA currently amount to some 450,000 10lb boxes (approximately 2,000 tons), equivalent to about one fifth of annual national mango exports.

5.2.2 Production

JMB obtains its mangoes from three sources:

- approximately 50 small estates, which deliver directly to JMB

³⁰ The Madame Francique variety is known by different names, including Francis and Mango Francique.

- approximately 250 small-scale farms which belong to farmer associations which are members of the Associations of Fruit Producers and Sellers from the South (ASPVEFS) and which use their association to harvest and market their mangoes
- approximately 200 small-scale farms which sell their produce to collectors (*voltigeurs*).

All three sources deliver to the JMB packhouse and to other exporters. Most of the small-scale farmers have less than 2.0 ha, often with fewer than 10 trees scattered amongst food crops.

5.2.3 Harvesting and primary marketing

Some fifteen *voltigeurs* deliver to JMB. They buy the crop from farmers through a network of collectors. The crop is bought while still on the tree, with the collectors undertaking the harvest. Collectors harvest all mangoes at one time, both ripe and unripe. The farmer is paid only for fruits considered acceptable to the *voltigeurs*. After these are selected, immature, over ripe, bruised and fly-infested fruits are left on the farm. These have little commercial value and, at best, can only be sold by the farmer to small-scale traders for local consumption at very low prices. The *voltigeurs* typically provide loans to farmers year-round. This relationship invariably results in *voltigeurs* paying indebted farmers less than the ruling market price

ASPVEFS, an agglomeration of small mango-grower associations, was established in cooperation with JMB to provide farmers with an alternative to selling to *voltigeurs*. In 2008, its membership comprised 750 small-scale mango farmers from four localities in southern Haiti.

The Association is supported by two NGOs, the Organisation for the Rehabilitation of the Environment (ORE) and Agronomes and Veterinaires Sans Frontier. The association's coverage is relatively small, with the mango output of its members amounting to 120,000 fruits. This compares with an output of over 12 million fruits on Haiti's Central Plateau.³¹

The main role of ASPVEFS is to organise and undertake all activities from harvesting fruit from the tree through to sale to exporters and small-scale domestic buyers. The association buys mango directly from farmers aiming to

³¹ CRS/CIRAT, *Assessment of Haitian Mango Value Chain*, 2011.

pay a stable price using standardised methods of acquisition. Once a farmer makes an agreement with ASPVEFS to sell his/her mangoes, the association uses its harvesting team to carefully select ripe mangoes, pick them, pack them into plastic crates and transport them to its conditioning centre, where they are washed and sorted into two grades - those suitable for export in fresh form and second class undergrades that are malformed, bruised or have blemished skins. The former are sold to the exporter JMB S.A., with which ASPVEFS has been dealing for over 10 years. Unlike supplies that have been picked and delivered by collectors, for which rejects can reach 50%, JMB rejects very few of the association's mangoes, which have been carefully selected during picking and subsequently sorted at its conditioning centre. Second class mangoes that do not meet the size and shape requirements of the fresh fruit export market are sold in fresh form for retailing domestically or dried by slow hydration at a processing facility financed by the EU and operated by ORE. After packaging, dried mangoes are sold locally and in Port-au-Prince. In 2008, ASPVEFS sold an estimated 38% of its purchases to JMB S.A for export, 21% to ORE for drying, and 41% to traders for fresh consumption in the domestic market.

ASPVEFS has been certified as a Fairtrade FLO-CERT Gmbh producer and has embarked on the process of obtaining organic certification for its members' production and for its packing facility. Both will allow its members to obtain premium prices for their crop in the North American market. This, coupled with the well-organised, efficient picking, handling and processing undertaken by their association results in members obtaining farm-gate prices well in excess of those paid by *voltigeurs*.³² ASPVEFS has attempted to sell to a number of exporters but has only developed a satisfactory and productive relationship with JMB.

5.2.4 Processing and exporting

JMB was established in 1983 to pack vegetables and fruit, including mangoes, for export. In 1986, it established a hot water treatment (HWT) facility for treating fresh mangoes prior to export to eliminate fruit flies. This technique was developed by a consortium of mango exporters, the Haitian Ministry of Agriculture and specialists from the US Department of Agriculture (USDA). The facility subsequently established by JMB was the first in the northern hemisphere. In 2011, ten packing facilities in Haiti had APHIS-approved HWT facilities.³³

³² CRS/CIRAT, Op Cit.

³³ <http://haiti.usembassy.gov/offices/offices-and-department.html>

By the mid-2000s, JMB was one of ten major exporters of Haitian mangoes. It currently has a large treatment and packing plant in Port-au-Prince covering 23,000 sq ft. This currently employs over 50 full-time and 100 part-time workers.

All JMB mango exports are to the USA. Following the 2007 banning of Haitian mango imports into the USA, JMB participated in a partnership with the Ministry of Agriculture, USDA/APHIS and the National Association of Mango Exporters (ANEM) to establish a detection and control programme in producing areas. All shipments to the USA are now subject to a Haiti Mango Preclearance Program run by the National Association of Mango Exporters.³⁴

In 2010, with the assistance of a debt and equity investment of US\$2.3 million by the George Soros Fund, JMB invested in an IQF facility to quick freeze individual pieces of mangoes, including diced and halved fruits and chunks. This facility uses fruits that are unsuitable to export in fresh form, converting them into a high-value exportable product. In addition to generating additional income for JMB, the facility reduces the quantity of rejected fruits for which the only alternative is sale on the domestic market at very low prices. Thus, JMB's pioneering investments in new processing technology have both raised the mean price of its mango exports and increased the percentage of farm production that can be exported.

JMB packs mangoes with both its own brand labelling and third-party labelling for customers of long standing. By working closely with NGOs and their programmes in Haiti and with USDA/APHIS it has skilfully carved out a market niche in the USA, positioning its brands around natural production, organic and fairtrade themes. Its exports to the USA include USDA/APHIS and BCS Oko Garantie GmbH certified products.³⁵ It works closely on the development and exploitation of this positioning with one of its main customers, the up-market US Whole Foods retail chain, which also promotes its products around green and fairtrade themes. Whole Foods, as part of its market positioning strategy, supports conservation programmes in Haiti.

5.2.5 Other JMB initiatives and support

JMB has helped further increase the efficiency of the domestic mango sector by:

34 APHIS provides training but the facilities and inspectors are financed by exporters. <http://haiti.usembassy.gov/press-releases-2012/press-release-mangoes.html>

35 USDA/APHIS is the Animal and Plant Health Inspection Service of the United States Department of Agriculture. BCS Oko Garantie GmbH is a long-established German private controlling agency which specialises in organic certification.

- establishing three post-harvest collection centres to reduce post-harvest losses and serve as post-harvest training facilities for farmers (together with USAID and the aid organisation, CHF International)
- training farmers to increase tree populations and productivity per tree and to improve the impact of mango farming on the environment
- training farmers, together with the Organisation for the Rehabilitation of the Environment (ORE), to propagate improved seeds, promote high value fruit tree grafting and soil conservation techniques, upgrade low-quality trees, and encourage tree infilling
- importing and testing numerous new mango varieties and establishing nurseries for Madame Francique seedlings
- promoting drip irrigation, including for new smallholder plantations;
- working with mango producers to adapt means of transport to local conditions (e.g. crate holders for donkeys), to improve temporary processing and selection centres (using appropriate technologies), and to establish fruit conditioning centres.

5.3 Innovative and interesting features

5.3.1 Driving a supply chain without vertical integration

JMB is an good example of how a commercial company can drive the development of a value chain without extending its ownership beyond a single stage of the chain. The improvements in the value chain that supplies mangoes to JMB have all been achieved without JMB becoming commercially involved in the stages of the chain that have been improved. This is largely due to JMB's demonstrated efficiency, commercial effectiveness, ability to innovate and capacity to attract sought after venture capital, which, in turn, has led to donors and NGOs aspiring to be associated with it through support of upstream activities.

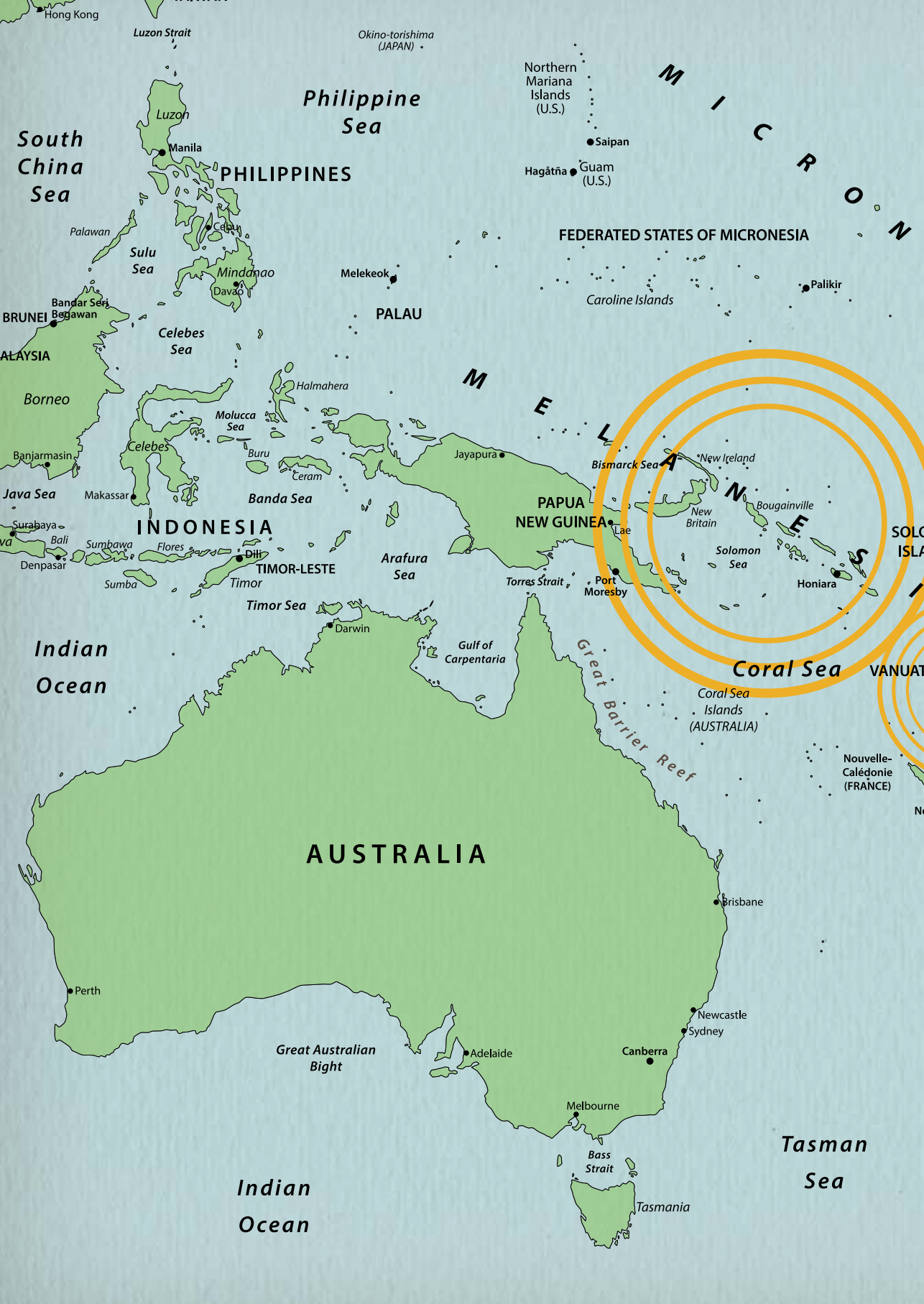
5.3.2 The key role that final processors for export play in value-chain development

Firms engaged in final processing for export must:

- be well-informed on demand in importing countries, including the demand for differently processed and packaged products, quality specifications, seasonal price patterns and the price premiums commanded by products certified as organic, environmentally friendly and fairtrade
- have the production and marketing expertise to meet market demand
- have reliable access at the lowest possible unit costs to domestically produced commodities suitable for meeting these demand.

JMB has demonstrated how its efforts to meet these conditions have given it the motivation and capacity to drive the development of the Haitian Mango chain through:

- upstream support for environmentally friendly and fairtrade production, increased domestic output of high quality mangoes, and improved post-harvest technologies
- widening of its product range to add value to fresh mangoes
- investment in IQF processing capacity
- downstream opening up and development of markets for natural, wild, organic and fairtrade mango products.



Hong Kong

Luzon Strait

Okino-torishima (JAPAN)

Northern Mariana Islands (U.S.)

M I C R O N E S I A

South China Sea

Philippine Sea

PHILIPPINES

Saipan

Hagåtña

FEDERATED STATES OF MICRONESIA

Palawan

Sulu Sea

Mindanao

Davao

Melekeok

PALAU

Caroline Islands

Palikir

BRUNEI

Celebes Sea

MALAYSIA

Borneo

Halmahera

M E L A N E S I A

Celebes

Molucca Sea

Buru

Ceram

Jayapura

PAPUA NEW GUINEA

Bismarck Sea

New Ireland

New Britain

Bougainville

Solomon Sea

Honiara

SOLOMON ISLANDS

Java Sea

INDONESIA

TIMOR-LESTE

Arafura Sea

Port Moresby

Surabaya

Bali

Denpasar

Sumbawa

Flores

Sumba

Timor

Timor Sea

Darwin

Gulf of Carpentaria

Torres Strait

Great Barrier Reef

Coral Sea

Coral Sea Islands (AUSTRALIA)

VANUATU

Nouvelle-Calédonie (FRANCE)

Indian Ocean

AUSTRALIA

Perth

Brisbane

Great Australian Bight

Adelaide

Canberra

Newcastle

Sydney

Melbourne

Bass Strait

Tasmania

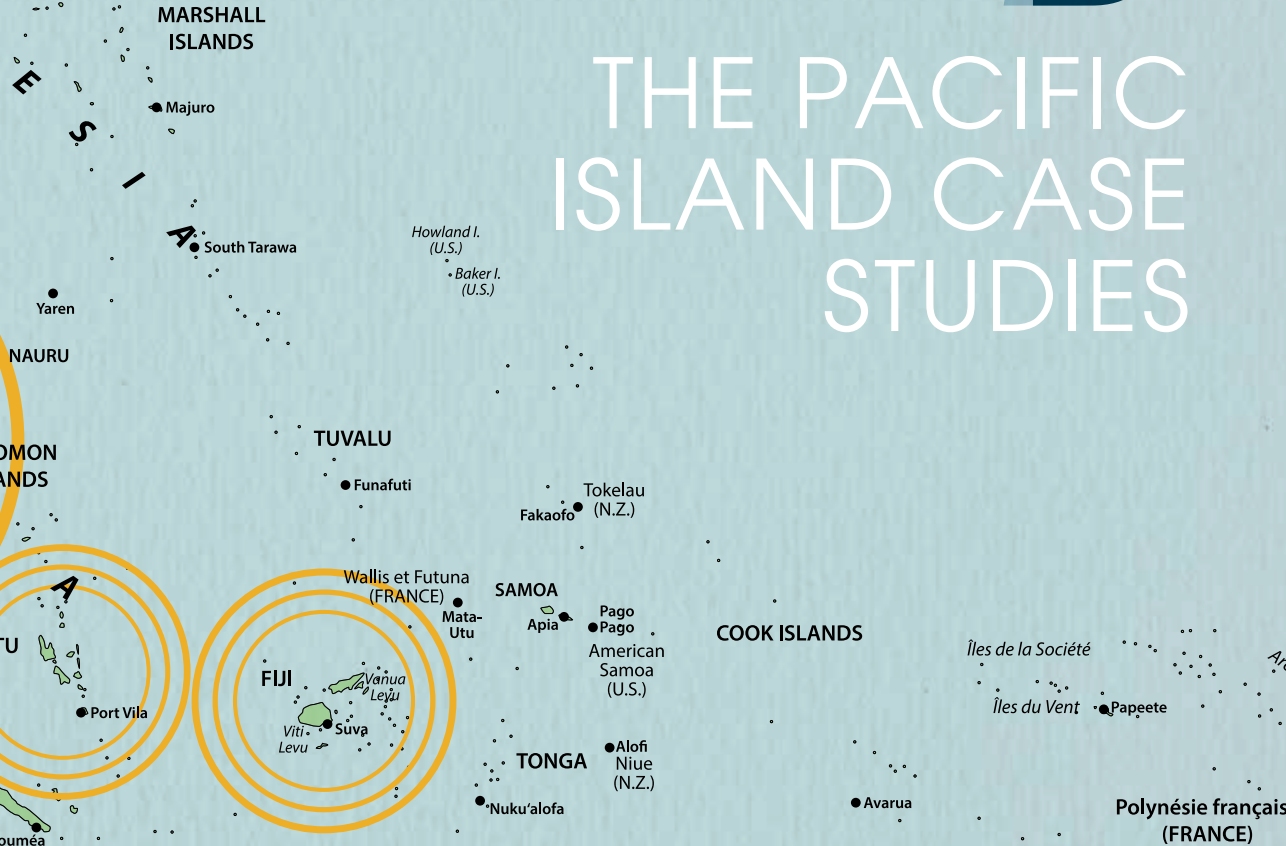
Tasman Sea

Indian Ocean

Wake I.
(U.S.)

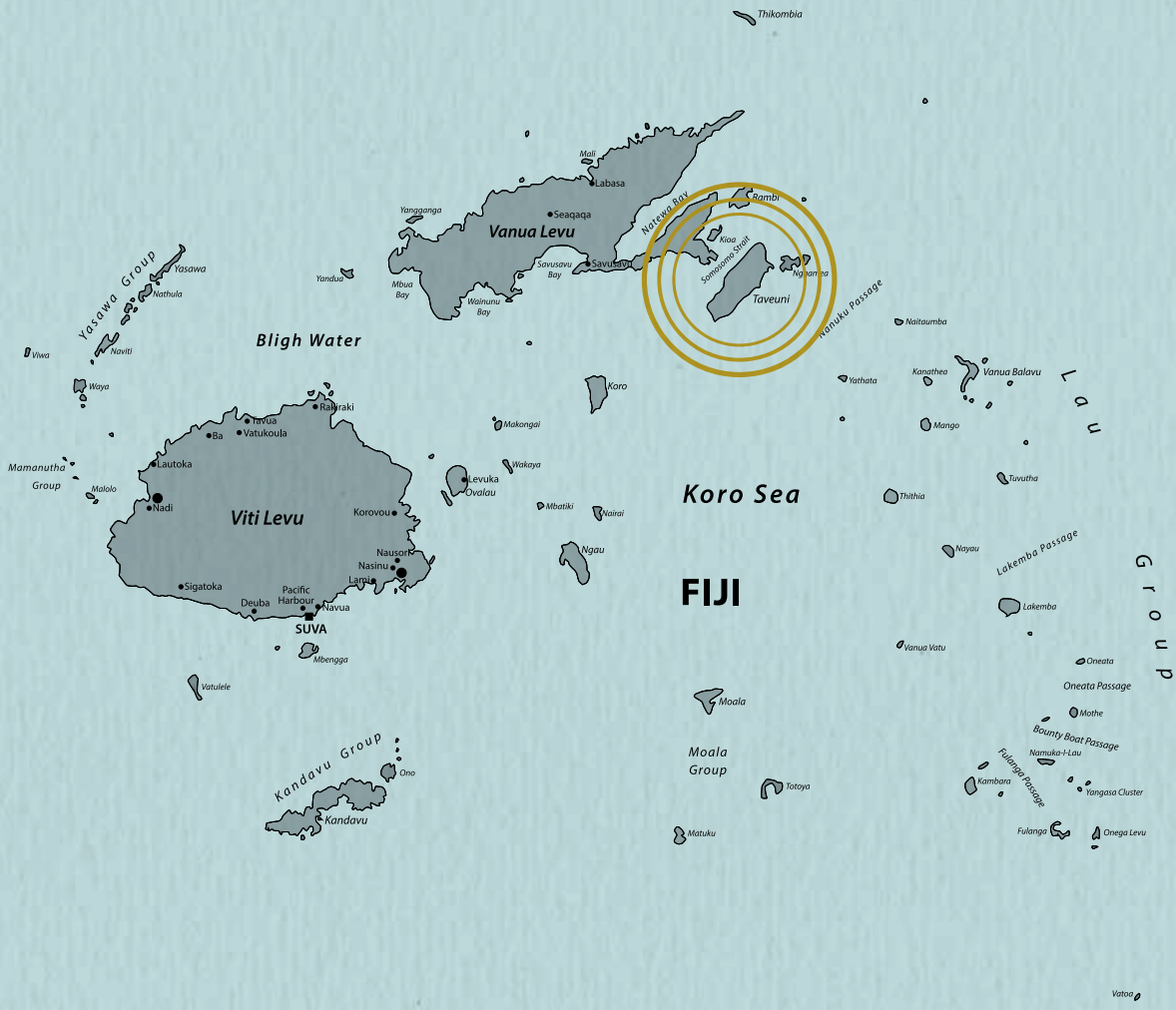
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THE PACIFIC ISLAND CASE STUDIES



South Pacific Ocean





SOUTH PACIFIC OCEAN

Omo-I-Lau



1

Fiji

The Taveuni Taro Export Value Chain



1.1 Context

1.1.1 Fiji's physical and socio-economic characteristics

Fiji is located about 1,000 km to the east of Vanuatu and roughly the same distance to the southwest of Samoa. The nearest developed country port is Auckland, New Zealand, some 2,500 km to the south. Fiji comprises two main islands Vanua Levu and Viti Levu. Suva, the national capital and the country's main port, is located on Viti Levu. Fiji has a large number of smaller islands, the largest of which are Taveuni (which falls within the Northern Division) and Kadavu (Eastern Division). Fiji's land resources are a little greater than those of the most comparable Caribbean case-study country, Jamaica. Its total land and arable areas are, respectively, 66% and 39% larger. However, its population is less than one third that of Jamaica.

Fiji's main crop is sugarcane. The main staple foodstuffs are root crops and imported wheat flour and rice. Almost 60% of the calorie requirements of Fijian households are met by imported food.

Fiji has the highest per capita income of the three Pacific island countries (PICs) covered by this study, estimated at US\$4,438 in 2012. This is similar to that of Belize and a little below that of Jamaica.

1.1.2 Taro cultivation and varieties

Taro is a tropical root crop which requires humid growing conditions. The majority of varieties do not tolerate drought. Most of the world's taro is grown in West Africa and China. The PICs account for about 4% of world output. In the PICs, it is an important food crop, accounting for a higher contribution to dietary calories than in any other region in the world.

Taro is propagated vegetatively. It can be grown either on flooded land or under upland conditions. Its leaves can be eaten, but it is grown principally for its corm, which is harvested 7-10 months after planting. The *dasheen* type (*Colocasia esculenta*) grown in Fiji and the rest of the region has a single large central corm. These have a short post-harvest storage life at ambient temperatures of no more than a week and of about 3-4 weeks when chilled.

A range of taro varieties are grown in Fiji. The bulk of exports comprises the pink-fleshed *Tausala ni Samoa* variety which is similar to the traditional Samoan cultivar (*Taro Niue*) favoured by the Samoan diaspora worldwide.

1.2 The Fiji taro export value chain

1.2.1 Value chain definition and scale

This case study refers to taro grown on the island of Taveuni, which in 2010 accounted for some 70% of the total weight of Fijian taro exports. A total of some 17,000 people are directly or indirectly dependent on taro for their livelihood, equal to about one fifth of the island's population and 2% of the total population of Fiji.

1.2.2 Production

In Fiji, taro is grown entirely in pure stand under upland (non-flooded) conditions in the country's wetter areas where rainfall exceeds 2500 mm.

The harvesting of taro requires loosening of the soil prior to the lifting of each individual plant by hand. After removing the leaves, the corm is sorted and cleaned of soil prior to home consumption or sale.

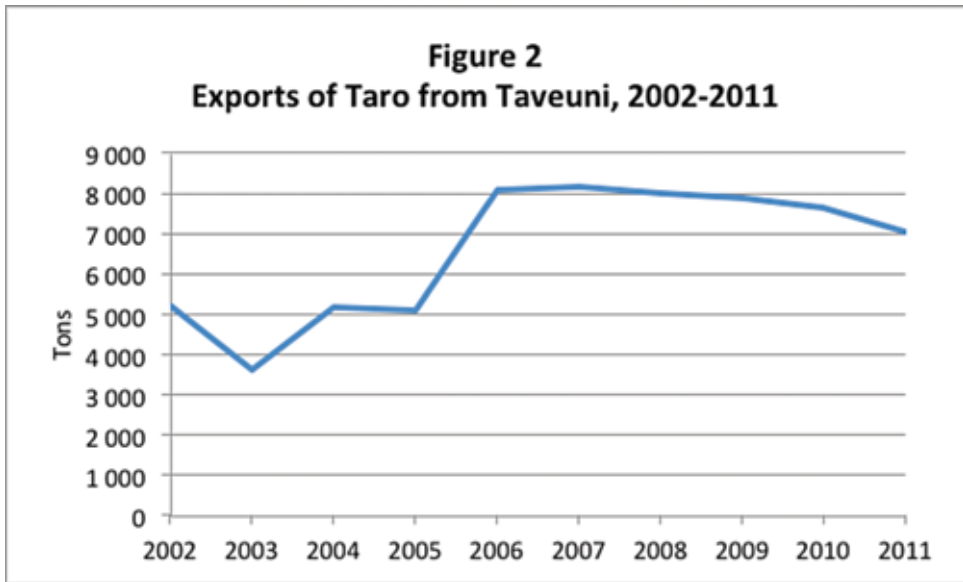
Until 20 years ago, taro was principally grown for home consumption and sale in local markets. This changed dramatically in 1993 when the Samoan industry was decimated by taro leaf blight (TLB), suddenly opening up the New Zealand taro market to exports from Fiji. Taveuni, which is free of taro beetle (*Papuana uninodis*) and has rich volcanic soils well suited to the growing of the *colocasia* variety, rapidly established itself as Fiji's main source of taro exports. This was solely the result of the initiative of Taveuni's farmers, responding to the sudden increase in demand from exporters.

Most of Taveuni's taro farmers - some 2,000 - fall into the semi-subsistence category, growing 5,000 -15,000 plants each. There are about 750 taro farmers who are fully commercial. The remainder of Fiji's taro exports are grown in high rainfall areas on Viti Levu that are located in close proximity to the port at Suva. The high post-1993 profits stemming from taro growing for export resulted in transformation of the island's largely subsistence, garden-based cropping systems into intensive monoculture of taro employing high levels of chemical fertilisers on existing crop land and on newly cleared forest land.

The constant search for new land on which to grow the crop has led to Taveuni having the highest rate of deforestation in Fiji. A substantial part of the crop is now being grown on unsuitably steep slopes, leading to heavy soil erosion. On existing farms, the high intensity of production has damaged the

structure and reduced the nutrient content of the soil, resulting in a significant fall in per-hectare yields and an increase in the percentage of corms that are too small to export.

This fall in land productivity, coupled with a squeeze on gross margins and difficulties with market access has meant that, after a period of strong growth, exports from Taveuni have been in decline in recent years (Figure 2). A response to these problems is now underway.



Source: Rohit Lal, Agricultural Officer, Taveuni.

Two Taveuni-based growers' organisations, Teitei Taveuni and Marist Tutu Rural Training Centre, are spearheading efforts to reverse the decline in productivity through the adoption of sustainable farming practices. These efforts are being supported by technical and financial inputs from a set of outside entities, including ACIAR, OMF, AusAID, Caritas Australia, SPC, UNDP, and the Fiji Ministry of Agriculture.

1.2.3 Marketing and exporting

Taro destined for the export market is purchased directly from farmers by agents of exporters, either at the farm gate or the agent's store. Agents compete for supplies on the basis of price and by being first at the farm gate with cash. It is largely a free-for-all market, although a few of the larger growers remain loyal to particular agents and exporters. In the past, exporters often

provided finance to farmers. However, this practice has largely ceased due to exporters incurring losses as a result of farmers side-selling to buyers to whom they were not indebted. At its peak in the late 1990s, there were 12 taro exporters supported by 30 agents and sub-agents operating in Taveuni alone. Following a shakeout about half these numbers are currently operating.

The taro marketing system is well supported by a good supply of carriers, trucks and shipping to Suva. The development of Taveuni's commercial taro industry coincided with the introduction of "roll-on roll-off" (RoRo) shipping services. There is also more than adequate sea freight capacity to international markets from the Suva and Lautoka ports.

The Taveuni agents have packing facilities, mostly located at the wharf near the ferry terminal at Wairiki, where they sort the taro, pack it in polybags and load the bags onto 10-ton trucks ready for transport on a RoRo ferry to Suva-based exporters. The distance between Waruki and Suva is some 250km. In Suva, exporters re-grade and wash the taro and then pack it for export into a reefer container, where the temperature is maintained at 6-8°C.

Some 65% of Fijian taro exports currently go to New Zealand by sea and a further 30% to Australia by air, with small amounts shipped to the USA (principally Hawaii) and other destinations.

The main taro consumers in export markets are former Pacific islanders, with the Samoan community being the dominant consumer group. According to the 2006 population census, New Zealand's Samoan diaspora was 131,000. This represented 47% of New Zealand's Pacific island population and around 7% of its total population. Cook Islanders, Niueans, Fijians and Tongans also have a strong preference for taro. In 2006, their New Zealand-based diaspora had a combined population of 141,000.³⁶

Fiji's highly competitive root-crop marketing system has provided Taveuni farmers with attractive prices, at least in the short term. 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 maximising farm-gate prices, there remains a degree of market failure in terms of produce quality.

³⁶ *Pacific Island Taro Market Access Scoping Study, Facilitating Agricultural Commodity Trade Project, March 2011.*

1.3 Innovative and interesting features

1.3.1 Climate change and the security of production

The taro variety, *Tausala ni Samoa*, being exported from Taveuni is genetically similar to the Samoan variety that was decimated by TLB in 1993. The incidence of TLB and taro's susceptibility to it are positively correlated with night time temperature. TLB has yet to be detected in Fiji, which is further from the Equator than Samoa and has cooler nights. However, global warming means that there is a probability that TLB will become established in Taveuni with dire consequences for its taro export industry.³⁷

Over the long-term, the arrival of TLB in Fiji would seem inevitable. There was no real awareness of this in the Fiji taro industry or the Ministry of Agriculture until publication in 2011 of a report by the International Union for the Conservation of Nature.³⁸ This recommended replicating Samoa's successful taro breeding programme in Fiji. Such a programme is now starting to be undertaken by the Research Division of the Ministry of Agriculture in collaboration with SPC's Centre for Pacific Crops and Trees (CePaCT). Thus, both identification of the problem and initiating a programme to address it took place outside the value chain. This is in contrast to the ongoing attempts to reverse the decline in taro yields in Taveuni, which were largely initiated and driven by growers. The difference in the two responses reflects the fact that small-scale farmers have neither the time to consider, nor the ability to analyse, the complex implications of a phenomenon such as climate change. They will react to reverse practices that are leading to clearly visible damage but will not take steps to prevent or mitigate the impact of uncertain adverse events, the causation of which is difficult to understand and the timing of which cannot be predicted.

1.3.2 Market access vulnerability

Australian is one of the two main markets for taro exported from Fiji and other Pacific islands. Australia also provides assistance to Fiji for measures that support the production of taro for export. Despite these two facts, it continues to impose quarantine barriers that hamper the importation of taro from Fiji and other Pacific islands. In particular, its protocol for Pacific islands' taro imports

37 *Tausala ni Samoa* is also grown elsewhere in Fiji. Other varieties grown in Fiji are also thought to be susceptible to TLB to some extent.

38 IUCN, *Assessing the social and economic value of germplasm and crop improvement as a climate change adaptation strategy: Samoa and Vanuatu case studies*, 2011.

requires taro corms to be devitalised by removal of their growing points to prevent propagation in Australia. In addition to the cost of devitalisation, this procedure greatly increases the perishability of the product, increases the incidence of corm rot and, in effect, precludes the option of sea-freighting. The increased costs and losses have caused Fijian taro to be uncompetitive in the Australian market and are preventing market expansion.

In 2010, in response to a request from a group of Fijian taro exporters, the SPC/EU FACT project undertook a study of taro import protocols for the four main developed country markets for Pacific taro, namely Australia, New Zealand, the USA and Japan. In the case of Australia, the study found that (a) devitalisation is a major cause of the high level of corm rot that hampers Fijian exports to Australia, (b) Fiji, Tonga and Vanuatu all have a well-documented favourable disease-free status for taro due to the absence of virus and fungal diseases, and (c) there is consequently a case for the three countries to be considered pest free/low prevalence areas under international SPS standards. The study noted that Australia's disease-free status was significantly less well documented than in the main PIC producing countries and also that both the USA and Japan are significantly larger taro producers than Australia but do not require devitalisation. It further noted that, despite its small size, the Australian taro industry has vigorously lobbied the Australian Quarantine Inspection Service and local parliamentary representatives to impose tighter restrictions on taro imports.

The Australian government responded to this study with its own analysis of the situation, undertaken by Biosecurity Australia (BA), an arm of the Department of Agriculture, Fisheries and Forestry. The resulting 230-page document, published in November 2011, recommended that the existing protocol stay essentially unchanged with the devitalisation requirements remaining in place. The main reported concern of BA was the presence of a virus and an insect in Fiji, which have not been reported in Australia. This virus does not affect taro production in Fiji, but in combination with the insect could, it is reported, lead to the spread of another damaging virus (which is not present in Fiji). While the transmission and interaction between insects and viruses is a complex issue that is often not well understood, it is most unlikely that taro commercially imported into Melbourne or Sydney to be consumed by the Samoan community would then be transported to the north of Queensland (the location of the Australian taro industry) to be used as planting material.

Measures to protect domestic producers are the most insurmountable market access barriers faced by small exporting countries. This example graphically illustrates the difficulty faced by such countries when attempting to export

to large nations that have similar domestic industries, regardless of how small these industries are. Regulators can readily hide behind 'what if' scenarios and, as demonstrated by Australia, are prepared to do so even when the exporting country is receiving related external assistance from donors and regional organisations.



2

Fiji

The National Papaya Export Value Chain



2.1 National context

Sub-section B.1.1, above, contains a brief description of the physical and socio-economic characteristics of Fiji.

2.2 The Fiji papaya export value chain

2.2.1 Value chain definition and scale

This case study refers to all papaya that are grown on Fiji for export in fresh form to New Zealand, including those that do not reach export grade and are sold in the domestic market. The chain is based on the output of some 200 small-scale farmers. Fiji's record exports of 800 tons in 2011 were equal to some 0.3% of global papaya exports.

The study is focused principally on quarantine treatment and exporting.

2.2.2 Production

The majority of the 200 papaya growers who produce for the export market are located in the Sigatoka Valley of Fiji's main island, Viti Levu.

Most of Fiji's papaya is grown on a relatively small scale, with farmers typically planting around 0.1 ha of papaya mixed with other horticultural crops. There are two large-scale growers who export their own output plus additional amounts which they acquire from small-scale farmers.

Since 2008, Fiji's papaya sector has been assisted by the donor-financed Fiji Papaya Project. This, *inter alia*, supports production and post-harvest handling through applied research across the supply chain. Farmers also receive support from MAF, Nature's Way Cooperative (NWC, see below), the Taiwanese Technical Mission and the Secretariat of the Pacific Community (SPC).

Small-scale growers buy papaya seedlings raised from seed of the Solo Sunrise variety in nurseries run by private companies, Nature's Way Cooperative, the Taiwanese Technical Mission and a government research station.³⁹ Until recently, Solo Sunrise seed was acquired from the University of

³⁹ The resulting fruits are exported under the name *Fiji Red Papaya*, although not all exporters presently use branding.

Hawaii Seed Laboratory. However, the availability and quality of seed from this source has declined and attempts are being made to establish domestic seed production under a certified scheme in the main growing areas. Farmers purchase fertiliser and other inputs from hardware stores.

Fiji's papaya production capacity is vulnerable to frequent damage from high winds and flooding. In December 2009, tropical cyclone Mick destroyed some 80% of the papaya crop. More recently, severe floods in January and March 2012 caused substantial damage to production capacity, destroying about 30 hectares and damaging other land planted to papaya. Tropical cyclone Evan inflicted further severe damage in December 2012, destroying 30% of the standing crop and causing substantial defoliation in other areas.⁴⁰ The yields and quality of papaya are also affected by drought during El Niño years. Climate change is expected to increase the frequency and severity of damaging climatic events.

2.2.3 Internal marketing

There is a relatively large market for papaya in Fiji. The percentage of annual national production absorbed by this market is inversely correlated with the level of national production and varies markedly from year to year. In recent years, the percentage of annual production exported has ranged from 20–50%.

There are currently about nine papaya exporters, of which four account for the majority of national exports. There are frequent new entrants, most of who struggle to survive due to the impact of natural disasters on fruits available for export, spoiled consignments and crooked business deals. The main exporters have adopted different means of acquiring papaya. The largest exporter, PSL, is also Fiji's largest producer. In addition to its own farm, it sources from satellite farmers. One exporting firm has its own farm and also sources from a large number of widely disbursed farmers; one uses supply contracts with individual growers.

The staff of exporters collect harvested fruits directly from farmers and are responsible for handling and transporting them until they are delivered to NWC. Farmers sell fruits not destined for export to traders at the farm-gate or directly to consumers either at the roadside or from stalls in local markets. Traders sell directly to consumers at the road side or in local markets. They also act as middlemen, on-selling to market traders, hotels, restaurants or supermarkets. Prices for papaya within the domestic market are usually negotiated at the time of sale. Payment is invariably in cash.

40 FPP Quarterly News Letter, Issue 11, February 19th 2013.

2.2.4 Quarantine treatment

Until 1990, Fijian papaya was fumigated prior to export at a government-operated facility, using Ethyl Dibromide (EDB). In 1990, most of Fiji's export markets for papaya and other horticultural commodities were lost as a consequence of EDB being banned as a quarantine treatment for fruit-fly host products on the grounds that it had been found to be carcinogenic. This resulted in a five-year period during which Fiji was unable to export papaya.

With the banning of EDB, 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 was provided through its Commercial Agriculture Development (CAD) Project, and was conditional on the quarantine treatment facility being operated by the industry rather than by the government. This represented a fundamental departure from the tradition in the Pacific islands of government-operated quarantine facilities. The condition was met through the creation in 1994 of Nature's Way Cooperative (Fiji) Ltd (NWC) to undertake mandatory quarantine treatment on behalf of Fiji's fruit export industry. NWC began the treatment of horticultural produce in October 1996. In addition to papaya, it treats eggplant, breadfruit, and mangoes. In 2011, papaya accounted for approximately 75 per cent of the export value of these commodities.

For the past 17 years, NWC's core business has remained the treatment and packing of fruit for a fee. It is not involved in exporting, which is undertaken by private companies. NWC initially had 65 members comprising exporters and farmers and now has over 140 members, including a significant number of women.

Since its creation, NWC has received substantial donor assistance, both financial and technical. USAID (the plant) and the Fiji Government (the building) provided the HTFA facility to NWC as grants in kind. The land on which the facility was built was provided by the Government. The New Zealand Government provided NWC's initial working capital and USAID covered the cost of employing its general manager for the first year of operation. Most recently, the Australian government has helped support

expansion of NWC's HTFA capacity and also agricultural research and value chain development through the multi-function Fiji Papaya Project. NWC has also received support from British American Tobacco (BAT).

2.2.5 Export markets and marketing

India is the world's largest papaya producer and consumer. The world's main exporting countries are located in Central and South America, namely Mexico, Brazil and Belize. Fiji is the largest exporter in the South Pacific. Its nearest significant competitor in the Pacific is the Philippines.

The establishment of the NWC HTFA quarantine treatment facility provided potential for Fiji to recommence the export of papaya. In 1996, Fiji negotiated a bilateral quarantine agreement (BQA) for market access to New Zealand for papaya and three other fruit-fly host crops. This agreement remains in effect with only small amendments.⁴¹ It took until October 2002 for a BQA to be established for Fijian papaya exported to Australia.⁴² Some 17 years on, USDA/APHIS has yet to approve a BQA for import of Fijian papaya into the USA, despite the critical role played by USAID in establishing the HTFA facility.

Currently, four fruit fly host commodities are exported to New Zealand under the 'BQA systems pathway': papaya, eggplant, mango and breadfruit. The BQA covers farm registration, field control measures, exporter and pack house registration and operations, quarantine treatment, phyto-sanitary certification and regulations and, on arrival in New Zealand, inspection and clearance at the port of entry. The systems have a major quality assurance mechanism that covers issues such as auditing of the export pathway, compliance and monitoring (tracing) and feedback on non-compliance.

2.3. Innovative and interesting features

2.3.1 The use of a service provider as a focal point for efforts to develop the value chain

The core business of NWC is as a provider of a service at a single point in the papaya value chain. However, it has proved to be a key institution

41 *Bilateral Quarantine Agreement between New Zealand Ministry of Agriculture and Forests and Ministry of Agriculture (Fiji) Concerning the Access of Host Material of Fruit Fly Species of Economic Significance into New Zealand from Fiji*, November 2001.

42 *Quarantine Requirements for Import of Fijian Papaya to Australia*, Ministry of Agriculture, Fisheries and Forestry, October 2002.

for supporting development along the full length of the chain. This is the outcome of a combination of factors.

First, it provides an essential service, without which the export of papaya would not be possible, since all papaya (and other fruit fly hosts) must pass through its treatment facility prior to export. Second, it is the sole provider of this service and has no potential competitors due to the risky nature of its business and because HTFA treatment is subject to economies of scale. Together, for all participants in the export value chain, these facts mean that it is essential that NWC remains functional and that it operates efficiently. Third, NWC does not take ownership of the fruits and consequently does not have to buy or sell to chain participants, thereby avoiding the possibility of commercial conflict with farmers, traders and exporters. This further strengthens its position as an entity which receives the support of all value chain participants. Fourth, NWC was established as a Cooperative rather than a private firm, making it in the eyes of the Fiji Government and donors both a legitimate host for donor-funded activities and a legitimate recipient of concessional assistance. In addition, NWC's status as a cooperative that has both producing and trading members means that its activities benefit from being steered and coordinated by members who have extensive knowledge of the value chain but who are not involved in NWC's day-to-day running.

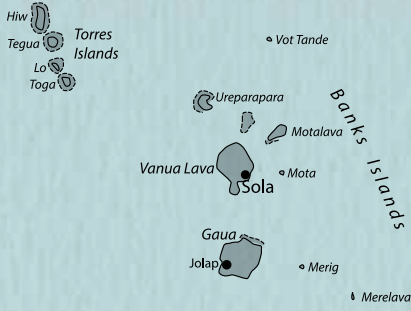
2.3.2 Mitigating the impact of extreme climatic events

NWC, through the Fiji Papaya Project, has been working on a set of strategies to mitigate the impact of high winds, floods and droughts on the livelihoods of papaya growers. These include measures, such as the following, which (a) limit the damage to papaya trees and (b) assist farmers in the aftermath of damage:

- The preparation of farm budgets and gross margin estimates under different assumptions relating to adverse climatic events that allow farmers to see the risks of papaya growing and the projected impact of adverse climatic events on profitability.
- The design of measures to minimise in advance the impact of extreme climatic events on production capacity, such as modifying the size, frequency and timing of planting, and installing irrigation and drainage.
- The inclusion of filters in the process of Solo Sunrise varietal selection that relate to resilience to adverse climatic events.

- The design and trialling of response measures to be implemented on farm immediately before or after an adverse event to minimise losses. For example, (a) the cutting of papaya trunks immediately prior to a cyclone to minimise the chance of uprooting thereby preserving the trees' capacity to produce a ratoon crop, and (b) after leaves have been stripped by a cyclone, preventing sun damage to exposed fruits by covering them with burlap sacks.

These and other measures would be financed by a natural disaster and preparedness fund that utilises donor funds and retained earnings of NWC.



SOUTH



PACIFIC

Coral

VANUATU

OCEAN



Sea



Futuna





3

Vanuatu

The National Vanilla Value Chain



3.1 The national and international context

3.1.1 Vanuatu

Vanuatu comprises a chain of islands that lie between Fiji to the east and the Solomon Islands to the north-west. Its total land area is about two-thirds that of Fiji. Its 2014 population was 272,000, compared with 875,000 in Fiji in 2012. Its main exports are coconut-based (copra and oil), cocoa, kava and meat (beef and veal). Its main agricultural import is rice followed by wheat and wheat products. These are the country's main staple foodstuffs, together with locally grown, bananas, taro, breadfruit and cassava.

3.1.2 World vanilla production, consumption, exports and prices

Natural vanilla comprises only a small proportion of the global vanilla flavour market, which is dominated by chemically synthesised vanillin (the flavour component in vanilla beans). Natural vanilla sells at up to 100 times the price of the synthetic alternative, principally for use in naturally flavoured ice cream and as a gourmet cooking ingredient.

World production of natural vanilla is dominated by three countries, Indonesia, Madagascar and India, which together account for over 80% of global production. In the PICs, in addition to Vanuatu, small amounts of vanilla are produced in Papua New Guinea, French Polynesia and Tonga. Export supply from the world's main producing countries tends to vary sharply from year-to-year resulting in large changes in global availability.

The world market for natural vanilla is highly concentrated, with the United States accounting for over half of all imports and consumption. The EU accounts for a further third, with France and Germany being the most important markets.

The fact that vanilla normally comprises only a small part of the cost of the end product to which it is adding flavour results in demand being price inelastic. This, coupled with unstable global export supply, results in highly unstable world prices, characterised by short spikes and prolonged troughs.

Figure 3: European vanilla prices 1970-2006



3.2 The Vanuatu vanilla value chain

3.2.1 Value chain definition and scale

The chain covers all the approximately 300 farmers who produce vanilla in Vanuatu and the single entity which undertakes processing and exporting. The chain runs from vanilla farms to the final points of retail sale within Vanuatu and to export markets in the region. The value chain is very small, with total annual sales amounting to about US\$100,000.

3.2.2 Production

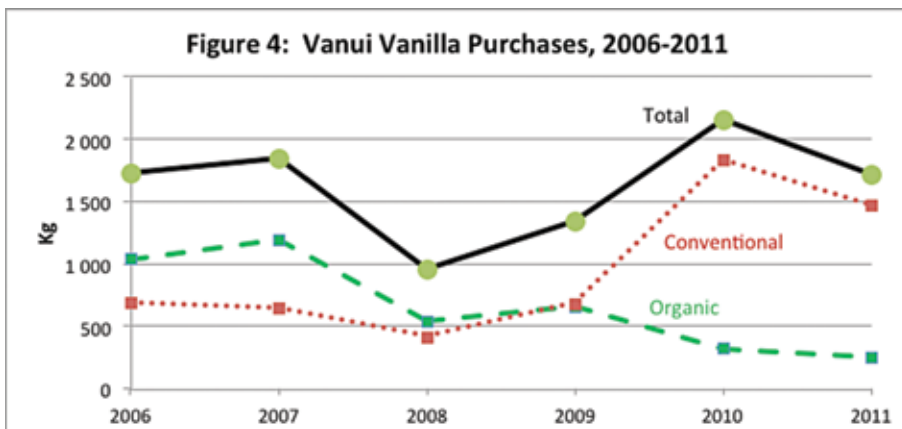
Vanilla is a climbing orchid, which is normally productive for 12-14 years. Vines are usually grown up the trunks of support trees that need to be pruned regularly to maintain a suitable amount of shade for the vine. The ground around each vine must be heavily mulched. Vines usually produce their first flowers in the third year after planting.

Vanilla is an ideal product for small-scale farmers in remote areas in that it has a very high value-to-weight ratio and does not perish rapidly. However, cultivation is knowledge and management intensive. Farmers diversifying into vanilla production require considerable training and extension support. Both vanilla growing and on-farm post-harvest activities are labour intensive. Each flower must be hand pollinated within 12 hours of opening. This is an arduous

task since the flowering season spreads over two months but individual flowers on each cluster open one-by-one and last for only one day.

The commercial growing of vanilla in Vanuatu was initiated by Piero Bianchessi, who set up a family-owned Vanuatu-registered company for this purpose in 1987: Venui Vanilla (VV). It soon became evident that the site of VV’s plantation in the south of the island of Espirito Santo was climatically unsuitable for efficient vanilla production. Thus, VV decided to extend production to small-scale growers located in other areas of Espirito Santo and on other islands in partnership with the Farmers Support Association (FSA) and the Association’s Spices Network. The latter was formed in 2005, with funding from Oxfam (NZ).

Vanilla is currently produced on seven of Vanuatu’s islands, with the annual production of individual islands in 2011 ranging from 88 kg to 449 kg. A typical farm plot has 100-200 vanilla and/or peppercorn plants covering approximately 0.25 ha. Annual national production from 2006 to 2011 is shown in Figure 4. It will be seen that national production varies substantially from year-to-year. This is due principally to changes in weather conditions. The production of individual islands varies more markedly.



Source: Venui Vanilla

The FSA was established in 1983 as a not-for-profit, farmer-based NGO to assist farmers with the operation of estates which they acquired abruptly at Independence.⁴³ In 2010 FSA had over 200 small-scale farmer members but only two permanent field officers (plus secretarial support staff at offices in Port

⁴³ FAO, *Farm Support Association (FSA) Farmer Market Linkage Activity for the Vanuatu Vegetable Sector*, June 2010.

Vila and Luganville.) The productive partnership between VV and FSA, which has now lasted for over 20 years, has been based on a division of functions under which VV provides the market outlet for farmers and FSA provides the extension outreach to remote locations. Beside the internal control system for organic certification, FSA supplies its members with up-to-date technical information and training material, and provides field coaching, plus theoretical and practical training through the use of pilot plots and the active participation of selected lead farmers. The outcome of the partnership is that VV has access to quality supply from remote locations and FSA members, despite their remote location, have the opportunity to generate cash income. Much of FSA's work has been in partnership with donors, including FAO, SPC, AusAID, NZAID, and the US Peace Corps.⁴⁴ FSA also receives a levy on vanilla sales and fees for activities it carries out on behalf of VV.

All vanilla production in Vanuatu is organic, although not all is certified as such. Venuei Vanilla together with 60 farmers from Santo, Malo and Ambae were first certified in 1996 by the New Zealand certifying agency BioGro. This was subsequently replaced by the EU's Ecocert and AsureQuality NZ. AsureQuality, which is IFOAM accredited, is VV's current certifier. The choice of certifiers has been based on cost, the aid support available at the time, and whether the certifying body is accredited to IFOAM, the international organic umbrella organization. From the outset the internal control for the certification process has been provided by the FSA as a service covered by a fee paid by VV. Over the years, the FSA has also received donor assistance to support its Spices Network. Most certification is done on the basis of farmer groups, using an internal control system operated by the FSA under which details of each farmer's production are collected and recorded. The organic certification agency checks a sample of this data as the basis of its annual assessment. In addition to paying FSA for providing the internal control service, VV also covers the costs of the certifying agency.

The cost of organic certification is high relative to the value of the vanilla certified. Consequently, in recent years VV has confined the coverage of certification to growers in less remote locations. Roughly 30% of farmers are currently covered by a certification scheme. There has been a progressive raising of standards as growers have become familiar with requirements. This has led to some farmers losing their certification for not meeting standards. It

⁴⁴ FSA has been heavily reliant on providing extension services to farmers largely financed by donors. A May 2010 report prepared for the New Zealand Government by Kinsa Associates and released under the NZ Freedom of Information Act (<http://www.aid.govt.nz/webfmsend/29>) is critical of FSA's informal set up and organisation but acknowledges that it has successfully established an effective, if casual, mode of extension.

is possible that in the present (2013) annual inspection, more may do so. The target is to expand certification to 60% of farmers over a two-year period. This would not only allow spice growers in isolated locations to obtain organic certification but would also enable them to take advantage of the extension services offered by the Spices Network.

VV has considered the possibility of obtaining Fairtrade certification, but has concluded that this is not feasible for a set of reasons. First, it would be complicated to organise due to the scattered nature of production, the remote locations of many farms and the lack of cooperatives. Second, there is limited consumer interest within the region in fairtrade products, resulting at best in their attracting only a small retail price premium. Third, the Fair trade organisation (FTO) would require VV to pay a 'fair' purchase price. This, together with the administrative costs of certification, would raise the total cost to VV associated with certification to a level at which it would require continuous subsidisation. VV's losses would be increased further by the FTO's requirement that its mandatory price be paid for all vanilla regardless of quality.

3.2.3 Processing and marketing

Vanilla beans are graded based on their length, appearance (colour, sheen, presence of any splits, presence of blemishes), and the moisture content of the fruit. The most highly graded beans are whole, dark, plump and oily, visually attractive with no blemishes, and must not have been over-dried.

The harvested vanilla pods go through a lengthy on-farm process of water killing (to stop further growth), sun drying, sun sweating, in-box sweating, in-shed curing, bundling and in-box conditioning. The total time from harvest to the finished product is 110-140 days. The equipment required is simple and robust, consisting of items such as saucepans, blankets, boxes and plastic sheets and bottles. Most of the necessary equipment was provided to farmers by VV. It is essential that each phase of processing is carried out correctly, since each is a critical determinant of the final quality and value of the bean. All processing is done on the farms due to their remote locations, other than for conditioning, a substantial amount of which is done after delivery to Venui Vanilla. Given the specialised skills needed, farmers are advised to consider investing in a cooperative curing centre operated by a trusted and experienced curer.

Growers' cured beans are graded by VV or FSA at the point of purchase. VV pays prices which it sets for each season based on market conditions. Disputes regarding grade or buying price are rare. Growers have confidence

in VV because of the company's long-term involvement in the sector, where the agreed price has always been paid for each clearly defined quality standard. VV's credibility with growers has been further strengthened by its long-term association with FSA, which is also well respected by farmers.⁴⁵

The prices paid to growers exhibit a certain amount of instability, but the extent of this is moderated by the fact that export prices for the premium quality niche market and value-added products that VV sells are more stable than those for bulk vanilla.

The fact that vanilla is non-perishable and has a high value-to-weight ratio means that farmers market just a few kilos at a time and that there is no need for physical assembly points. Cured pods are usually collected by FSA staff on field trips, dropped off during visits to the VV facility or its offices at Vila or Santo, or otherwise delivered informally to VV.

Since VV's initial plantation commenced yielding, in most years the company has processed and marketed all of the vanilla produced in Vanuatu.⁴⁶ VV's processing facilities on Espiritu Santo, which are world class, were financed by VV without donor support. However, it has at various times received support for its marketing and other activities from a number of external organisations, including *Projet d'Organisation des Producteurs pour la Commercialisation Associative* (POPACA) and the Brussels-based Centre for the Development of Enterprise (CDE) for the initial cost of the external organic certifier.⁴⁷

From the outset, VV established a facility for the processing of small and split beans into vanilla essence and vanilla paste. All vanilla production was initially marketed within Vanuatu. In the mid-1990s, as production began to rise above local demand, VV participated for three consecutive years in the Melbourne and Sydney Fine Food Fairs, invited and financed by the South Pacific Trade Commission (today PITIC). A first contract for the export of first-grade between VV and one buyer/distributor in the Melbourne area was concluded in 1997 and was still continuing in 2013.

45 Piero Bianchessi plans to train two ni-Vanuatu, one from Ambae island and one from Tanna island in the south, to be buying agents who will later become independent operators, buying and marketing in their own right. Their training would include not only a thorough grounding in quality standards and packaging and marketing operations but also accompanying Mr Bianchessi to food fairs so as to become familiar with the nature of the market and make industry contacts. This training will require donor funding because of the high costs involved.

46 During the vanilla boom in 2002, a number of novice traders entered the market and purchased and on-sold vanilla with little regard for quality, negatively impacting the market. Source: *Vanuatu Economic Opportunities Fact-Finding Mission*, Peter Bazeley and Ben Mullen, AusAID and NZAID, July 2006.

47 John McKinnon, Kinsa Associates, *Review of the Vanuatu Farm Support Association (FSA)*, P 11.

In 2011, beans accounted for roughly half of the total value of VV's vanilla sales, vanilla extract for 45% and vanilla paste for 6%. VV's main export market in terms of value comprises three New Zealand ice cream companies. In 2011 these accounted for 43% of the total value of VV's vanilla exports. In 2011, all sales to these companies were in the form of extract and paste. In the same year, exports of beans to Japan comprised VV's second largest export market (29%). Australia ranked third (21%), taking a combination of beans, extract and paste. The export of these products to the nearby French territory of New Caledonia accounted for the remaining 7% of export value. Vanilla produced in Vanuatu cannot compete in the larger European and North American markets due to the high cost of transportation. In 2011, sales to the domestic market accounted for just under one fifth of the value of all sales. Beans account for more than half the value of domestic sales, followed by extract and paste, for which there is an excellent domestic tourist market for packaged products. The total value of all VV exports in 2011 was some Vatu 7.7 million, around US\$85,000

3.3. Innovative and interesting features

3.3.1 'Pulling' products through the value chain

The VV value chain demonstrates that a company that processes and exports an agricultural commodity is potentially well placed to develop the entire supply chain for its raw material. Such a company is better placed than an external body, such as a donor agency, or farmers or other domestic value chain participants to assess the quality needs of foreign buyers and the value which they place on organic and other certification.

To obtain the necessary supplies in the circumstances prevailing in the Pacific islands, the exporting company invariably needs to be proactively involved in the development of the sector, including making significant long-term investment and having a long-term presence. VV has demonstrated that a company prepared to do this can effectively 'pull' products through the value chain in circumstances where there is little or no prospect of scattered producers in isolated rural areas initiating production and successfully 'pushing' it into an export market.

In the case of vanilla in Vanuatu, it was also essential that VV ensure that the incentive to grow vanilla was maximised by making certain that growers had a remunerative market for their entire vanilla output, not only for export quality beans. VV achieved this by establishing a capacity to process lower

quality beans into vanilla extract and paste. A combination of efficient, high-quality processing and adroit labelling has resulted in the total value of these processed products exceeding the value of VV's sale of high-quality beans.

3.3.2 The role of organic certification

The high cost of organic certification and the fact that organic products at best fetch only small premiums in regional retail markets, makes the net *direct* benefits of certification questionable. However, to obtain organic certification, the selling company must demonstrate traceability of all the components of its product, an acceptable level of cleanliness in storage, handling, transport and manufacture, and that its labelling is accurate. Thus, even if a purchasing company in Australia, New Zealand or Japan is not interested in the organic nature of a product, the fact that an exporter has the capacity to supply organic products will strengthen the company's expectation that it will make a sound trading partner. This is particularly important for a small exporter, such as VV, based on a distant island. Thus, organic certification has served as a marketing tool for VV rather than enabling it to export at prices which reflect price premiums for organics in destination retail markets.

While organic certification has served this role, Hazard Analysis Critical Control Point (HACCP) food safety certification is increasingly being adopted as the main instrument of quality assurance. HACCP certification is likely to become obligatory in the near future for enterprises which export processed products for human consumption. Given the high cost of obtaining certification, a subsector such as that for vanilla in Vanuatu cannot afford more than one type. Thus, it is likely to be necessary for VV to switch from organic to HACCP certification in the near future.

Since it is relatively simple to insert organic control points into a HACCP certification system, it would be reasonably easy for international certifying agencies to move to one-step combined HACCP food safety/organic verification systems under which both the food safety and organic characteristics of a product are certified in one exercise. This would benefit all enterprises involved in producing and exporting foodstuff but particularly those with small throughputs, such as VV.

PACIFIC OCEAN



SOLOMON SEA



4

Solomon Islands

The Honiara Floriculture Value Chain



4.1 National context

The nation of the Solomon Islands (see map at the beginning of Section B) comprises six main islands of roughly similar size plus some 900 smaller islands. These are located to the east of Papua New Guinea and to the north west of Vanuatu, in a chain which covers a total distance of about 1,000km from the island of Choiseul in the north west to San Cristobal in the south east. The population of the Solomon Islands is approximately 550,000. Honiara, the national capital, located on Guadalcanal Island in the south west of the chain, has a population of about 70,000. The islands' oceanic-equatorial climate is extremely humid throughout the year, with a mean temperature of 26.5°C.

In 2003, a Regional Assistance Mission to the Solomon Islands (RAMSI) was dispatched to Guadalcanal to quell unrest. RAMSI remains, having developed into a partnership between the people and Government of the Solomon Islands and 15 Pacific countries. Its main purpose is to assist national recovery and development.

4.2 The Solomon Islands floriculture value chain

4.2.1 Value chain definition and scale

The case study refers to a short and small value chain in and around Honiara. It involves some 500 producers who grow flowers in their backyards which are arranged by florists and retailed.

4.2.2 Production

Until 2003, there was virtually no growing of flowers for sale in the Solomon Islands. The practice began after the emergence of a demand for cut-flowers following the influx of RAMSI personnel. It was further encouraged by a widening of demand stimulated by local economic growth stemming from the presence and activities of RAMSI. Since the growing of sufficient flowers to produce a small supplementary income for households requires little land, the demand for cut flowers has been met through households in and around Honiara growing blooms in their back yards.

4.2.3 Value adding

Since flower arrangements sell at a higher price than unarranged cut flowers,

those with skills in arrangement (referred to locally as 'florists') took the initiative to arrange flowers which they had grown or purchased. This was and continues to be done at the home of the florist, normally on a part-time basis.

4.2.4 Marketing

Flower growers who are not also florists sell their output directly to florists or at an area dedicated to flowers at Honiara Central Market. About 40 growers currently sell at the market. Florists buy from an informal network of producers and from the Central Market.

In recent years, demand has gradually increased beyond the expatriate community to include businesses, churches, government departments and the general public, who buy flowers for special occasions. There is no 'flower shop' in Honiara. Florists sell their arrangements directly from their homes and at the Central Market.

All flowers are sold locally within the island of Guadalcanal. There is no exportation.

4.3 Innovative and interesting features

4.3.1 An appropriate free-market response to meet demand for a new product

The floriculture value chain developed initially without any government or external support. The part-time growing of flowers on a very small-scale by a relatively large number of households reflects the fact that there are no significant barriers to entry into the activity. Households' backyards contain enough land and the only other significant input is household labour, which is in abundance in many households.⁴⁸ Flower arranging is similarly labour-intensive with virtually no start-up costs. The activities in the chain provide small amounts of additional income to the households concerned.

A larger-scale response to the emergence of demand would have meant considerable investment in expensive peri-urban land for the establishment of a flower farm or incurring expensive transport costs to bring flowers into Honiara from a more distant farm. It would also have been less desirable in terms of income distribution, since it would have resulted in a few full-time

48 United Nations Human Settlement Programme, *Solomon Islands: Honiara Urban Profile, 2012*.

jobs rather than the opportunity for many households to generate a little additional income.

Although small in terms of the total product value, floriculture on Gaudalcanal is good example of how a well-functioning, appropriate chain can develop naturally to meet emerging demand.



Features of value chain development in the Caribbean and Pacific

1. Characteristics of Small Island Value Chains

1.1 Remote locations

All but one of the case studies refers to a commodity produced within an island nation. The exception is Belize. Grenada, Jamaica, Haiti and the three PICs are all a long distance from the closest developed country markets. Belize is also distant from the main markets for its citrus, the USA and the EU. Remoteness from markets is a particular problem for the three rapidly perishable export crops included in the case studies, mangoes, taro and papaya.⁴⁹

1.2 Vulnerability to disruptive weather events

All of the case study countries are located in regions characterised by extreme weather events capable of devastating crop production capacity. The small size of the countries means that hurricanes and typhoons can damage capacity across an entire country.⁵⁰

1.3 The small scale of the value chains

The small size of most of the Caribbean and Pacific ACP nations in terms of both land area and population means that value chains necessarily involve relatively few farmers and small amounts of output. The numbers of farms in the case-study chains range from 13 for organic cocoa in Grenada to 3,700 for taro grown on the Fijian island of Taveuni. In some instances, such as in Grenada, all activities within the domestic value chain to the port of export are located in their entirety within an area of a few square kilometres. In the Solomon Islands, floriculture and the market for cut flowers are concentrated in and around Honiara. However, in two of the PIC value chains included in the study, despite the involvement of only small numbers of farmers, production is either scattered over a set of islands (vanilla in Vanuatu) or most production is on a single island but, prior to export, must be transported by sea to the island on which the country's international airport or main sea port is located (taro in Fiji).

49 Note that other developing countries with successful horticultural export industries, such as Kenya, are even further from their main developed country markets. However, they tend to have a greater frequency of scheduled flights to cities in these markets.

50 This is marginally less of a problem in nations, such as Vanuatu, which comprise chains of islands extending over 1,000km or more.

The small quantity of output passing down some of the value chains means that there is little scope for exploiting economies of scale. Consequently, a chain is only viable if the economies of scale in all the activities within the chain are small or if the final product(s) can be sold at exceptionally high prices.

1.4 Tourism

The majority of the case-study countries have large tourist sectors, some of which contribute more to GDP than agriculture. Tourism increases the demand for domestically grown food crops due to their use in hotels and restaurants and their sale in processed form as souvenirs. The growth of agro-tourism provides not only additional demand for farm products but also the potential to earn further income in the form of accommodation on estates and entrance fees to observe working farms and processing facilities.

1.5 Disproportionately large donor assistance

In all the case studies, other than for that relating to the Solomon Islands, aid has played an important role in establishing the chain and/or in its development. This reflects the generally very high levels of aid per capita received by the case study countries. Other than for Haiti, this, in turn, reflects the fact that, worldwide, countries with small populations tend to receive disproportionately large amounts of aid per capita.⁵¹ In Haiti, aid levels per capita are also high reflecting the fact that it is one of the world's least developed countries and has recently received additional aid following the devastating January 2010 earthquake. However, Haiti receives far less aid on a per capita basis than the much richer small islands of the Caribbean and Pacific.⁵² The PICs, in particular, receive exceptionally high levels of aid.⁵³ This is principally due to their small populations but also because they neighbour two high income countries, Australia and New Zealand, which focus much of their aid on Pacific countries. The small PICs receive over half of all New

51 See: UNDP, *Towards Sustaining MDG Progress*, 5: Official Development Assistance: *Towards Human Resilience: Sustaining MDG Progress in an Age of Economic Uncertainty*, especially Chart 5.9. Note that farmers in the EU, Japan and other developed countries are in effect also aided, through policy measures aimed at supporting domestic agriculture that lead to transfers from consumers to producers.

52 In 2005-06, prior to the earthquake, amongst the world's poorest countries, Haiti ranked only 21st as a recipient of aid on a per capita basis. See: Robert Utz, *Will Countries with Insufficient Aid Please Stand Up?* CFP Working Paper Series No. 7, September, 2010. http://siteresources.worldbank.org/CFPEXT/Resources/CFP_Working_Paper_07.pdf

53 Even Fiji, which is ranked by the OECD as a lower middle income country, receives substantially more aid per capita than the poorest countries in sub-Saharan Africa, such as Malawi and Ethiopia. See: World Bank, *Net ODA received per capita*. <http://data.worldbank.org/indicator/DI.ODA.ODAT.PC.ZS>

Zealand's overseas development assistance⁵⁴ and 35% of Australia's annual bilateral and regional aid budget of over US\$3 billion.⁵⁵ Amongst the case-study countries, in 2011-12 Australia's aid to the Solomon Islands and to Vanuatu amounted to, respectively, US\$ 467 and US\$265 per capita.⁵⁶

2. Chain Initiation and Development

Only one of the case studies, vanilla in Vanuatu, refers to the development of a completely new crop sub-sector. The value chains for taro in Fiji and flowers in the Solomon Islands developed to accommodate a change in the order of magnitude of production which stemmed from a sudden increase in demand. All the Caribbean case studies and that for papaya in Fiji refer to value chains that have been in existence for many years and have been progressively modified in response to external events and through the efforts of individuals and enterprises to expand their throughput and otherwise develop their business.

2.1 Individual initiative

Two of the value chains, vanilla/Vanuatu and cocoa/Grenada were established by individuals, both foreign nationals. Both took an explicit decision to create a new activity, motivated by a combination of altruism and their fascination with technical aspects of the value chain. There would appear to have been no specific event relating to any aspect of the crops or to the products derived from them which triggered these two initiatives. It was simply a case of individuals identifying and exploiting already existing opportunities. A key to the success of the chains was that both individuals, although scientists and engineers by profession, were able to foresee the potential of the then nascent markets for organic and gourmet products.

2.2 External triggers

Specific external events played a key role in initiating two of the value chains:

- The most clear cut example is for taro exported from the Fijian island of Taveuni, which was triggered by an outbreak of taro leaf blight on Samoa.

54 *Show Me the Money: New Zealand Government Aid in Numbers*, By Joanna Spratt and Terence Wood, P4. <http://nzadds.files.wordpress.com/2011/04/summary-show-me-the-money-v3.pdf>

55 *AusAid, Annual Report 2011-12*, pp339/40. <http://www.ausaid.gov.au/AnnualReports/Pages/rep-12default.aspx>

56 For the Solomon Islands, this figure includes Australia's contribution to RAMSI (see section B 4.1, above).

- In the case of papaya exports from Fiji, the establishment of the present value chain was triggered by the banning in 1990 of the existing means of treating fruit fly host products prior to export and the subsequent conditions imposed by USAID for supporting the establishment of an acceptable replacement means of treatment.

2.3 Domestic triggers

- Floriculture in the Solomon Islands was triggered by internal unrest which resulted in the arrival of RAMSI personnel, which, in turn, created a demand for cut flowers.
- The Jamaica Egg Farmers Association decision to move into egg packing and processing was in effect triggered by a non-event, namely the stagnation of the domestic market for eggs.

2.4 Gradual progression

- The Agro Grace value chain for hot pepper has principally been the result of commercial decisions taken over a 90-year period. There is no single clear cut internal or external event that initiated the present form of the chain.
- In the case of the Citrus Company of Belize, the large-scale processing of citrus began over 70 years ago. The present value chain is the result of a succession of steps aimed at unifying and increasing the efficiency of the country's citrus sub-sector, the most important of which were the donor-supported vertical and horizontal integration in 2001-02 and the recent partial split of a set of large farmers from the citrus growers association which, prior to this split, embraced all commercial growers.
- In the case of mangoes exported from Haiti by JMB SA, the value chain has evolved since the creation of JMB in 1983. No external events can be said to have triggered development of the JMB value chain, but two events influenced the present structure of the chain. First, the development some 30 years ago of hot water treatment of mangoes with the assistance of USDA. Second, the 2007 banning of Haitian mango exports to the USA, which required the introduction of domestic measures to detect and control fruit fly infestation.

It will be seen that, where there was an obvious trigger for the establishment of a value chain, this trigger related to **demand**. None of the triggers was an

independent change in the quantity or nature of domestic production. This reflects the fact that all of these chains were established principally at the initiative of the private sector, albeit often with donor support, rather than at the behest of donors.

3. Relationships within Value Chains

3.1 Vertical relationships

It is evident from the case studies that it is productive for firms and individuals operating at one stage of a value chain to interact with other stages in ways that go beyond those of open-market selling and buying at spot prices. This can be achieved in two conceptually distinct ways, through (a) contracting or otherwise interacting with upstream or downstream enterprises and (b) vertical integration, i.e. extending ownership into different stages of the chain through either taking over or establishing new capacity. All nine of the value chains studied are characterised by the vertical integration of stages or by contractual arrangements between entities at different stages. In Jamaica, GK has used a combination of these. It recently established its own pepper mash processing facility upstream of the manufacture of its hot pepper products and, further upstream, contracted growers for the supply of fresh peppers to the facility. Meanwhile, downstream it has acquired ownership of firms that undertake the processing and marketing of pepper products. In line with GK's world-wide business model, it still contracts out the manufacture of its sauces in Jamaica, despite the fact that this is the stage at which its products are given their unique identity.

Vertical linking within a chain has also been achieved through the creation of associations and cooperatives of participants at one level of value chains which partly or fully own enterprises operating at other levels. Among the case studies, the most straightforward example of this is the Belize Citrus Growers Association, which is the majority owner of CPBL, the downstream processor of its members' output.

An unusual example of a cooperative that has links to other stages of the value chain is Nature's Way Cooperative in Fiji. Rather than being a cooperative that owns other stages of the value chain, NWC operates at a single stage and is owned by members which operate at other stages. NWC owns Fiji's sole facility for the pre-export HTFA quarantine treatment of fruits. This treatment is an essential stage in the value chain for papaya exported from Fiji. NWC's members comprise both growers and exporters, i.e. individuals

and enterprises which participate in upstream and downstream stages of the value chain. Although they have contributed little to NWC in terms of equity, they are notionally its owners and are occasionally paid dividends. NWC does not take ownership of fruits, which belong to exporters during the period that they are undergoing quarantine treatment and being packed. This arrangement has a set of advantages which have made NWC the main driver of the chain (see section B 2.3.1).

The case studies highlight a number of different reasons for enterprises to establish upstream and downstream relationships:

- A processor or exporter which wants to increase the scale of its activities or operate its processing facilities at full capacity may see it as worthwhile to assist growers to increase their output. This is particularly likely to be the case where growers must deliver their output to a single enterprise. Good examples of this are Venui Vanilla in Vanuatu and the CPBL in Belize both of which are monopsonists. In the case of CPBL the industry was deliberately consolidated through both vertical and horizontal integration with the aim of increasing operational efficiency. Processing and exporting enterprises that need an assured supply from growers but which face competition from other buyers may be able to support growers as part of a contract farming arrangement. However, this can lead to the incurring of losses if there are ready opportunities for side selling, as has been the case for taro exporters in Fiji.
- For perishable commodities, processors may seek to schedule the supply of their raw material from growers. GADP does this in Jamaica through contracts with growers which specify delivery schedules.
- It may be necessary for a commodity and products derived from it to be traceable through the full length of the value chain to allow one or more of the products to be certified as having particular qualities.
- Processors may wish to have control over on-farm practices to ensure that their main raw material has characteristics which minimise their processing costs and/or maximise the value of their sales. There are two good examples of this in the case studies. In Haiti, JMB seeks to minimise the need to reject low-quality mangoes at its pre-export quarantine and packing facility through an arrangement with a farmers' association (ASPVEFS) which harvests fruits selectively and undertakes all post-harvest operations. Belize Citrus Products sells its juices at a premium in export markets due to their high brix/acidity. It assures that deliveries have this

quality through prior maturity testing of farmers' fruits at its laboratory combined with a system under which harvesting and processing are coordinated at short notice.

- Finally an enterprise may integrate vertically simply to raise the scale of its involvement and its profits.

3.2 Horizontal integration and co-operation

In the Caribbean, there is a significant amount of horizontal cooperation at the farmer level in the shape of cooperatives or associations. Citrus growers in Belize and subsets of mango farmers in Haiti are particularly well organised into associations that play important functional roles within their value chains. Large-scale egg producers in Jamaica have cooperated to initiate and operate domestic egg processing facilities. Cocoa growers in Grenada and hot pepper farmers in Jamaica are also organised into cooperatives and associations.

Within the Pacific Islands there is no strong cooperative tradition. Farmers tend to sell individually to processors, traders or consumers. Support for farmers is provided principally by the government, donors and NGOs through institutions which they have either taken the lead in creating or which they are supporting financially and/or with technical assistance. Processing, and especially domestic trading and exporting, tend to be characterised by intense competition rather than cooperation. The exception is the quarantine treatment of papaya in Fiji, for which there are substantial economies of scale which necessitate all exports passing through a single facility (see section 3.3, below)

3.3 Public-private partnerships

Partnerships between enterprises and donors/NGOs are particularly important for agricultural commodity export value chains in the very small countries of the Pacific and Caribbean regions. In the area of marketing, sponsored visits by Venui Vanilla to three consecutive Australian Fine Food Fairs proved invaluable for making contacts that have led to an enduring market outlet in New Zealand.

VV has also depended on a long-lasting partnership with the Farmers Support Association to provide technical assistance to remotely located farmers and logistical support for organic certification.

The volume and value of the flow of commodities through small-island agricultural commodity chains are necessarily small, yet, for some, there are substantial economies of scale in processing and quarantine treatment for export. For papaya in Fiji, the quarantine treatment facility operated by NWC could not have been established without grants in kind from the national government and USAID, since exporters were neither willing nor able to provide finance and neither the commercial banks nor the Fiji Development Bank were prepared to do so.

In Grenada, the founder of the Grenada Chocolate Company developed productive partnerships with cocoa growers, with an established processor, a foreign customer and a zero-carbon shipper.

4. The Role of Technology in Providing Market Access and Improving Efficiency

The adoption of technologies and processes that were new to the country has been fundamental for the development of seven of the nine value chains covered by the case studies. Such adoption has had three distinct purposes: the treatment of fresh fruits to meet the requirements of importing countries, the introduction of additional processing to create new products, and the introduction of new processing and technologies to increase efficiency.

4.1 Quarantine treatment

New means of treatment had to be adopted to eliminate fruit-fly infestation of mangoes exported from Haiti and papaya exported from Fiji. Both were a necessary condition for resuscitation of export value chains after imports into the main foreign market had been banned. In the case of Haiti, the exporter, JMB, invested in the necessary IQF facility. The HTFA facility in Fiji was provided by donors and supported by donor-financed technical assistance.

4.2 New processing technology and products

The introduction of new processing technology into the two very small-scale value chains for vanilla in Vanuatu and cocoa in Grenada was also an essential component of their success. In both cases, use of the technology has raised the income of farmers over and above that which they would have obtained from export of the basic commodity. The processing by Venui Vanilla has meant that a greater proportion of farmers' total output is exportable, thereby raising the income of farmers sufficiently for them to

maintain an interest in growing vanilla. The manufacture of organically grown cocoa by the Grenada Chocolate Company into high value products has generated sufficient additional value added within the chain for farmers to be paid a higher price than they would receive from sales to the Grenada Cocoa Board, assuring that farmers remain committed to selling to GCC. Both these initiatives were financed as commercial investments.

In Jamaica, the value chain for eggs supplied to the domestic market has been extended through a joint venture by egg producers and a local chilled food distributor to invest in technology to produce a set of liquefied egg products. This was undertaken as a commercial venture by the companies involved.

4.3 Efficiency increase

In Belize, CPBL has established a capacity to process waste products from its citrus juice concentrate plants into valuable goods, thereby raising the overall value of its products and reducing its processing costs while simultaneously minimising the adverse impact of its activities on the environment. These investments have been undertaken as commercial ventures aimed both at raising the profitability of CPBL directly and increasing the support which it receives from the local community.

In Fiji, the adoption of plastic crates for the collection and domestic transportation of papaya has reduced post-harvest losses significantly. The adoption of this simple technology would benefit virtually all fresh produce industries throughout the region.

4.4 Exceptions

Of all the case-study value chains, the only crops which have not been subjected to new or enhanced treatment and/or processing are taro grown on Fiji and cut flowers produced in and around the capital of the Solomon Islands, Honiara. In the case of taro, the main need has been to introduce technological change at the *production* level of the chain to reverse the adverse impact which greatly expanded production has had upon the natural vegetation and soils of Taveuni. In the case of cut flowers, the development of the value chain was founded on the fact that an opportunity developed for an economic activity for which there was *no* need for any investment in treatment and processing.

5. Small Island Economies and Niche Markets

All of the case studies refer to crop value chains that have been developed to supply niche markets. Since the number of case studies is small and the studies were not selected randomly, they probably give a false impression of the importance of niche markets for agricultural commodities for the two regions as a whole. Notwithstanding this, one would expect niche markets to be particularly important for small isolated countries, where, amongst export commodities, high value-to-weight commodities have a comparative advantage due to the inordinately high cost of transport. The niche *export* markets which have been exploited are of three types. The first comprise principally the country's diaspora in developed countries. The second are for products which have unique characteristics associated with their origin. The third is where export markets can be supplied during periods of seasonal retail price peaks. These three types of niche market cover seven of the case study value chains. The remaining two chains refer to domestic niche markets.

5.1 Products marketed to diaspora

Small island nations in the Caribbean and Pacific have tended to experience high levels of emigration over the past 50-60 years. Some of these diasporas are relatively large and comprise important markets for traditional foodstuffs from their country of origin. The case studies include three examples of exports that are targeted principally at diasporas. The exports are of two types: (a) bulky and perishable fresh foodstuffs to countries where the mainstream staples are grains and (b) high-value processed foodstuffs such as spices. The diasporas of the Pacific islands are located principally in New Zealand and the main areas of heavy population in south-eastern Australia, where climatic conditions are unsuited to the growing of the root crops, which are the traditional staples of islanders.⁵⁷ Both taro and breadfruit are now important export earners for Fiji. However, over the long term the market is likely to be eroded as the PIC diasporas become progressively more assimilated culturally and switch to the consumption of lower-priced grains.

The case study of hot pepper products originating in Jamaica relates to an important high-value component of the Caribbean diet, namely sauces and other items derived from hot pepper mash. Such products differ from fresh staples in that there is potential for sales to extend progressively beyond the

⁵⁷ Note that imported wheat and rice are rapidly becoming of equal or greater importance in the PICs.

diaspora into mainstream markets. This is unlikely to happen for perishable fresh staples, which have a low value-to-weight ratio that makes them uncompetitive with grains as sources of calories.

5.2 Products with unique characteristics

The locations of the Caribbean and Pacific islands and the fact that some are of volcanic origin means that they have unique growing conditions that endow crops with distinctive tastes, textures and appearances. Within the value chains studied, the physical characteristics of Grenadian cocoa and Vanuatu vanilla have been maintained and accentuated skilfully through meticulous labour-intensive processing. The value of the products has been enhanced further through packaging and marketing that exploits their exotic origins. This has allowed sale to tourists and in export markets at sufficiently high prices to cover the high costs of domestic small-scale processing.

In Belize, to meet the diverse requirements of a wide range of clients, CPBL has established its own capacity to extract essential oils, which it uses to fine tune the composition of its juices.

In Haiti and Fiji, conditions are suited to the growing of, respectively, the Madame Francique variety of mango and the red-fleshed Solo Sunrise variety of papaya, both of which sell at premium prices in developed country markets. Haiti's JMB has increased the size of the premium it obtains on its export sales of mango by working in the USA with the up-market Whole Foods retail chain to carve out a market niche by positioning its brands around natural production, organic and fairtrade themes.

Product branding has played an important role in establishing a market and sustaining demand in all the export value chains covered in the studies other than that for fresh taro. For products exported from small developing countries, branding is particularly necessary due to the need to establish and maintain the credibility of a product whose source is not well known and which potential consumers may initially regard with suspicion. For such countries, it is important that the brand includes a positive association with the origin of the product. Both Venui Vanilla and the Grenada Cocoa Company pack their products ready for retailing in branded packaging that shows the commodity prior to harvest set against a background which emphasises its tropical origins. Solo Sunrise papaya are exported from Fiji as 'Fiji Red', the 'Fiji Red' brand has a unique logo however it is currently underutilised by exporters. Through Nature's Way Cooperative, the 'Fiji Red' brand will be patented and exporters will be encouraged to use it on boxes and fruit stickers. The long-established Grace

Kennedy Group places the group's predominantly black and white 'Grace' logo prominently on all its products. Given that its exports sales have been principally to the Jamaican diaspora, its hot pepper products are labelled picturing and identifying the type of pepper used rather than a scene redolent of their origin. The bright colours used for this labelling ensures that the black and white GK logo stands out, making it readily distinguishable from that of other competing Jamaican companies.

5.3 Exploitation of price seasonality

The prices for perishable foodstuffs rise markedly in importing countries during periods when there is no domestic production and the supply from foreign countries is reduced. The geographic positioning of the Caribbean and western Pacific countries means that for some crops natural harvest periods coincide with these times of short supply in importing countries. There is also some scope for changing the timing of harvests on tropical islands due the permanently humid nature of the weather and the relatively small seasonal changes in ambient temperature. In Haiti, mangoes can be harvested for 11 months of the year, allowing the US and other markets to be supplied when mangoes are not available from Mexico and other regional suppliers that have shorter harvesting seasons. In the case of the Pacific, Samoa is able to supply New Zealand from September to February when citrus are not being harvested locally, while Tonga has been able to supply squash to Japan and watermelon to New Zealand when local production is unavailable in those countries.

5.4 Domestic niche markets

In Jamaica, there is a niche market for processed eggs in the hospitality market. The case study of the egg processing chain focuses on an effort by the Jamaica Egg Farmers Association to stimulate demand for domestically produced eggs by processing them into a form suitable for this market.

In the Solomon Islands a niche market for cut flowers emerged following the arrival of RAMSI personnel and their families in 2003. This has led to small-scale flower growing and arranging in the national capital Honiara.

6. Non-Tariff Import Barriers

It is widely recognised that developed countries often use SPS border controls to protect domestic industries from imports. Fiji's attempts to increase its taro exports to Australia are a graphic illustration of this. The intractability of the

problem is demonstrated by the fact that Australia devotes a substantial proportion of its total aid budget to the PICs but is nevertheless prepared to go to extraordinary lengths to protect its small domestic taro industry at the expense of small-scale PIC growers. A similarly extreme example of the problem is the US Government's inconsistent approach to facilitating the exportation of papaya from Fiji. Some 15 years ago, USAID helped to establish a facility in Fiji for the quarantine treatment for fruits, yet USDA APHIS has yet to approve the importation of papaya that passes through this facility.⁵⁸

7. Chain Development and Governance

The nine value chains differ significantly in the extent to which they have been initiated, designed and coordinated by a dominant enterprise. To a large extent this stems from the choice of chains to be studied since some refer to entire commodity sub-sectors while others are confined to production which flows through a single enterprise. Notwithstanding this, there are interesting differences in the entities that have been dominant in establishing and driving the chains.

Single expatriates have played an important part in both initiating and developing the chains for the production and export of high value cocoa products from Grenada and for vanilla produced in Vanuatu. The activities in both chains would appear to have been highly dependent on the energy and commitment of these two individuals. The sustainability of these chains over the long-term must therefore be questionable.

The value chain for processed eggs in Jamaica is the only chain that has been developed in stages according to a formal plan aimed at meeting a specific objective. This development was formally initiated by the Jamaican Egg Farmers Association but was driven subsequently by a subset of members of the association who were interested and able to make an investment in the joint venture. The citrus value chain in Belize was created by several pioneering businessmen and evolved through an explicit attempt to create a producer-run industry. It has been managed largely as intended until the recent split from the Citrus Growers Association of a set of large growers.

In Fiji, NWC has played a dominant role in developing the papaya export value chain despite the fact that it was established initially to own and

⁵⁸ Note that, unlike the example of taro exports to Australia, the distance to the USA means that it is at best a marginal potential market for Fijian papaya.

manage an export treatment facility. This is partly because the cooperative status of NWC has made it an acceptable conduit for donor assistance to the whole chain but also because of the continuity of skilled and committed senior managers who have remained unchanged for almost two decades.

JMB obtains its mangoes from a number of sources. It worked with donors in developing one of these sources - the association of small-scale producers, ASPVEFS - and it has worked in liaison with NGOs and donors to increase the efficiency of Haiti's mango sub-sector.

Two of the value chains have developed naturally without any plan or project and without the dominance of any value chain actor, namely taro in Fiji and cut flowers in the Solomon Islands.

8. Inclusiveness

Most farming in ACP countries is small-scale. Most farm households acquire inputs and sell at least a part of their output. For all the commodities included in the case studies, most or all of the output is sold. Much of this output is processed, stored, transported, and bought and sold on one or more occasions before it is finally consumed or used. Thus, most farm households are involved in agricultural commodity chains and rely on their existence for their livelihood. Other participants in such chains, in turn, could not function without the activities of farm households. These households provide a final market for chains that supply farm inputs and services and they are the source of produce for the processing and marketing enterprises that operate downstream in agricultural commodity chains.

It is possible for an agricultural commodity chain to function if the purchase of inputs and the selling of outputs is the only interaction which farmers have with enterprises in the rest of the chain. However, it is now recognised that such chains can function more efficiently and effectively when small farmers have additional links with input and service suppliers and users of their produce. Value chain service providers can supply farmers with finance, information and training. Rural stockists can help farmers finance their activities by supplying them with inputs on credit. Farmers can also cooperate with buyers of their produce to ensure that they supply a product that is suited to the physical characteristics and reliability and timing of supply required by final consumers and end users. This has the potential to result in larger volumes sold, reduced losses along the chain, a higher final price for the end product and, possibly, a higher farm-gate price. It is also possible

for small-scale farmers to negotiate arrangements with buyers that reduce the risks that they face when buying from and selling into free markets. Thus, greater integration of small-scale farmers into value chains can have mutually beneficial outcomes both for the farmers themselves and for other value chain participants.

In the sub-sections below, we examine means of small-scale farmer inclusion in value chains that go beyond their simply being a provider of the raw material on which the chain is founded. We focus on the interaction of farmers with other enterprises trading commercially within the chain and with providers of technological, marketing, business management and financial services.

8.1 Both upstream and downstream integration

The case studies contain three examples of farmer associations or cooperatives that are involved in activities that are both upstream and downstream of the farm-production stage of the value chain. These associations and cooperatives include small-scale farmers, although in two cases - the Belize Citrus Growers Association (BCGA) and the Jamaica Egg Farmers Association (JEFA) - the majority of output within the value chain is produced by medium and large-scale farmers

Citrus: Belize The BCGA provides all members with a comprehensive set of services which largely isolate them from the private sector. It has its own Citrus Research and Education Institute, it provides information, advice and training to growers, and it provides growers with credit and services which they would otherwise need to obtain from private enterprises. It operates nurseries that provide healthy and improved planting material, runs an input supply sales store from which growers can purchase chemical inputs and diesel at cost price, and provides machinery for weeding citrus groves. Downstream from its members' farms, it assists with the transport of their produce, and negotiates quality-based prices for the sale of their produce. BCGA is also the majority owner of CPBL which owns all of Belize's large-scale citrus processing plants. BCGA's support services are funded by a levy on growers, the government Social Security Revolving Loan Fund and an EIB low interest loan. Of all the case-study chains, the BCGA value chain is ostensibly by far the most inclusive of growers. However, it is open to question whether smaller growers are better off than if a more competitive open-market system had been allowed to develop, since the smallest farmers have no voice in how the chain is managed, there is substantial overcapacity in processing facilities, until recently CPBL operated at a loss for a number of years, and a set of large farmers have broken away from BCGA, depriving it of much of its income.

Eggs: Jamaica In addition to providing advice and training to farmers, JEFA procures inputs in bulk which it on-sells to farmers, it supports national egg nutrition promotion programmes in Jamaica aimed at promoting the domestic demand for eggs and, through some of its members, it is a part-owner of a domestic egg processing plant. The organisation is unusual in that its membership comprises large-scale farmers, but it is funded partly by levies on inputs purchased by small and medium scale farmers, who, in turn, receive services from it.

Papaya: Fiji Output for this chain is produced by some 200 small-scale farmers. The majority of these are members of NWC, which undertakes pre-export quarantine treatment of papaya and other crops. NWC is currently hosting the Fiji Papaya Project, which is supporting research and the strengthening of the value chain. Growers' membership of NWC allows them to assist in steering these activities.

Vanilla: Vanuatu There are about 300 vanilla growers, all of which are small-scale. VV and the FSA jointly provide appropriate low cost curing equipment and training to these growers. Downstream, both the FSA and VV assist in collecting and transporting farmers' beans to VV's facility. This assistance is largely unstructured and has evolved due to the long-standing partnership between VV and the FSA and the fact that, as the only buyer, it is in VV's interest to assist farmers with the marketing of their crop. The FSA provides the internal control for the organic certification process. This activity receives donor support.

8.2 Upstream integration

Hot Peppers: Jamaica This value chain is based on the output of some 25-35 small and medium-scale farmers. Under GK's contract farming arrangements aimed at acquiring a steady supply of peppers for its mash factory, farmers receive inputs from Agro Grace farm and gardening supply branches at discounted prices and with deferred payment. They also benefit from technical assistance provided by GAPD with the help of the Rural Agricultural Development Authority. Farmers receive a preset price for their sales. They have no involvement in downstream activities.

8.3 Downstream integration

Mangoes: Haiti The value chain selected in Haiti for study was for mangoes supplied to a private exporter, JMB. A part of its supplies are acquired from an association of mango growers, ASPVEFS, whose members are entirely

small-scale growers. Although ASPVEFS provides some services related to mango growing, its main function is downstream, namely to harvest, select, pack and sell fruits. It in effect does this as a business, buying the fruits on the tree and selling them to JMB for export, to a donor-supported dehydration facility for sale locally in dried form, and to traders for sale and consumption in the domestic market. The main advantages for small-scale growers are that (a) their mangoes are picked selectively and carefully sorted, (b) they are sold to ASPVEFS at prices which reflect net market value rather than at prices negotiated with local traders, and (c) ASPVEFS has obtained fairtrade certification allowing the part of their output which is exported to be sold at premium prices.

In addition to the supply from members of ASPVEFS, JMB acquires a proportion of its mangoes from private traders who, in turn, purchase from small-scale producers and gatherers from feral trees. These producers use few inputs and sell their crop to traders on the tree. Thus, their only contact with the value chain is with these traders at the time of harvest, other than where traders lend to them in advance of the harvest.

8.4 Other

Taro: Fiji Most taro is grown by small and medium-scale growers. These sell for cash to marketing agents at the farm-gate and have no further contact with downstream operators.

Cocoa: Grenada The value chain covers the output of a large estate and 13 small-scale farmers, all of which have holdings larger than most agricultural holdings in Grenada, which are of less than one acre. Thus, although some 25% of the cocoa entering the value chain is produced on small-scale farms, the chain is not inclusive of typical Grenadian small-scale farmers.

Cut flowers: Solomon Islands The value chain is short and straightforward with little opportunity for inclusive arrangements other than for the informal networks that some households have developed for selling cut flowers and flower arrangements.

9. Green Aspects of Chain Development

The need to reverse the adverse impact of population growth and economic development on the environment is now widely recognised. This requires that natural resources are used efficiently and that the destruction of existing

natural resources through erosion, pollution, and carbon emission is minimised. Consequently, it is important that existing and new agricultural value chains are as 'green' as possible.

One of the main means of reducing environmental damage and conserving natural resources is to improve the output achieved from a given set of resources,⁵⁹ thereby minimising the resource use necessary to meet demand. For example, planting seeds at the correct depth at the correct time can increase output significantly without the need for additional resources. Many such means are often not thought of as green, even though they may make a major contribution to the environment. This should be borne in mind when evaluating the importance of *explicit* green measures.

In addition to the external benefits that stem from greener chains, it is possible for value-chain enterprises, including farmers, to benefit directly from the adoption of green practices, since such practices can reduce unit costs and/or raise final product prices. To obtain higher, green final product prices, there is usually need for cooperation between enterprises at different levels of the chain. In addition, for farmers to benefit from higher final prices, a part of the price increase must be transmitted back to them.

The majority of the value chains contain examples of initiatives taken by chain participants to adopt green practices in either the growing of the crop, during processing, or during the treatment of waste. Only in the cases of taro growing has development of the value chain caused serious damage to the environment and required explicit measures to reverse the damage. In all the other cases, chain-development has either not had obvious adverse environmental impacts or steps have been taken to introduce greener methods to reduce such impacts.

9.1 Adverse environmental impacts

Within a few years of the collapse of Samoan taro production, taro growing on the Fijian island of Taveuni had become a major export industry. The high returns on offer to growers saw the transformation of subsistence, garden-based cropping systems into intensive monoculture involving land clearance and high rates of application of chemical fertilisers. Despite Taveuni's robust volcanic soils, the pressure of intensive production soon resulted in a decline in yields. Farmers responded by increasing the amounts of fertiliser applied

⁵⁹ Note that increasing the short-term return to a single resource, such as land, can be environmentally damaging, as demonstrated by the example of taro in Fiji.

and expanding cultivation into new locations in higher elevation forested areas. This resulted in the destruction of forests and degradation of the soil on both existing and newly cleared land. The end result was a decline in taro corm size and an accompanying decline in the per-hectare yields, as well as the degradation of water catchments.

Remedial action to address the problem is now being initiated. A group of farmers are adopting radical changes in production practices, focused on the rehabilitation of depleted acidic soils through the introduction of the legume mucuna bean (*Mucuna pruriens*) and the application of lime. A change in the mindset of taro growers is being driven by two Taveuni-based grower organisations, Teitei Taveuni and Marist Tutu Rural Training Centre, which are spearheading efforts to reverse the decline in productivity through the adoption of sustainable farming practices. These efforts are being supported by technical and financial inputs from a set of outside entities, including ACIAR, the Organic Matters Foundation (OMF), AusAID, Caritas Australia, SPC, UNDP, and the Fiji Ministry of Agriculture.

9.2 Green initiatives at the production level

The lack of significant price premiums for organic production in the Australian and New Zealand markets means that the only example of organic certification amongst the PIC case studies is vanilla grown on Vanuatu. Vanilla production is organic on all the seven islands where the crop is grown. Vanilla vines have root systems that spread just below the surface making heavy mulching the best means of providing nutrition while simultaneously aerating, protecting and enhancing water retention in the soil, protecting the roots from the sun and controlling weeds.⁶⁰ A wide range of mulching material is recommended, including byproducts and waste products from other crops, such as coconut husks, cocoa pods and oil palm waste. The main benefit that accrues from organic certification may in some instances be the indirect advantage of making exports more marketable rather than the achieving of an explicit organic price premium. This has proved to be the case for Vanuatu's vanilla value chain.

Amongst the Caribbean case studies, two value chains are organic, that for the production of mangoes in Haiti produced by members of the Associations of Fruit Producers and Sellers from the South (ASPVEFS) and cocoa in Grenada produced by the Grenada Organic Cocoa Farmers Co-operative Society.

60 Piero Bianchessi, *Vanilla Handbook*, Venui Vanilla, 2012.

In Haiti, mangoes are grown organically without any use of fertilisers or other agro-chemicals. In the past, this was considered a factor inhibiting growth of the industry but it is now being exploited as a means of raising export prices. The exporter, JMB, has adopted a strategy of working with selected small-scale grower cooperatives in certified growing regions in the north-west of Haiti, to progressively obtain USDA and BCSOko-Guarantie certification for the output of each.

The organic value chain for cocoa in Grenada is the only chain amongst the case studies that has been developed explicitly as a green chain with the dual objectives of enhancing the environment and raising additional income to be used to improve the livelihoods of cocoa growers and workers engaged in the domestic manufacture of chocolate and other cocoa-based products. Its target markets have been tourists visiting Grenada, especially those making short stops on cruise ships, and niche gourmet markets in the UK and USA. At the farm level, chemical fertilisers have been replaced by the use of organic mulches, including cocoa production and fermentation byproducts (pods and shells) and composted ruminant and pig manure.

In Belize, BCGA and CPBL have promoted green production techniques, including the use of integrated pest management and more efficient use of fertilisers and plant hormones to raise yields per hectare while reducing the use of agricultural chemicals. In Haiti, JMB, the US retailer Whole Foods, the 3M Corporation and a number of donors have supported the training of mango farmers in a range of green production and post-harvest measures, including the infilling of small plots, reforestation, the top grafting of less desirable species with export varieties, and improved post-harvest techniques aimed at reducing losses.

In Jamaica, JEFA supplies waste generated by poultry to fruit and vegetable farmers for use as fertiliser, while GAPD has promoted measures to increase the efficiency of land and water use by its contracted hot pepper farmers.

9.3 Green initiatives involving processing and transport

Of the commodities covered by the PIC case studies, a part of the vanilla grown in Vanuatu is processed prior to final consumption or use.⁶¹ Amongst the Caribbean case studies, all or most of all the crops are processed and/or quarantine-treated domestically.

⁶¹ All vanilla is cured on farm. A proportion of the cured vanilla is processed into extract and paste by VV.

Crops which are normally processed prior to consumption or before being utilised in manufacture are most commonly processed near to the point of production. There are two main reasons for this. First, processing usually reduces the weight of the main product, thereby reducing transport costs. A good example of this is citrus processing, where the juice is pressed from the fruit and then concentrated with the aim of reducing both the weight and volume transported. Second, some crops are rapidly perishable. If heavy losses are to be avoided, they must be utilised rapidly. Hot peppers are an example. If destined for export, it makes commercial sense to process such crops domestically, except where they can only be consumed in fresh form or unless the fresh form has a value in foreign markets that is substantially higher than the total value of the products processed from it.⁶²

The domestic processing of export crops that results in a loss of weight and/or volume is of itself a 'green' activity in that it lowers the amount of polluting transport required for shipment to foreign markets. However, if the processed product is packaged domestically, and especially if it is bottled, weight and volume are added, offsetting and possibly wiping out the green transport advantage gained from processing near the source of production.

In four of the five value chains covered by the Caribbean case studies, all or most of the crop is processed prior to export. In Grenada, the manufacture of chocolate products has additionally allowed a part of the country's cocoa production that was formerly exported to be consumed domestically, thereby reducing transport costs further, albeit by a minute amount.

In Belize, in addition to the green gains from exporting frozen citrus concentrate rather than whole oranges or normal strength juice, CPBL also:

- minimises the amount of resources used in citrus production for any given level of export by minimising losses during processing through (a) investing in state-of-the-art processing equipment and (b) testing fruit maturity prior to harvesting and systematically planning and scheduling fruit deliveries
- uses solid byproducts productively to extract citrus oils, to make organic fertiliser, to make cattle feed, and to use as a fuel for the generation of electricity
- biologically cleanses liquid wastes using effluent ponds, and processes residual solids into byproducts

⁶² This total may include byproducts sold domestically.

- seeks to reduce carbon emissions by, *inter alia*, switching from diesel and bunker fuel to sweet crude oil.

By establishing its own hot pepper mash processing facility in Jamaica, GK has reduced the need for Jamaican processors to import mash from Central America, thereby reducing transport costs. It has further reduced transport costs by manufacturing a part of its pepper-mash based products in the UK, thereby needing to ship only mash to the UK rather than bottles and other retail packaging.

Also in Jamaica, JEFA's Caribbean Egg Processors subsidiary renders waste eggshells into organic fertiliser.

The hot water treatment facility introduced by JMB in Haiti to eliminate fruit flies from export consignments allows Haitian mangoes to be exported without resort to more invasive agrochemical-based means of eliminating fruit flies.

9.4 Reasons for the adoption of green practices

Virtually all the green practices adopted by farmers and enterprises operating in the case-study value chains yield returns to the adopter. There are five conceptually distinct mechanisms for this:

- First, environmentally sound practices can result in *lower unit production costs* at the growing, post-harvest, processing and transport stages of the value chain. The low-cost organic methods used for producing and curing vanilla in Vanuatu, the use of solar power in the processing of cocoa on Grenada and the use of sea rather than air-freight for fresh exports from the PICs are examples of green-based unit cost reduction at each of these chain stages.
- Second, such practices can raise farm production and the total output of processors. In the case of farm production, this is mainly through the impact of conservation and improvement of the quality of resources available to farmers, especially their soils. The organic farming of cocoa in Grenada and the conservation practices being implemented on mango farms in Haiti are examples of this. In the case of processing, total output can be raised by switching from disposing to making productive use of potentially polluting waste products. CPBL has done this by converting both its hard and liquid waste into a range of valuable products, including essential oils, organic fertiliser and fuel.

- Third, the certification of one or more of a value chain's end products as organic or produced using other environmentally sound methods can lead to higher selling prices, which can be passed back in full or in part up the value chain. The most striking example of this is the organic farming, curing and manufacture of cocoa-based products in Grenada. In practice, the costs of certification can be high, especially where production is small-scale, scattered and farmers do not market their commodity collectively, as in the case of vanilla in Vanuatu, where certification is not commercially viable for over half of all production.
- Fourth, even where organic produce commands little or no retail price premium, organic or some other form of environmental or hygiene-based certification may enhance market access by demonstrating that the supplier is dependable and likely to be a stable long-term partner with whom to do business. This has been exploited by Venuei Vanilla as a means of obtaining more ready access to regional markets for its vanilla products. Similarly, CPBL has used its Almost-Pesticide-Free status to attract EU and Japanese bottlers concerned with the environmental friendliness of their supply chain.
- Finally, green practices may improve the socio-political environment in which the chain operates. For example, productive use by CPBL of its citrus processing byproducts means that the communities in the proximity of its citrus plant no longer have to suffer from local discharge of putrid smelling and environmentally damaging waste organic matter.

10. External Factors

10.1 Tax and trade policy

The case studies provide good examples of the importance of conducive fiscal and trading arrangements relating to both domestic marketing and international trade.

In Fiji, NWC lobbied successfully for the removal of a 32% import duty on plastic crates. The resulting reduction in domestic crate prices has led to them becoming the norm for internal transport of fresh fruit, improving returns along value chains for papaya and other horticultural produce.

In Belize, CPBL benefits from two fiscal arrangements which increase its competitiveness in export markets. Under the Lomé Caribbean Basin Initiative, it is able to export its citrus products to the EU free of import duty. Belize's membership of CARICOM allows it to sell its products into Caribbean markets protected from external competition by a 35% common external tariff.

10.2 Infrastructure

The importance for agricultural marketing of good rural access roads is widely recognised. For nations comprising sets of small islands, efficient inter-island transport is also important, both for domestically consumed and exported produce. Appropriately located all-weather wharfs where roll-on roll-off vessels can berth safely are particularly important for perishable commodities, since the use of such vessels reduces the total journey time. In Fiji, the initiation of a RoRo service from Taveuni to Viti Levu was an important factor in the rapid development of a national taro export industry.

IV

Comparisons between
the Caribbean and
Pacific regions and
implications for
each region

The fact that the case studies were not randomly selected means that it is not possible to make a general comparative analysis of value chains within the two regions. However, there are two sets of case studies that have many common features coupled with interesting differences: those relating to mangoes in Haiti and papaya in Fiji and to cocoa in Grenada and vanilla in Vanuatu.

1. Comparison of the JMB Mango Value Chain in Haiti with the Value Chain for Papaya Exports from Fiji

It should be noted that the value chain in the Haitian case study refers to mangoes passing through a single exporter only, whereas that for Fiji refers to all exported papaya. Despite this the chains have many similar characteristics.

1.1 Similarities

Both chains:

- are for a perishable fresh fruit grown principally by small-scale farmers
- have domestic and export markets for the fruit
- were disrupted by decisions to ban exportation to the country's main, well established developed-country markets due to fruit fly infestation
- received US government assistance to establish acceptable means of pre-export treatment
- have a set of private sector exporters
- have received donor and NGO assistance to develop the value chain
- are subject to severe hurricane/cyclone damage.

1.2 Differences

The most important difference to note is in the scale of the two country's exports. Fiji's total papaya exports amount only to some 800 tons, compared with the 10,000 tons of mangoes exported by Haiti. The differences in scale largely reflect the difference in the populations and land areas of the two countries. Haiti has almost 12 times the population of Fiji and 51% more land area of which it uses 70% for agriculture compared with 23% in Fiji. Haiti also has a higher percentage of its population engaged in farming.

In both countries exporters typically buy directly from farmers at prices negotiated by their agents at the point of sale. The JMB value chain differs from that

in Fiji in that a proportion of its purchases are sourced from a cooperative (the ASPVEFS) which picks and markets its members' fruits. There is no equivalent of ASPVEFS in Fiji, which does not have a strong cooperative tradition.

The key difference between the value chains is that all Fijian exports of papaya are treated prior to shipment for a fee at a single HTFA facility owned by a cooperative which has grower and exporter membership, whereas JMB treats its own purchased mangoes at its own a hot water treatment facility. The main reason for this difference would seem to be the much larger scale of exports from Haiti. This means that a single exporting company is large enough to be able to finance its own treatment facility. In Fiji, donor finance was necessary due to the small size of the enterprises exporting papaya and other export crops needing quarantine treatment. The requirement for donor finance in Fiji, in turn, influenced the structure of the marketing chain, since the condition of USAID that the facility be operated commercially required the establishment of a cooperative. In this regard, it should be noted that the Fijian plant was established in 1996 when exports were even smaller than at present. By contrast JMB's facility was established more recently in 2007, prior to the devastating 2010 earthquake.

A further difference between the two value chains is that a part of Haiti's mango exports are organic, whereas Fiji has yet to exploit organic export markets for its papaya despite a potential for organic production in Fiji.⁶³ Again the main reason for this would seem to be difference in scale, in this case, the scale of the main markets. The nearest developed country market for Haiti is the USA, whereas for Fiji the only countries within reasonable proximity are the much smaller markets of Australia and New Zealand. In terms of the demand for organic fruits, this difference is exaggerated by the fact that, in the USA, organic produce can be sold at specialised outlets at greater price premiums than can be obtained in Australia and New Zealand.

2. Comparison of the Organic Cocoa Value Chain in Grenada with the Venui Vanilla Value Chain in Vanuatu

2.1 Similarities

The similarities are that:

⁶³ K.N. Stice, L.D.Tora, and A.M. McGregor, *The Economics of Growing Organic Papaya in Fiji*, Koko Siga Pacific, Suva, Fiji Islands.

- both chains were established by and have been heavily dependent for their growth on a single person
- both persons were foreign nationals who endowed the chain with a combination of technical skills and business acumen and who were motivated in part by altruism
- both persons established companies that operate at the processing/ manufacturing stage and at the exporting stage of the value chain
- both focused on the processing of high-value, niche market products targeted at the top end of foreign markets and at tourists.

2.2 Differences

The two chains differ in that:

- cocoa production was already established in Grenada prior to creation of the value chain, whereas there was no commercial production of vanilla in Vanuatu
- cocoa production in Grenada is highly concentrated into one small area whereas vanilla production in Vanuatu takes place in remote locations on eight separate islands
- in Grenada a proportion of cocoa is grown using chemical fertiliser but the Grenada Cocoa Company (GCC) value chain is entirely organic; conversely in Vanuatu, vanilla production is almost entirely organic whereas only a part of the production passing down the Venui Vanilla (VV) chain is certified as such
- growers in the GCC chain are organised into a cooperative, whereas each VV grower operates independently
- The majority of cocoa entering the GCC value chain is produced by a single estate, the owners of which also undertake the initial processing of the beans produced by all other members of the cooperative, whereas Vanuatu's vanilla growers are all small-scale and cure their own beans on-farm
- VV is wholly family owned whereas all the GCC chain's growers have shares in GCC

- VV relies principally on the provision of a high quality product to ensure sale at a price premium, whereas the GCC aims to market its products as completely 'green', using publicity stunts such as carbon neutral delivery by sailing vessel.

These differences can be explained in part by differences between the geography and history of the nations of the Caribbean and of the South Pacific. The vast difference between the spatial concentrations of production is due in part to the fact that some of the Caribbean nations are extremely small in size and comprise a single inhabited island. Grenada is only 344 km² compared with Vanuatu's total land area of 12,189 km², and Grenada consists of only one main island whereas Vanuatu comprises an archipelago.

The reason why the value chain in Grenada is supplied principally by a large estate but all production on Vanuatu is small-scale is that there was no history of vanilla growing in Vanuatu until the VV chain was developed. This meant that during the colonial era no vanilla estates were established and consequently there were no existing estates that could have been included in the chain.

The fact that initial cocoa processing takes place off-farm in Grenada but on-farm in Vanuatu is due principally to differences in the spatial concentration of production and in the storability of the harvested crop. The more scattered nature of vanilla growing in Vanuatu makes it impracticable for centralised processing of the fresh vanilla beans for which the first, water-killing stage of curing must be undertaken on the day of harvest. By contrast, cocoa production in Grenada is highly concentrated and newly harvested pods can be stored for up to four days prior to splitting and fermentation.

The differences between the two chains in the ownership of the final processing/manufacturing and export company is due to a combination of (a) a much larger number of small-scale growers in Vanuatu than Grenada, (b) the lack of a cooperative tradition in Vanuatu that makes farmers reluctant to become involved in collective ownership, and (c) possibly differences in the means by which the founders of the chains have sought to benefit farmers.

2.3 Key-person dependency

Both chains have succeeded because their founders had the foresight to appreciate that their chain's activities would only be viable if the high unit processing and marketing costs stemming from their small scale could be

offset by achieving exceptionally high export prices. In the case of the VV chain, this was a necessary condition for paying a price to growers that was sufficiently high to encourage them to begin growing vanilla and to maintain an interest in the crop. In the case of the GCC chain, this was necessary to induce farmers to grow organically rather than to produce conventionally using agricultural chemicals.

Both chains have been highly dependent on their founder's combination of entrepreneurial, technical processing and marketing skills coupled with an altruistic aim of wishing to improve the livelihoods of low-income households. In Vanuatu, small-scale entrepreneurial investors have been at the vanguard of agro-processing development but, by their very nature, their enterprises suffer from being very key-person dependent. In the case of vanilla, the success of the chain is entirely dependent on the expertise of the proprietor and the niche markets developed by him. It is essential that founding entrepreneurs of small-scale value chains targeted at niche markets recognise the problem of key-person dependency and, during development of the chain, initiate the development of a sustainable export industry that is not solely dependent on their efforts.

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