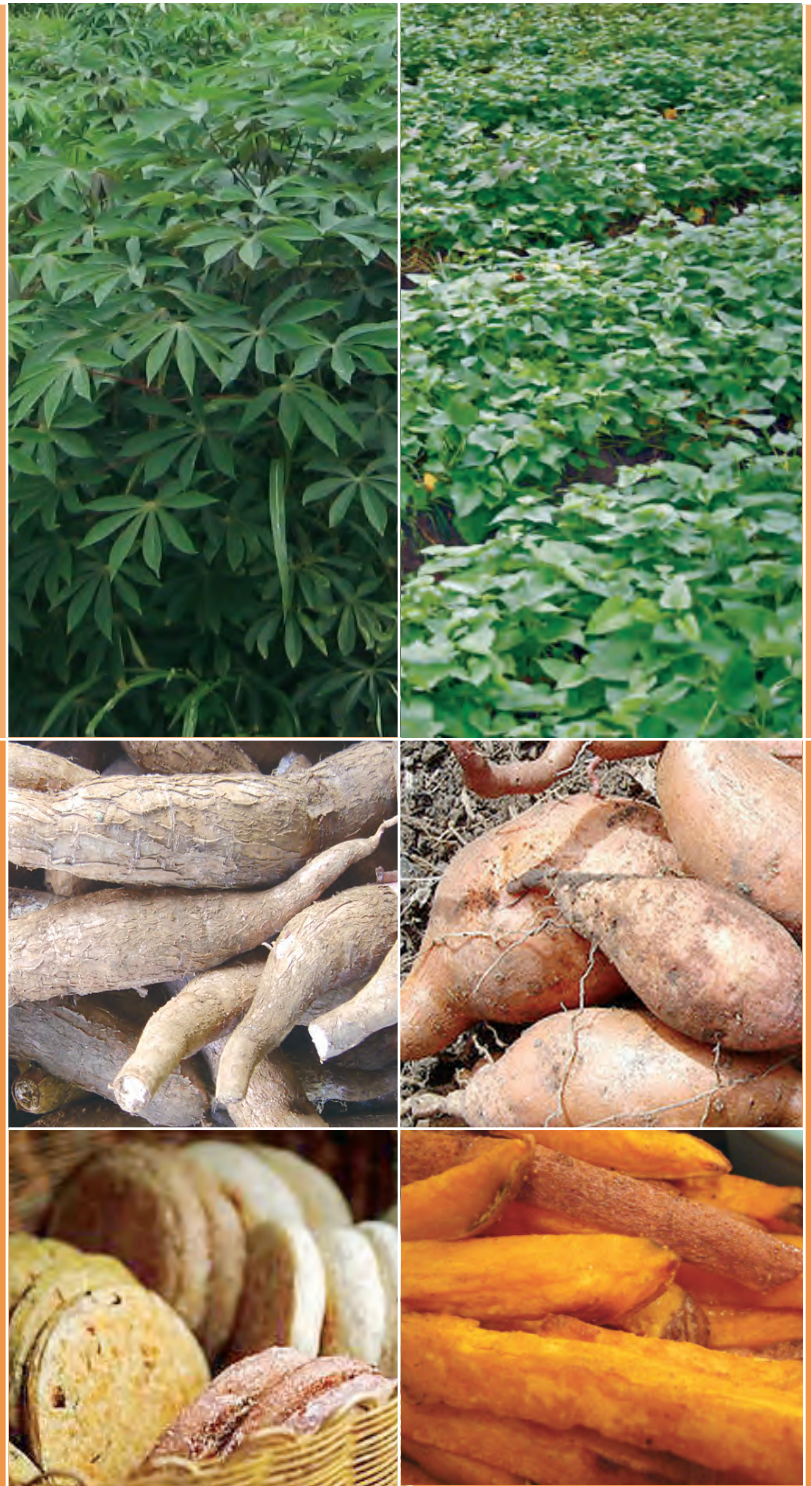


Roots and Tubers Processing in the Caribbean: Status and Guidelines





Roots and Tubers Processing in the Caribbean: Status and Guidelines

Inter-American Institute for Cooperation on Agriculture
Caribbean Agricultural Research and Development Institute

Inter-American Institute for Cooperation on Agriculture (IICA), 2013



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CONTENTS

Foreword - v

Preface - vi

Acknowledgements - vii

- 1** **Diamonds in the Rough:**
The potential for roots and tubers processing - 1
- 2** **What's Going On:**
Profiles of root and tuber processing in 7 countries - 18
- 3** **Building Enterprises:**
Guidelines for business and product development - 60
- 4** **Intervention Points:**
Putting efforts where they're needed most - 81
- 5** **References**
87
- 6** **Annex:**
List of establishments interviewed by country - 90

LIST OF ACRONYMS

BADMC	Barbados Agricultural Development and Marketing Corporation
CARDI	Caribbean Agricultural Research and Development Institute
CARIBCAN	Caribbean-Canada Trade Agreement
CARICOM	Caribbean Community
CARIRI	Caribbean Industrial Research Institute
CNCDs	Chronic Non-communicable Diseases
CTA	Technical Centre for Agricultural and Rural Cooperation ACP-EU
EU-ACP EPA	Economic Partnership Agreement between the European Union and the African, Caribbean and Pacific States
FNS	Food and Nutrition Security
GAPs	Good Agricultural Practices
GHPs	Good Hygiene Practices
GMPs	Good Manufacturing Practices
HACCP	Hazard Analysis Critical Control Points
IICA	Inter-American Institute for Cooperation on Agriculture
IFAD	International Fund for Agricultural Development
REDD	Reducing Emissions from Deforestation and Forest Degradation
REDD+	REDD + inclusion of the role of conservation, sustainable management of forests and enhancement of forest carbon stocks
RFNSP	Regional Food and Nutrition Security Policy
RFNSP+ AP	Regional Food and Nutrition Security Policy and Action Plan
SME	Small and medium enterprises
SP	Sweet potato
SPS	Sanitary and Phytosanitary Measures
SKN	Saint Kitts and Nevis
SVG	Saint Vincent and the Grenadines
UN-REDD	United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation

FOREWORD

The IICA Competitive fund for Technical Cooperation (FonTC) was established, as an annual initiative undertaken by the institute, to finance technical cooperation projects with collaboration from local and international organizations. The FonTC was launched on February 28, 2011 with the aim of achievement of the goals established in IICA's 2010-2014 Medium term plan; to foster the provision of high quality technical cooperation by financing projects with innovative approaches and to promote more productive, competitive and sustainable agriculture.

As a result of the first call for proposals, the IICA Office in Trinidad and Tobago in close collaboration with CARDI and in conjunction with selected IICA Offices in the Caribbean and Latin America prepared and submitted a comprehensive proposal targeted at the value added processing of roots and tubers which was approved for funding. The objective of the 2-year project "*Enhancing the value-added processing of roots and tubers in the Caribbean through the transfer of improved technologies*" was to primarily improve the performance and to increase the competitiveness and sustainability of the root and tuber industry with a focus on adapting and transferring technological information and scientific knowledge to the processing sector from among the Caribbean and Latin American institutions. The efficient production of roots and tubers is not limited to large scale operations but lends itself well to the small scale production systems which are so widespread in the region and remains one of the areas of commodity development which is well suited to the agricultural landscape in the Caribbean. Hence, it is not surprising that roots and tubers have been identified as a priority area of commodity development at the national and regional levels in stated agricultural policy and food security programs being pursued in the region.

The first phase of the project captured the profile of processors in the seven countries via a survey instrument; identified and described the existing weaknesses and strengths in the root crop industry and led IICA to conceptualize the framework for present interventions. This publication is based on those findings and also provides a set of recommendations on how to stimulate the development of the value-added processing of roots and tubers in the Caribbean, which can lead to further interventions and facilitate synergies among all the stakeholders in the industry.

We hope that this publication will provide useful information to agricultural planners, processors, farmers, individuals, and development organizations as to the status of the industry in the region and how the information presented can assist in guiding the development of the industry.

Dr. Víctor Manuel Villalobos Arámbula
Director General of IICA

PREFACE

A lot rides on agriculture in the economies of the Caribbean. It has traditionally been the backbone for development. While economic development has seen efforts and resources diverted to other sectors, agricultural enterprises continue to be a pivotal element of the progression of manufacturing, culinary and tourism sectors amongst others. At the heart of this extraordinary contribution are small entrepreneurs. They exist as farmers, marketers, researchers and manufacturers, and they are the cadre of small businesses which support employment and value-creation in the agriculture sector.

They are also the focus of this publication which represents one of the outputs of the Inter-American Institute for Cooperation on Agriculture's (IICA's) project on "Enhancing the Value-Added Processing of Roots and Tubers in the Caribbean through the Transfer of Improved Technologies". This project was intended to contribute to the further development of value-added processing of roots and tubers in an effort to boost food security within selected countries. This intent was born of a recognition of the fact that for the processors operating in the Caribbean Region, there is a major challenge of knowledge of and access to processing technologies, equipment, best practices in production and processing (Good Manufacturing and Agricultural Practices), and packaging and labeling which will contribute to the sustained growth and development of the industry. Additionally, information on *suitable* varieties for processing is lacking in many of the Caribbean territories; information that is critical to determining the best end-use of the particular root and tuber crop.

With this in mind, the IICA and its partners are collaborating in areas which can directly improve the performance, competitiveness and sustainability of the agriculture sector, through the adaptation and transfer of technologies, information and scientific knowledge, among the institutions of the Caribbean and Latin American Regions. Root and tuber crops were high on the priority list of commodities which presented sufficient scope and opportunity for this kind of investment. The functional aspect of root and tuber crops is their high nutritive and starch content¹. These characteristics lend themselves to a range of food processing functions, yielding derivatives with a wide range of applications. Some of the main arguments for this are discussed here with the aim of creating a premise for investment and market development for root and tuber products.

¹ Moorthy, S.N. 2000. Application of Tuber Starches in Industry. Central Tuber Crops Research Institute (CTCRI).

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This publication represents a collaborative effort of several institutions and persons led by the Inter-American Institute for Cooperation on Agriculture (IICA), Trinidad and Tobago Office. The idea for the study of the cassava and sweet potato processors in specific Caribbean countries grew out of an initiative by IICA to direct technical assistance, training and support to operators in selected Caribbean countries - Barbados, Dominica, Guyana, Jamaica, St. Kitts and Nevis, St. Vincent and the Grenadines and Trinidad and Tobago. The idea was shaped into a project proposal by IICA with support from the Caribbean Agricultural Research and Development Institute (CARDI) leading to a project under IICA's Competitive Fund for Technical Cooperation (FonTC).

The Coordinators of the project would like to thank the IICA and CARDI focal points and their Country Representatives in the various project countries for their contributions and for ensuring the gathering of quality data in a timely manner. We also wish to acknowledge the contributions of the IICA focal points and Representatives in Brazil, Colombia, Peru and the Concentration Programs - Agribusiness and Commercialization and Agricultural Health and Food Safety who were integral to the process of project design, technical assistance and support to the processors.

Special thanks go out to all the processors, institutions and persons who willingly gave important information in responding to the survey questionnaires.

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- IICA Staff, Trinidad and Tobago Office.

Finally thanks to the Coordinators of the Fund and the Director General for allowing the IICA Trinidad and Tobago Office to draw on its own resources and that of other IICA Offices; the opportunity to strengthen regional and hemispheric integration, horizontal technical cooperation and collaboration across Institutions and Offices in an effort to facilitate an enabling environment for root and tuber processors in the Caribbean Region.

Coordinators

Lisa Harrynanan
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Gregg Rawlins (Project Coordinator)
Representative for Trinidad and Tobago



1

Diamonds in the Rough:

Realising the potential for roots and tubers processing

- 1.0 Introduction**
- 1.1 Responding to Food and Nutrition Insecurity and Increasing Food Prices**
- 1.2 Finding Local Options: Creating New Opportunities**
- 1.3 FOOD+: Realising the Scope for Root and Tuber Products**
 - 1.3.1 Supporting Food and Nutrition Security
 - 1.3.2 Sustainable Economic Development
- 1.4 Market Development – Opportunity, Appeal and Growth Prospects**
 - 1.4.1 Value Added
 - 1.4.2 Growth Factors

1.0 INTRODUCTION

The CARICOM Region has identified cassava (*Manihot esculenta*), sweet potato (*Ipomoea batatas*) and yam (*Dioscorea alata*) as the root and tuber crops with the highest potential for value-added development and for addressing the region's food and nutrition security needs. The specific concern of Caribbean economies is building resilience and capacity to advance food and nutrition security (FNS) in synergy with other development goals. In this context, the importance of root and tuber crops is identified in several of the region's strategy documents for supporting agriculture and rural development, including the CARICOM Regional Food and Nutrition Security Policy, the Inter-American Institute for Cooperation on Agriculture's (IICA's) Caribbean Agricultural Development Strategy 2010-2014 and the Caribbean Agricultural Research and Development Institute's (CARDI's) Medium Term Plans 2008-2010 and 2011-2013 (Commodity Development Programme, Roots and Tubers).

As with the potential of these crops to support local and regional agriculture, there is general agreement on the need for broader cooperation on tackling the persistent challenges that hinder a proper realisation of this potential. On that basis, the efforts of various public and private institutions have been channelled into assessing the suitability of local roots and tubers for various processing activities and technical assistance, training and support to operators in Caribbean territories, as well as supporting access to financial resources. This has been necessary to create, validate and coordinate a production base, as justification for investments in downstream endeavors such as processing and market development. As a result there has been notable progress in advancing the recognition and utilisation of root and tuber crops as a source of food and value-added products (food and non-food). This has also encouraged more extensive technical cooperation between local governments, development agencies and other regional and international partners.

Leveraging these successes, present focus has been put on supporting agro-processors of these commodities and responding to some of their major challenges: knowledge and access to processing technologies; equipment; best practices in production, processing, food safety, and packaging and labeling. This investment has yielded rewards in the form of the advancements made by processors as well as the information generated through these engagements, which is critical to determining the best end-use of the particular root and tuber crop. Chapter 1 of this publication hopes to highlight findings from this process and to present some of the insights that motivate renewed interest and investment.

1.1 RESPONDING TO FOOD AND NUTRITION INSECURITY AND INCREASING FOOD PRICES

Caribbean economies are currently faced with the growing challenge of securing the food and nutrition needs of their citizens. This position is compounded by growing trade imbalances² (i.e. greater spending on imports than earnings from exports), particularly for food, while facing growing national debt. If this trend were to continue, the Caribbean would see a situation where it was no longer able to buy imported foods and other items that their economies rely upon for industry and commerce. In fact, over the last few years, the world food market has been plagued with one of the greatest crises in recent history – that is, the unprecedented dramatic increases in food prices coupled with broader financial and economic instability.

The “official” start of the food price crisis is often cited as circa mid-2006 when most food prices initiated a steep hike in international markets, resulting in prices of essential products such as wheat, corn and rice rising considerably³. This event has in turn prompted negative effects on households and by extension nations worldwide, such as the acceleration of inflation, the reduction of real consumption, food insecurity – especially amongst the poor – and the rise in inequality, among others.⁴ Higher food prices are likely to persist for some time, and governments must act quickly and comprehensively to address those policy aspects of the problem that can be addressed (Stewart 2011⁵).

In addition to this trend, there is also a trend towards deteriorating health, largely linked to poor diet and lifestyle habits. Chronic non-communicable diseases (CNCDs) such as diabetes, hypertension, cancer and respiratory diseases are becoming more common in the Caribbean amongst youth, young adults and the elderly. In similar fashion, this trend too suggests an undesirable future where most of the work force is unable to work and highly dependent on the state to meet increasing health costs. These are issues that affect every aspect of life and development but perhaps more so for agriculture given its essential role in supporting the food industry. Food is essential to human life and well-being, making agriculture similarly essential to sustainable development. In this context, agriculture represents at least part of an effective response to these present challenges which ultimately affect human life and health.

² In fact, over the period 2008 – 2010, the Caribbean earned US\$ 0.46 from food exports for every US\$1.00 spent on food imports. UN Comtrade Database. 2012. Author's compilation.

³ Economic Commission for Latin America and the Caribbean, *The Escalation of World Food Prices and its Implications for the Caribbean* (Santiago, Chile ECLAC Publications, 2008), 1. <<http://www.eclac.cl/publicaciones/xml/9/34779/L.179.pdf>>

⁴ Ibid.

⁵ Stewart, T. 2011. The Global Food Crisis and Trade: Design Better Policies for the Future but Feed the Hungry Today. <http://www.worldcommercereview.com/publications/article_pdf/68>

For agricultural strategies to effect appropriate responses to challenges such as growing food insecurity and rising food prices, they must be, above all, sustainable. Sustainability implies a combined or integrated approach to development where the social, cultural, health-related and monetary/financial aspects are accounted for and able to generate benefits over time for present and future generations. Implicitly, sustainability requires that development be rooted in the local environment and landscape; making full use of available resources and strengths. For countries like ours in the Caribbean which possess few natural resources, maximising the use of all available resources is essential.

In this way, the processing of local commodities, including roots and tubers, presents an opportunity to move closer to domestically driven and sustainable development projects. This approach to local development is more strategic and targets areas where meaningful impacts may be best realized to the benefit of citizens. This is in no way a revolutionary idea, but it is an effective one which the Caribbean can utilize through developing markets and products for root and tuber crops.

1.2 FINDING LOCAL OPTIONS: CREATING NEW OPPORTUNITIES

Root and tuber crops have been traditional foods for the Caribbean. This is perhaps most evident in their prominence in national dishes, at national and cultural festivities and in local agriculture. The cultural context and perception of these crops is strongly associated with Caribbean identity and the Caribbean people. In the same way, as these perceptions and identities expand, become more defined and sophisticated, so too will the association with these traditional foods. Modern Caribbean consumers have become more in-tune with a 'quick, easy, tasty and nutritious' approach to food preparation and consumption - both in and outside of the home. Whereas this has traditionally been seen as a shift in preference towards imported food products over local alternatives, it is perhaps more a reflection of sophistication in consumer tastes and production realities. It also presents an opportunity for adjusting local foodstuffs to accommodate and capitalize on new avenues created by these changes.

This really forms the basis for the keen interest in and focus on processing of local products, including roots and tubers; an opportunity to expand the scope of utility of products which are locally available, locally acclimatized, suitable for multiple levels of processing and for which specific local knowledge and expertise in both production and utilisation already exist. What this means for Caribbean entrepreneurs is an opportunity to use locally available resources in new or improved products and processes. The importance of developments such as this has already been recognized, in the Regional Food and Nutrition Security Policy and Action Plan (RFNSP+AP) as well as the Action Plan for Promotion of a Regional Agribusiness Sector and Targeted Commodity Enterprises, as critical to gaining equity with

consumers and improving the utilization of commodities for which Caribbean economies have production advantages.

Consumption and utilization is perhaps the most vital pillar of food and nutrition security (FNS) as it creates 'pull' in food chains and thus informs important elements of an agri-food development strategy such as the kinds of products consumers are interested in, as well as the coordination required through production to marketing. It is also a literal gold-mine for new product development for willing entrepreneurs.

1.3 FOOD+: REALIZING THE SCOPE FOR ROOT AND TUBER PRODUCTS

REDD+ is a term that refers to the extra effort being put into Reducing Emissions from Deforestation and Forest Degradation (REDD). In this way REDD+ goes beyond REDD's focus on deforestation and forest degradation to include the role of conservation, sustainable management of forests and enhancement of forest carbon stocks (UN-REDD [2009](#)⁶). In the same way the regional consensus on going beyond primary production for agriculture and rural development by utilizing the integration of the agri-food system with the broader economy, as the driver for expansion and innovation into downstream applications - conceptualized here as FOOD+ - seeks to apply the concept for sustainable development of value-added products from roots and tubers.

The functional aspect of root and tuber crops is their high nutritive and starch content⁷. These characteristics lend themselves to a range of food processing functions, yielding derivatives with a wide range of applications. Some of the main arguments for this are discussed here with the aim of creating a premise for investment and market development for root and tuber products.

1.3.1 Supporting Food and Nutrition Security

1.3.1.1 Combating the Effects of Poor Diet and Health

As sources of food, roots and tubers are outstanding (Table 1). In addition to producing remarkable quantities of energy per day, even in comparison to cereals (Scott et al. [2000](#)⁸), the consumption of these crops has long been associated with distinct health benefits due to the ample amounts of Vitamin A, Vitamin C, protein, fiber, and many essential nutrients which they possess. For example, sweet potato has a comparatively high content of vitamins A, C and antioxidants that can help

⁶ UN-REDD Programme. 2009. About REDD+. <<http://www.un-redd.org/aboutredd/tabid/582/default.aspx>>

⁷ Moorthy, S.N. 2000. Application of Tuber Starches in Industry. Central Tuber Crops Research Institute (CTCRI).

⁸ Scott, G. J., Rosegrant, M.W., and Ringler, C. 2000. Roots and Tubers for the 21st Century: Trends, projections, and Policy Options. International Food Policy Research Institute (IFPRI). <<http://www.ifpri.org/sites/default/files/pubs/2020/dp/2020dp31.pdf>>

prevent heart disease and cancer, enhance nutrient metabolism⁹, bolster the immune system and even slow aging by promoting good vision and healthy skin. It is also an excellent source of copper, manganese, potassium, iron and vitamin B-6.

Table 1: Raw Material and Nutritional Characteristics of Major Root and Tuber Crops

Characteristic	Cassava	Sweet Potato	Potato	Yam	Aroids
Dry matter (%)	30-40	19-35	20	28	22-27
Starch (% FW)	27-36	18-28	13-16	18-25	19-21
Total sugars (% FW)	0.5-2.5	1.5-5.0	0-2.0	0.5-1.0	2.0
Protein (% FW)	0.5-2.0	1.0-2.5	2.0	2.5	1.5-3.0
Fiber (% FW)	1.0	1.0	0.5	0.6	0.5-3.0
Lipids (% FW)	0.5	0.5-6.5	0.1	0.2	0-1.5
Vitamin A (mg/100 g)	17	900	Trace	117	0-70 iu*
Vitamin C (mg/100 g)	50	35	31	24	9
Ash (% FW)	0.5-1.5	1.0	1.0-1.5	0.5-1.0	0.5-1.5
Energy (kJ/100 g)	607	490	318	439	390
Anti-nutritional factors	cyanogens	trypsin inhibitors	solanine	alkaloids, tannins	oxalates
Starch extraction rate (%)	22-25	10-15	8-12	n.a.	n.a.
Starch grain size (micron)	5-50	2-42	15-100	1-70	1-12
Amylose (%)	15-29	8-32	22-25	10-30	3-45
Max. viscosity (BU)	700-1,100	n.a.	n.a.	100-200	n.a.
Gelatinisation tem. (°C)	49-73	58-85	63-66	69-88	68-75

* iu = international unit where 1 iu = 0.3 µg retinol or 0.6 µg beta-carotene

Source: (Wheatley et al. 1995)

Furthermore, cassava has been touted as a millennium crop (Ospina and Ceballos 2012¹⁰) and in Africa, and other parts of the world where it is grown, is being looked to support food security and food innovations for the coming years (Aerni 2005¹¹). More than half the production of roots and tubers in fresh form is for human consumption (Wheatley et al. 1995¹²). Through the long tradition of human consumption, precautionary measures for dealing with some of their anti-nutritional factors (Table 1) have been developed.

⁹ Men's Health. 2012. 40 Foods with Superpowers. <http://www.menshealth.com/mhlists/nutritious_foods_for_a_healthy_body/immunity_booster_sweet_potatoes.php?page=1>

¹⁰ Ospina, B. and Ceballos, H. 2012. Cassava in the Third Millennium: Modern Production, Processing, Use and Marketing Systems. CIAT, CLAYUCA and CTA. Cali, Colombia.

¹¹ Aerni, P. 2005. Mobilizing Science and Technology for Development: The Case of the Cassava Biotechnology Network (CBN). 9th ICABR International Conference on Agricultural Biotechnology. Ravello (Italy), 2005.

¹² Wheatley, C., Scott, G. and Best, R. 1995. Adding Value to Root and Tuber Crops: A Manual on Product Development. The International Center for Tropical Agriculture (CIAT).

1.3.1.2 Supporting Household-level Resilience to Food and Nutrition Insecurity

Many of the developing world's poorest producers and most undernourished households depend on roots and tubers as a contributing, if not principal, source of food and nutrition (Scott et al. 2000). These crops are efficient in their production of food energy per calorie of labour input (Hahn et al. 1979¹³), tolerant to extreme stress conditions as well as being suited to local farming conditions (from small-scale to commercial) making them good choices for combating food insecurity at multiple levels but particularly at the micro/household level. Root and tuber crops are a traditional part of life for many people around the world, including the Caribbean.

1.3.2 Sustainable Economic Development

1.3.2.1 Reducing Foreign Expenditure on Imports

Most root and tuber crops – especially cassava and sweet potato - can be substituted in virtually any recipe that calls for apples, squash or white (Irish) potatoes¹⁴. In addition, through new food processing techniques, they can also replace the use of corn and wheat in everything from pasta to breakfast cereals. Even small inroads in these areas could contribute to reducing CARICOM's escalating food import bill while also supporting sustainable, competitive industries at home.

Some of the important product categories that CARICOM could pay attention to are detailed in **Section 1.4**.

1.3.2.2 Supporting Competitive Industry Development

The entire food system, including the production of primary goods and commodities, marketing and retailing, accounts for more than 50% of developing countries' GDP (IFAD 2008¹⁵). However, value-addition accounts for the greatest proportion of the value of food items purchased by consumers. Globally, agro-industries occupy a dominant position in manufacturing, and can represent as much as 61% of total manufacturing in agriculture-based countries (IFAD 2008¹⁶). Further, productivity levels in food processing are typically on average or above the manufacturing average, making this one of the more efficient economic sectors in least developed countries (IFAD 2008). Consequently, incremental investments in this sub-sector are

¹³ Hahn, S.K. et al. 1979. Cassava Improvement in Africa. Field Crops Research, 2, 193 - 226.

¹⁴ Wayne E. Bailey Produce Company. 2012. Sweet Potatoes.
<<http://www.sweetpotatoes.com/About/SweetPotatoFacts.aspx>>

¹⁵ IFAD. 2008. The Importance of Agro-Industry for Socio-economic Development and Poverty Reduction. International Fund for Agricultural Development. <<http://www.ifad.org/events/csd/csd.pdf>>

¹⁶ Wilkinson, J. and Rocha, R. 2008. Agro-Industries Trends, Patterns and Development Impacts. <http://www.gaiif08.org/content/agro-industry_trends_brief.pdf>

posited as having substantial potential benefit to the overall competitive position of developing countries (IFAD 2008).

1.3.2.3 Supportive Policy Initiatives

As noted at the beginning of this chapter, the policy space that encourages commercialization and value addition to agricultural products already exists for the Caribbean. What remain outstanding are more facilitating processes for strategy implementation and creation of the infrastructure (soft and hard) needed to effectively manage/coordinate activities.

1.4 MARKET DEVELOPMENT – OPPORTUNITY, APPEAL AND GROWTH PROSPECTS

1.4.1 Value Added

Caribbean cassava and sweet potato producers have traditionally delivered primary products for fresh consumption. However, the true potential of roots and tubers may be unlocked through value-adding activities. As Figure 1 shows, this represents a very diverse range of products. At the level of production there are opportunities in utilization of leaves and vines as well as the root/tuber for human or livestock consumption, as well as in supplying planting material to commercial producers. The processing level is divided into two broad areas identifying primary/first processing and secondary processing products (usually derived from outputs of the primary processed level).

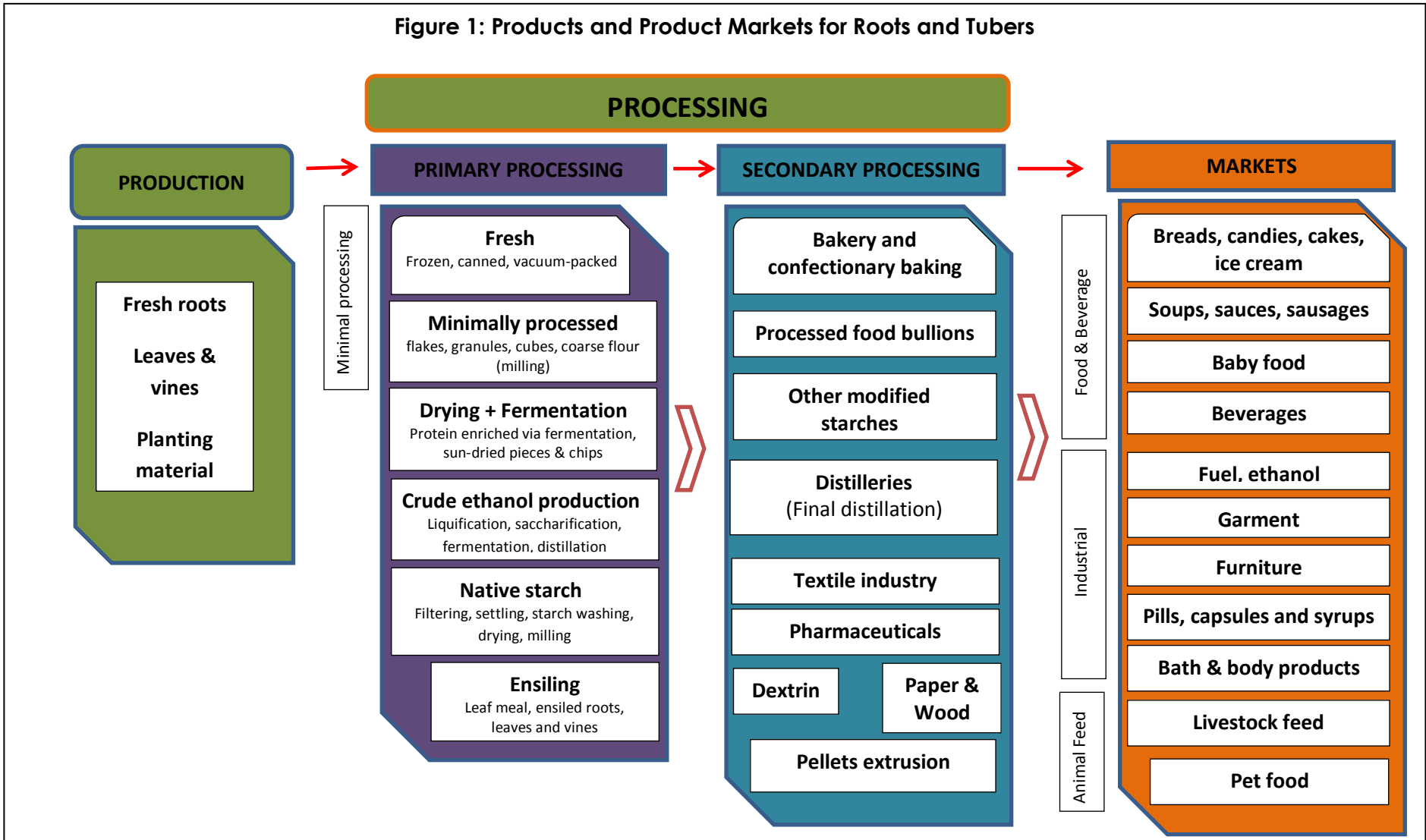
Although food options are quite diverse for root and tuber crops, there are still more non-food opportunities. This diversity creates a large market space within which CARICOM processors can make long-term development plans, supported by growth prospects for investment in the commodities.

Important food market segments that should be considered include:

1. **Inputs for local food industries [HS 92 – 21: Miscellaneous edible preparations (sauces, ice cream, yeast, food preparations, not elsewhere specified)]** which is a high area of import spending for CARICOM (avg. US\$ 273.8 million over 2008-2010¹⁷) and for which there is already a productive sector (over the same period CARICOM exported US\$ 42.6 million worth of products in this classification).

¹⁷ UN Comtrade Database. 2012. Author's compilation of HS 92: 21. [HS stands for harmonized system; 92 stands for 1992; 21 stands for the respective selected commodity]

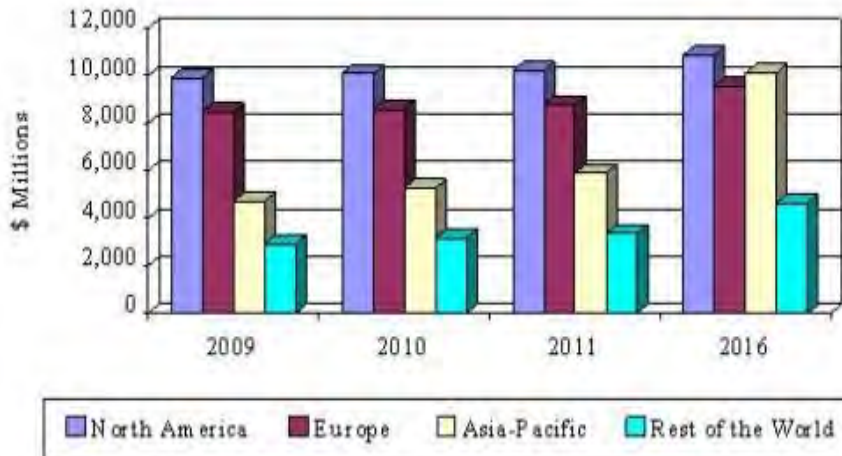
Figure 1: Products and Product Markets for Roots and Tubers



Source: Adapted from Government of Nigeria (2006) and Wheatley et al. (1995)

- II. **Inputs for further food processing [HS 92 – 23: Residues, wastes of food industry (including animal feed preparations)]** which accounted for US\$ 159.8 million of CARICOM's imports over 2008-2010¹⁸. With respect to animal feed, the high efficiency of roots and tubers in producing dry matter [in fact, cassava and sweet potato out-yield the cereals in dry matter production per unit area (Wheatley et al. 1995)] make them an interesting option for inclusion in animal feed formulations.
- III. **Cereals and Cereal foods [HS 92 – 10 and 1904]** which accounted for, on average, US\$427 million of CARICOM's imports over the period 2008-2010¹⁹.
- IV. **Baby foods** which represented a US\$ 28.2 billion global industry in 2011 (BCC Research LLC 2012²⁰) and is expected to reach up to US\$ 35.2 billion in 2016 (Figure 2) fuelled by population growth (with expected compound annual growth rate of 4.5%). Moreover, this is mainly expected in markets where CARICOM has good presence; the developing world (inclusive of CARICOM itself) where root and tuber crops are already known and widely used, as well as in North American and European markets with which CARICOM has favourable trade agreements (Figure 2).

Figure 2: Global Markets for Baby Foods



Source: BCC Research LLC 2012

Non-food product categories also offer several attractive segments for root and tuber crops. These include:

¹⁸ Ibid. Author's compilation of HS 92: 23.

¹⁹ Ibid. Author's compilation of HS 92: 10 and 1904.

²⁰ BCC Research. 2012. Global Baby Food Market to Reach \$35.2 Billion in 2016. <<http://www.bccresearch.com/pressroom/report/code/FOD046A>>

- i. **Pharmaceuticals and health care products** inclusive of liquid glucose, modified starches²¹, vitamin C and maltodextrins.
- ii. **Bath and body products** where sweet potato, more than cassava, is being featured in face and body scrubs, bubble-bath solutions and creams. The desirable traits include the nutritive value of the pulped flesh, as well as its aroma and colour. Also, vegan and other consumers preferring bath and body products without synthetic ingredients represent a market segment for which root and tuber crops present a natural and suitable alternative.
- iii. **Industrial products** including biodegradable plastics, ethanol, textiles and adhesives. These are important elements of the manufacturing sector, and in this way can support local industries and their competitiveness through broader integration with agri-food systems.

1.4.2 Growth Factors

Figure 3 presents some of the major trends and initiatives in the global value chain which indicate the growth prospects for root and tuber products. These are highlighted at the stages in the value chain where they most impact and at which they perhaps most encourage investment.

In general, the trends emphasize recent developments in the domestic and international environment – including market and consumer preference factors – which motivate continued/new investment in product and market development. Throughout the agri-food chain and value chain, combinations of factors/drivers are contributing to this.

The main drivers of these opportunities identified in Table 2 are endemic/indigenous advantages which speak to local options that give an advantage and support sustainability; technological advances which expand the productive potential for utilizing roots and tubers; consumption trends/patterns which create market/marketing opportunities for products derived from root and tuber crops; market access criteria which are important to market participation; and value chain coordination which identifies motivating factors for broader cooperation amongst value chain actors. It also includes aspects of the enabling environment together with the elements of the value chain.

²¹ "The properties of cassava and sweet potato demonstrate the untapped potential of cassava and tuber based starches for use in food and non-food applications previously dominated by cereal starches." Nuwamanya, E., Baguma, Y., Wembabazi, E. and Rubaihayo, P. 2011. A Comparative Study of the Physiochemical Properties of Starches from Root, Tuber and Cereal Crops. <<http://www.academicjournals.org/ajb/PDF/pdf2011/26Sep/Nuwamanya%20et%20al.pdf>>

Perhaps the largest area for focus is the advances in food processing technology and processes. While the majority of these processes have been traditionally used (e.g. blanching, fermentation, etc.), food extrusion is a process in which a food material is forced to flow, under one or more varieties of conditions of mixing, heating and shearing, through a die, which is designed to form and/or puff-dry the ingredients (Rossen and Miller 1973). Essentially, extrusion offers a way to modify starch so that it can be used in a wider variety of ways. This greatly expands the range of possible products from root and tuber crops, while addressing the highly perishable nature of their fresh forms by increasing shelf life in the process. Future investments in food are expected to focus heavily on process; aiming at increasing the range of product offerings available to consumers while maintaining food safety, quality and nutritive benefit.

Figure 3: Indicative Trends and Initiatives in the Global Value Chain for Growth Prospects for Roots and Tubers



1. INPUTS

- Improved methods for developing and supplying genetic/ propagative material;
- Improved propagation techniques;
- Response to consumer requests for more environmentally friendly inputs;



2. PRODUCTION

- Increased use of inputs in production processes;
- Increased mechanisation (e.g. In planting, harvesting & post-harvest);
- Improved capacity to supply high volumes required by industry;
- Increasing trend for subcontract/cluster farmer production;
- Increased cooperation with buyers/processors;



3. PROCESSING & DISTRIBUTION

- Shift from traditional to industrial type processing;
- Growing mechanisation and technological sophistication;
- Clustering of small-scale processors for collaborative negotiating and meeting market demands;
- Small & medium-scale food and animal feed industry processors using more efficient technologies;
- Increased compliance with food safety requirements;



6. FEEDBACK LOOPS

- Recyclable/re-usable packaging for fresh/ready-to-consume products;
- Greater concern over the 'impact' of purchase – link to social/ welfare/ environmental benefits;
- Growing interest in health and wellness and how food contributes to this;



5. CONSUMPTION

- Considerable interest in highly diversified product offerings
- Consumer demand for quality and safety certification;
- Consumer demand for high product standard;



4. MARKETING

- Large emerging global market demand for diversified R&D-based products;
- National and international policy focus/support on FNS and stabilising local economies – increasing domestic demand and market potential;
- Increasing scope in animal feed, industrial food ingredient markets;
- Coverage (primary and processed) under scope of major trade agreements (e.g. EU-ACP EPA, CARIBCAN).

Source: Adapted from *Cassava Master Plan: A Strategic Action Plan for the Development of the Nigerian Cassava Industry (2006)*

Table 2: Factors Driving Opportunities for Root and Tuber Commodities

Elements of the Value chain	Factors Driving Opportunities				
	<i>Endemic Advantages</i>	<i>Technological Advances</i>	<i>Consumption Trends</i>	<i>Market Access</i>	<i>Value chain Coordination</i>
Inputs					
	- Acclimatized and indigenous genetic material	- Improved methods for developing & supplying genetic/propagative material	- Response to consumer requests for safer, more environmentally-friendly inputs	- Increasing awareness and leveraging of GAPs and food safety principles for market participation	
Production					
	- Number of processable local varieties	- Availability of customised equipment - Increased mechanisation (e.g. in planting, harvesting & post-harvest)		- Access to global markets through trade agreements	- Forward linkages with processors - Increasing trend for subcontract/cluster farmer production - Increased cooperation with buyers/ processors
Processing & Distribution					
		- Growing mechanisation and technological sophistication - Use of more efficient technologies		- Access to global markets - Clustering of small-scale processors for collaborative	- Backward linkages with farmers

Elements of the Value chain	Factors Driving Opportunities				
	<i>Endemic Advantages</i>	<i>Technological Advances</i>	<i>Consumption Trends</i>	<i>Market Access</i>	<i>Value chain Coordination</i>
				negotiating and meeting market demands	
Marketing					
			- Large emerging global market demand for diversified R&D-based products	- Policy focus/support to FNS and stabilising local economies - increasing domestic demand and market potential - Scope for market development within trade agreements (e.g. EU-ACP EPA, CARIBCAN)	
Consumption					
	- Traditional consumer base		- Interest in highly diversified product offerings - Demand for quality and safety		
Feedback Loops					
	- High support for "eat local"		- Preference for products which have		- Growing concern over how food is produced,

Elements of the Value chain	Factors Driving Opportunities				
	<i>Endemic Advantages</i>	<i>Technological Advances</i>	<i>Consumption Trends</i>	<i>Market Access</i>	<i>Value chain Coordination</i>
			meaningful 'impacts' - Growing interest in health and wellness		by whom and having an affinity with the producer(s)
Enabling Environment					
	-Continued investment in exploring/assessing genetic potential of endemic species	-Joint research initiatives for process and product innovations	-New investments in collating and disseminating consumer/market intelligence	- Improved food safety management systems (GAP, GHP,SPS, HACCP)	- Advancements in capacities to provide training & market intelligence



2 What's Going on: Profiles of Root and Tuber Processing in 7 Caribbean Countries

2.0 Introduction

2.1 Overview of Processing Activities in the Countries Surveyed

2.1.1 Technological Innovations

2.1.2 Food Safety Management

2.1.3 Business Development for Small Entrepreneurs

2.1.4 Product Development

2.2 Country Profiles

2.2.1 Barbados | 2.2.2 Dominica | 2.2.3 Guyana | 2.2.4 Jamaica |

2.2.5 Saint Kitts and Nevis | 2.2.6 Saint Vincent and the Grenadines

2.2.7 Trinidad and Tobago

2.0 INTRODUCTION

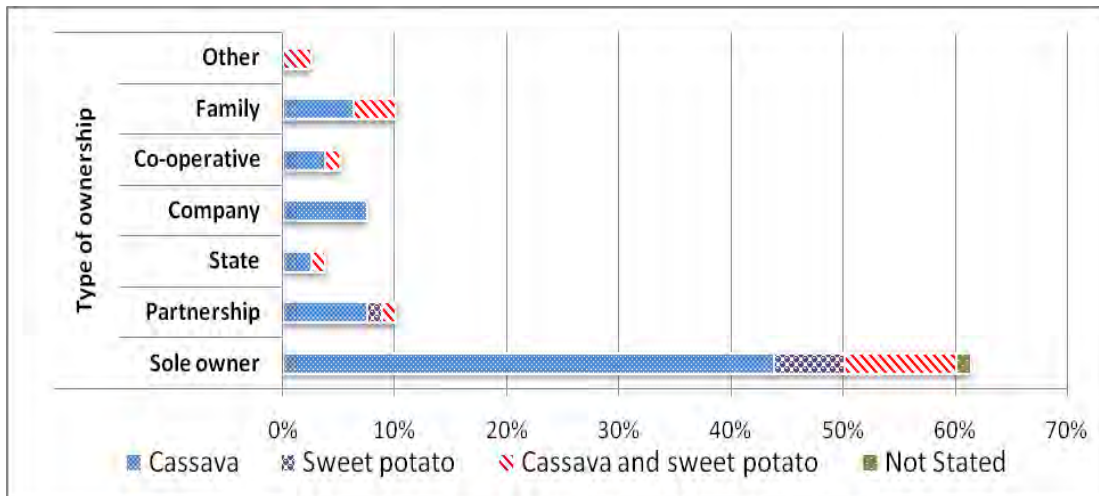
In 2012, the Inter-American Institute for Cooperation on Agriculture (IICA), together with other development partners undertook a survey in seven Caribbean islands to ascertain the nature of operations, the business environment, accessible support services and institutions and preferred support (including training in technical areas and capacity building) for processors of cassava and sweet potato. The target countries in this study were Barbados, Dominica, Guyana, Jamaica, St. Kitts and Nevis, St. Vincent and the Grenadines and Trinidad and Tobago. The findings of this survey form the basis for the profiles presented in this chapter and seek to give a concise overview of the present situation in each country which would inform both processors and support institutions (private and public) on areas where cooperation and investment may best be directed. In this way, it provides an initial table-item for future cooperative actions.

This chapter presents firstly an overview of the processing activities in the seven countries surveyed and highlights the main findings. This is followed by individual county profiles (presented in alphabetical order) which give further details on the unique characteristics of processors surveyed in each country.

2.1 OVERVIEW OF PROCESSING ACTIVITIES IN THE COUNTRIES SURVEYED

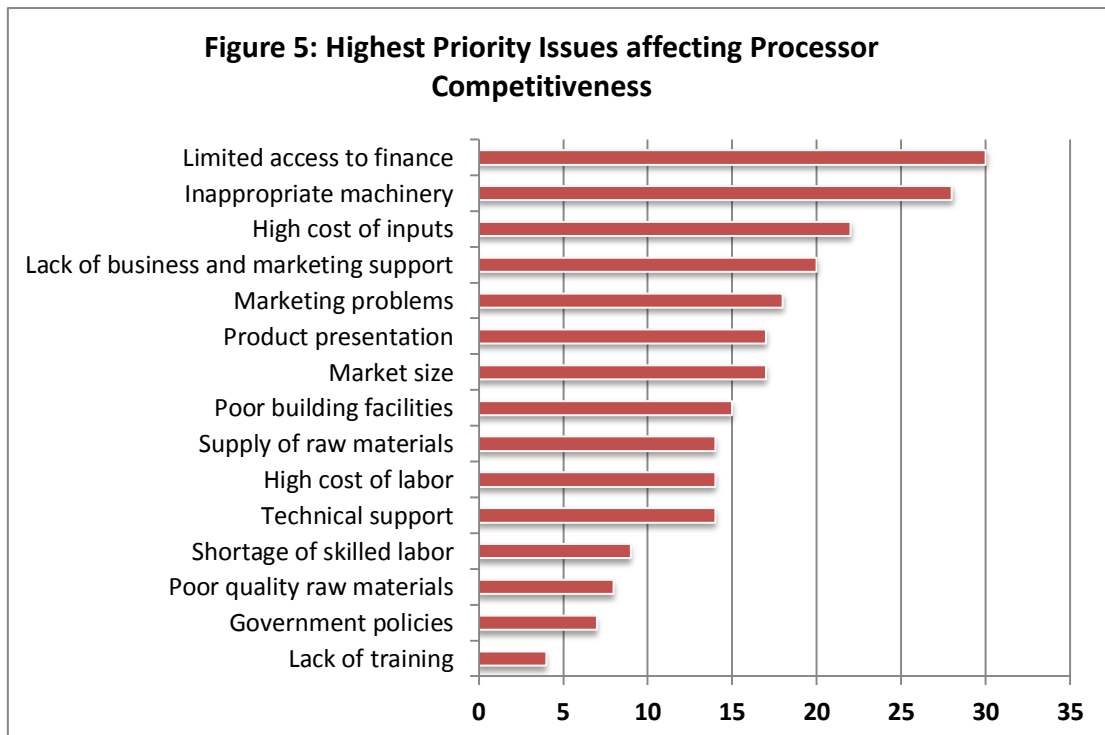
Overall, the processing activities of Caribbean processors/operators are focused on cassava. Most operators, (71.3%) process only cassava with 20% processing both cassava and sweet potato and just 7.5% processing only sweet potato. The majority of these processing enterprises (56%) exist as sole ownerships, partnerships and family enterprises (i.e. micro-enterprises) with 0-2 employees (Figure 4). Although many of the owners/managers/senior-level staff had not received much formal education (often not going beyond the primary school level), they tended to be highly experienced in processing: most often for 11 years or more. In general this experience was comprised of learning traditional processing methods (62.5%) and training in food processing and food safety. The greater proportion of processors operate out of a separate, dedicated processing space at home (31%), dedicated facility space away from the home (28%) or in a home kitchen (28%). Micro-enterprises (i.e. sole ownerships, family businesses and partnerships) were mainly based in the home kitchen or a separate and dedicated processing space at home.

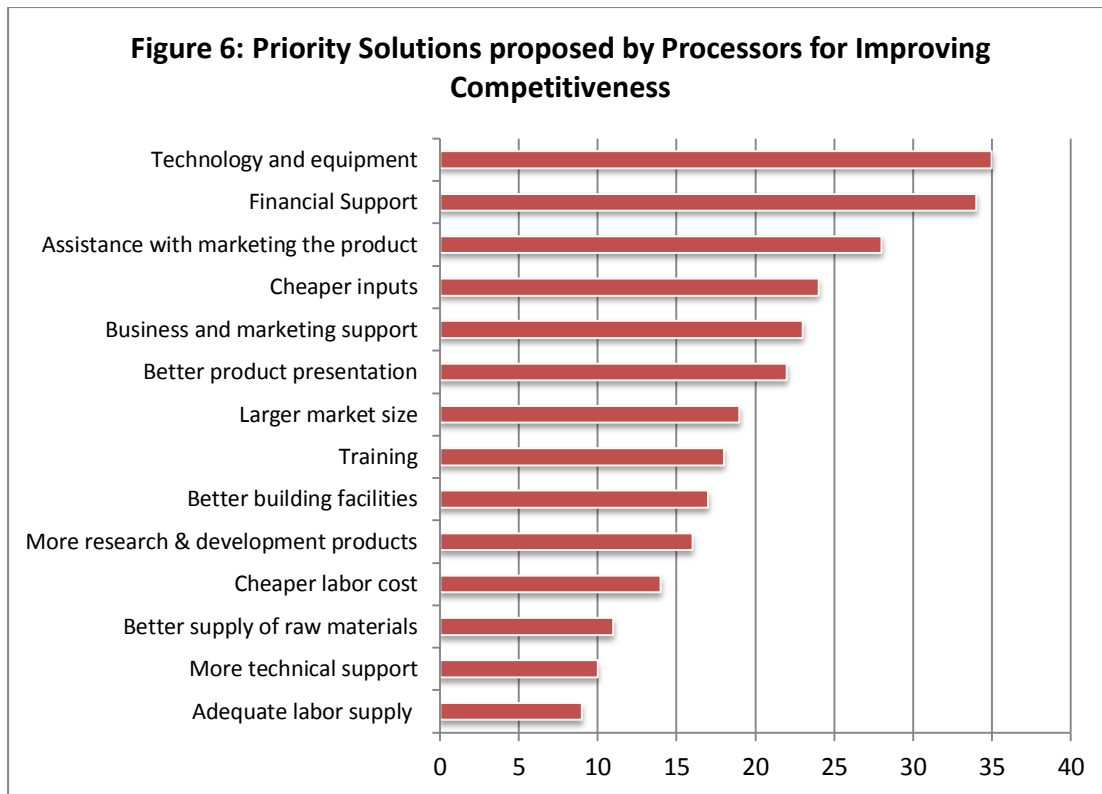
Figure 4: Distribution of Cassava and Sweet Potato Processors by Type of Ownership



Larger enterprise forms (i.e. companies, state-owned enterprises and cooperatives) used dedicated facilities away from the home. Communal facilities were in the minority (11%). Although the majority of processors reported that their enterprises were profitable (82% of cassava processors and 80% of sweet potato processors), there were several indicators of unrealised potential, validated by the stated concerns/hindrances to operations (Figure 5), as well as the preferred/recommended solutions offered by processors (Figure 6).

Figure 5: Highest Priority Issues affecting Processor Competitiveness





These responses as well as the auxiliary data captured through the survey, allowed for a categorisation of responsive strategies around four broad thematic areas. These are highlighted here with additional elements related to these presented in the last chapter on **Intervention Points**:

2.1.1 Technological Innovations

There is clear evidence of a need for both physical and process innovations in specific areas where a combination of mechanization and system re-design could make meaningful improvements (Table 4).

These include:

A. Physical innovations

- i. Development of cultivars of cassava and sweet potato that yield more uniform tuber size and which can be more easily peeled;
- ii. Micro-enterprise mechanization options for primary activities (e.g. cleaning/washing, peeling, cutting, grinding or milling).

B. Process innovations

- i. Improvements in quality control;
- ii. Better production process management.

Table 4: Priority Improvements desired by Cassava and Sweet Potato Processors based on Responses (% in parentheses)

A. Production Process	B. Management of Operations
Labeling and packaging (67.5%) Food safety (61.3%) More efficient peeling process and greater mechanization of operations (60% each) More research into (new) product development (57.5%)	Training in best practices and innovation (58.8%) Working capital and financial management (48.1%)
C. Building/Facility	D. Equipment
Upgrading facilities to food safety standards (53.8%) Expanding the existing structure (46.3%)	More use of advanced equipment/technology (73.8%) Equipment/technological training (60%)

2.1.2 Food Safety Management

Food safety should be communicated as the foundation for business/ enterprise development as it influences consumer perception/acceptance as well as market access and participation. However, processors had comparatively less capacity in this area as compared to food processing. As a result, specific attention is recommended for interventions in this area as most processors operate out of home kitchens and/or special facilities at home.

2.1.3 Business Development for Small Entrepreneurs

This area of focus recognizes that business development skills necessitate training in areas of production management and financial management as well as in marketing and business sophistication, in addition to continued capacity building in food processing and food safety. This was validated by processor response on the main hindrances to improving their competitiveness, amongst which marketing challenges, product presentation and business and market development weaknesses ranked high. Processors expressed a strong demand (Table 5) for training courses in areas related to food safety, product quality and product acceptance in the targeted market (Table 4). Training in food safety (72%), packaging and labeling (70.6%) better positioning the business within the food industry (69.4%), good manufacturing practices (67.1%), agro-processing machinery and equipment handling (66.8%), and meeting export market requirements (63.9%) generated the greatest interest (Table 5). These considerations are also important to ensuring that business support interventions and the delivery mechanisms adopted for these yield the maximum utility.

Table 5: Percentage Distribution of Responses on Training Courses that Respondents are “Interested and Willing” to take

Country	Topical Areas for Training								
	Product processing	Product quality	Better positioning business within food industry	*GAPs	*GMPs	Food safety	Agro-processing machinery & equipment	Exporting to EU,US, regional markets	Packaging & labeling
Barbados	80.0%	60.0%	100.0%	60.0%	100.0%	80.0%	80.0%	100.0%	100.0%
Dominica	71.4%	78.6%	71.4%	85.7%	85.7%	85.7%	42.9%	50.0%	85.7%
Guyana	95.0%	95.0%	95.0%	75.0%	95.0%	95.0%	95.0%	70.0%	95.0%
Jamaica	14.0%	18.6%	18.6%	7.0%	14.0%	16.3%	14.0%	11.6%	11.6%
St. Kitts & Nevis	80.0%	80.0%	80.0%	50.0%	80.0%	80.0%	80.0%	80.0%	80.0%
St. Vincent & the Grenadines	80.0%	80.0%	86.7%	86.7%	80.0%	86.7%	80.0%	86.7%	86.7%
Trinidad & Tobago	51.9%	44.4%	55.6%	37.0%	48.1%	63.0%	66.7%	55.6%	55.6%
Trinidad	41.2%	41.2%	47.1%	29.4%	41.2%	41.2%	52.9%	41.2%	41.2%
Tobago	70.0%	50.0%	70.0%	60.0%	60.0%	100.0%	90.0%	80.0%	80.0%
AVERAGE	64.8%	60.9%	69.4%	54.5%	67.1%	72.0%	66.8%	63.9%	70.6%

*GAPs – Good Agricultural Practices; GMPs -Good Manufacturing Processes

2.1.4 Product Development

Processors - especially sweet potato processors – have a narrow product range. Interestingly, many of these processors have experienced receiving special requests to develop new products (44% and 30% of cassava and sweet potato processors, respectively). Coupled with the reports of excess/unmet demand for their products (48% and 73% for cassava and sweet potato, respectively), this is a strong motivator for renewed investments in product development. However, most of those receiving these requests are micro-enterprises (specifically, sole ownerships) which may lack the critical skills and facilities needed to experiment in new product development, testing and validation.

There is also a need to improve product sophistication. First-line interventions should focus on packaging and labeling practices (improving product presentation) together with processor registration with appropriate food regulatory authorities (62% of processors were not registered) as a prerequisite for market development (local and export). With these systems in place, focus could then be given to developing and introducing more sophisticated, secondary-processing commodities which have commercial/industrial potential (e.g. livestock feed, processed food, bouillons and modified starches, flour and bakery products and health and wellness).

2.2 Country Profiles

The Individual island profiles are now presented. Variety names and other country-specific descriptors were supplied by the respondents to the survey and are reported as given.

3. PROCESSING

- Adequate volumes of raw material (cassava + sweet potato) for processing needs = between 151-200 lb (combined SP&cassava) & >1,000 lb (cassava)
- Cassava = white butter + white skinned;
- Sweet potato = red skinned;
- Cassava product range = flour (fine), logs (whole, peeled & frozen);
- Sweet potato product range = flour, konki
- Product diversity can be improved for both cassava and sweet potato:
 - Cassava = 6/17;
 - Sweet potato = 2/6

**2.2.1 BARBADOS****4. MARKETING & DISTRIBUTION**

- ¼ processors surveyed have a registered brand. Reliance on word-of-mouth to promote products;
- More diverse markets for cassava than sweet potato;
- Primary markets = supermarket and local fresh market;
- Preferred export markets: US, Canada, CARICOM

2. PRODUCTION

- Production and productivity (t/ha) average:
 - Cassava: 1,316 t/yr on 107 ha = 12 t/ha;
- Sweet potato: 335 t/yr on 50 ha = 6 t/ha;
- Falling yields and productivity (t/ha) for sweet potato (2005 - 2010);
- Falling productivity (t/ha) but increasing yields for cassava (2005-2010)

Highlights

- 4 processors surveyed;
- Processing of both cassava + sweet potato
- Processors' pick:
 - cassava: 'white butter', 'white skinned' (butter);
 - sweet potato: 'red skinned';
- Preferred products:
 - cassava: fine flour, cassava logs (whole, peeled & frozen), cassava biscuit/cookies;
 - sweet potato: flour, konki;
- Most processors consider their operations profitable

5. CONSUMPTION & FEEDBACK LOOPS

- Usually experience excess demand for at least part of the year;
- Consumers occasionally make special/new product requests of the processor

1. INPUTS

- Planting material is readily available locally

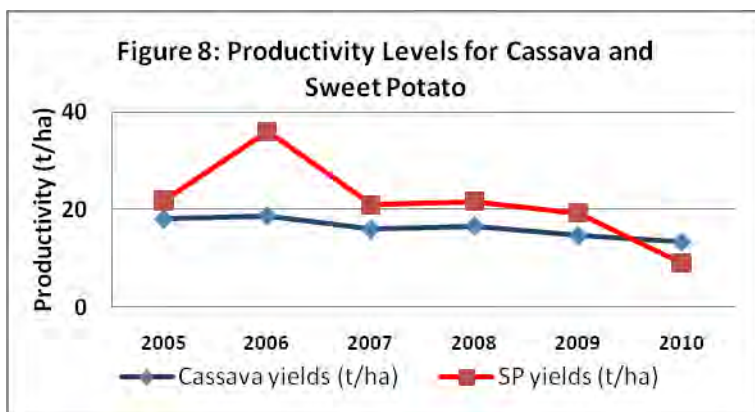
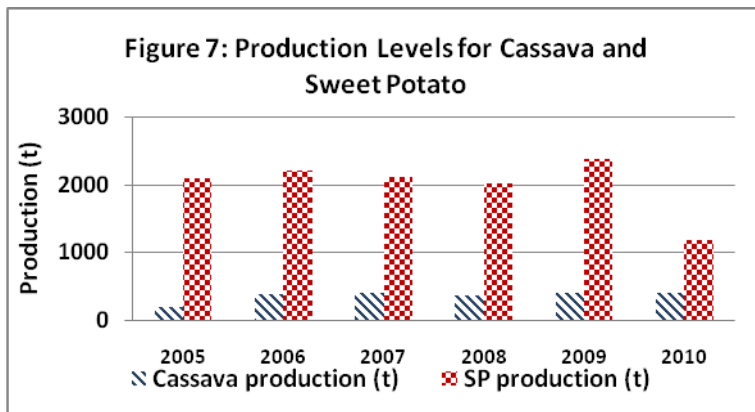


BARBADOS

2.2.1.1 Overview of the Business and Marketing Environment

The majority of enterprises surveyed in Barbados were small, sole-proprietor businesses operating out of the home. All of these enterprises were started within the last decade. Just one is not a registered enterprise, and only one does not have a registered brand. On average there is one head/supervisor and between 2 and 5 employees working in various or all aspects of the processing. There is also a noted reliance on unpaid labour, probably from a mixture of young and elderly family members, friends and/or neighbours²².

Typically, the head/supervisor has upwards of 5 years of experience in processing learned through his/her own initiative as opposed to traditional apprenticeships or formal training (even where these were available). The manager and technical staff primarily rely on private institutions for training. As these are small operators, most of the processing activities occur in the home kitchen. The Barbados Agricultural Development and Marketing Corporation (BADMC) is the exception with a specific facility for processing.



Barbados meets just about 99% of its cassava and sweet potato consumption from local production. Traditionally, more sweet potato (SP) than cassava has been produced in Barbados (Figure 7). Also, sweet potato producers have traditionally been more productive – averaging at 24 t/ha as compared to 17 t/ha for cassava (Figure 8). However, where cassava productivity has remained fairly constant (cassava productivity fell by 8% in 2010 from the 2009 level even though production increased by 5 t), sweet potato has seen a more drastic decline. Sweet

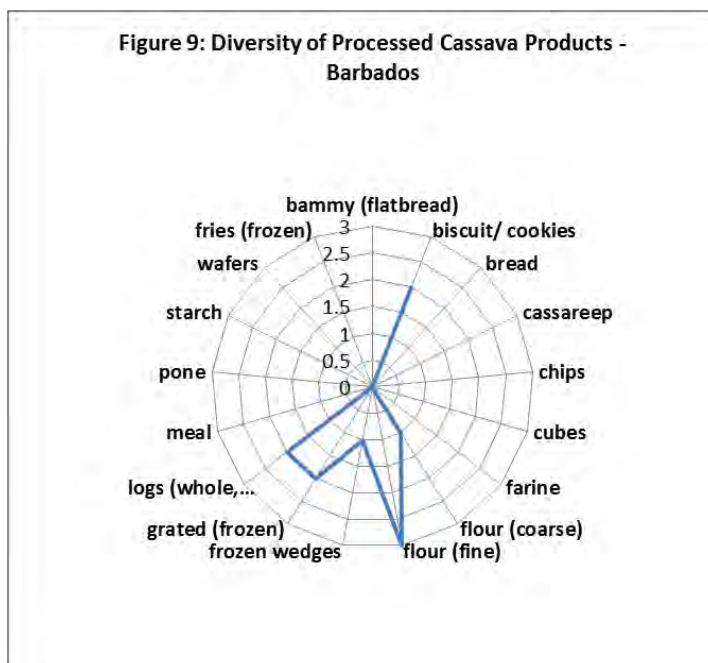
²² Unpaid males 41-50, 30 years of age and under

potato productivity fell by 53% in 2010 – matching the fall in production levels.

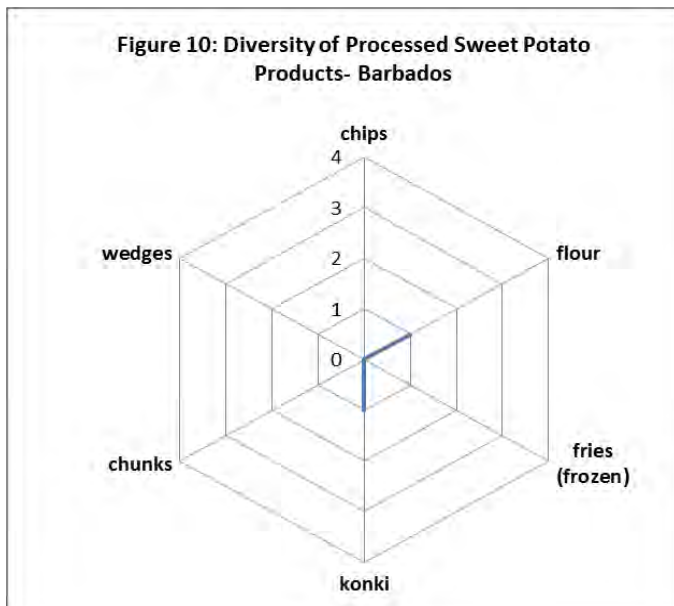
All processors surveyed indicated that although they have a ready market, they are not able to meet demand for both their cassava and sweet potato products for at least part of the year. There then seems to be scope for improving on the scheduling/scale of processing activities to meet this excess demand. Interestingly, while processors report that there is excess demand for both sweet potato and cassava products (for at least part of the year), their level of in-take of raw materials for processing remains rather low.

The majority of the surveyed processors purchase on average between 151-200 lb of both cassava and sweet potato each month. The state enterprise, the BADMC was an exception and indicated that it required over 1,000 lb of both cassava and sweet potato per month for its operations. The main varieties of cassava being purchased for processing were the White Butter and White Skinned cassava. The Red Skinned sweet potato was the only variety being used by the processors surveyed.

All processors indicated that they receive adequate supplies of both cassava and sweet potato. Processors sourced the majority of their raw material from a few main sources. The most popular were middle men, contract farmers, the local wholesale market and their own farms. Available information suggests that processors have procurement arrangements with suppliers (local and foreign) that are sufficient for



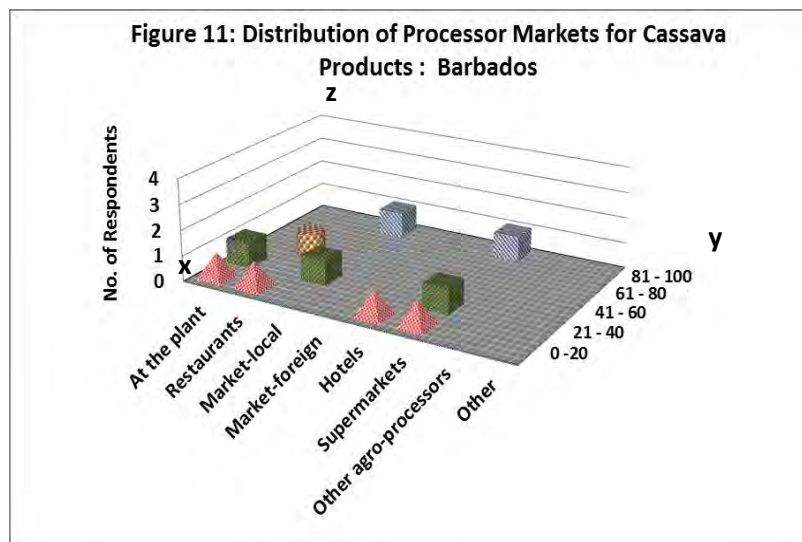
the demands of their operations. Processors in Barbados were turning a better profit with cassava products than sweet potato products. The main cassava products (Figure 9) being produced are cassava biscuit/cookies, cassava flour (coarse), cassava flour (fine), frozen wedges, grated cassava (frozen) and whole logs (peeled and frozen). However, this is a relatively narrow product range when compared to the broader range of products being produced within the surveyed countries alone (Figure 9).



The same is more so for sweet potato (Figure 10) relative to the smaller range of sweet potato products being processed in the Caribbean. Both cassava and sweet potato processors are equally interested in exporting to the USA, Canada, EU and other CARICOM countries.

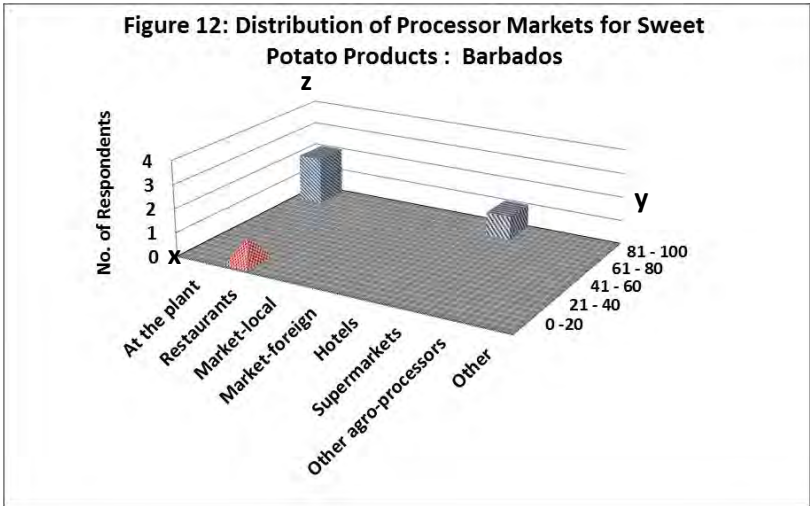
Figures 11 and 12 show the distribution of processors' preferred markets in Barbados. The figures show the preferred markets (y axis) based on the number of processors who supply this market

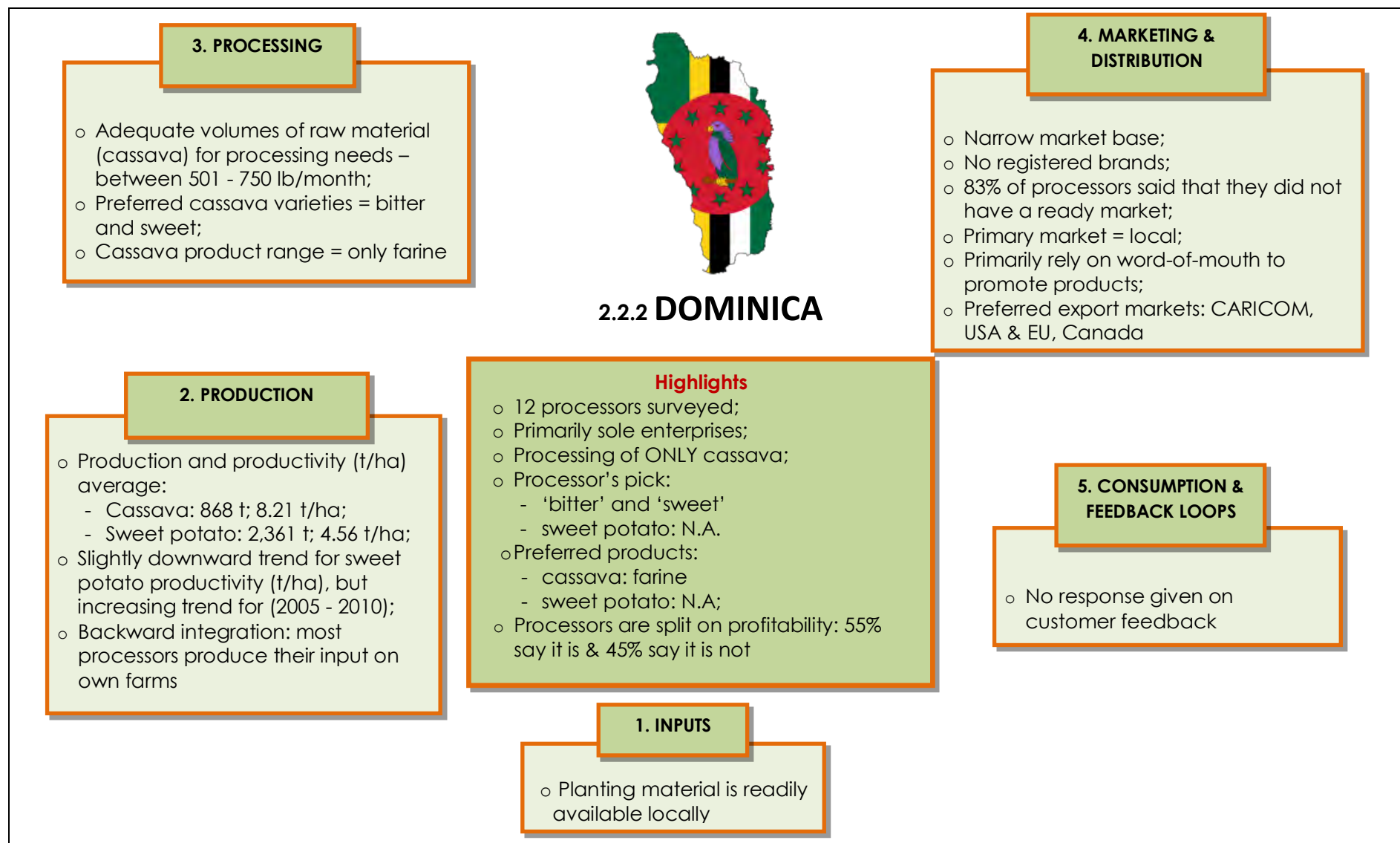
type (z axis – no. of respondents) and the volume of product normally sold there on the forward-most axis (x coordinate of 0 - 20% to 81 - 100%). Cassava processors distributed their products across a large range of markets. These included supermarkets and the local markets (Figure 11).



Although these markets accounted for the largest proportions of products being sold (i.e. in the range of 81–100%), the findings suggest that the other markets – by their multiplicity – are important avenues for processors. The predominant points of sale for sweet potato products were the point of processing (i.e. the

plant) as well as the supermarkets. These markets/points of sale attracted large proportions of sweet potato products. In contrast, a small proportion of sales was directed towards restaurants.



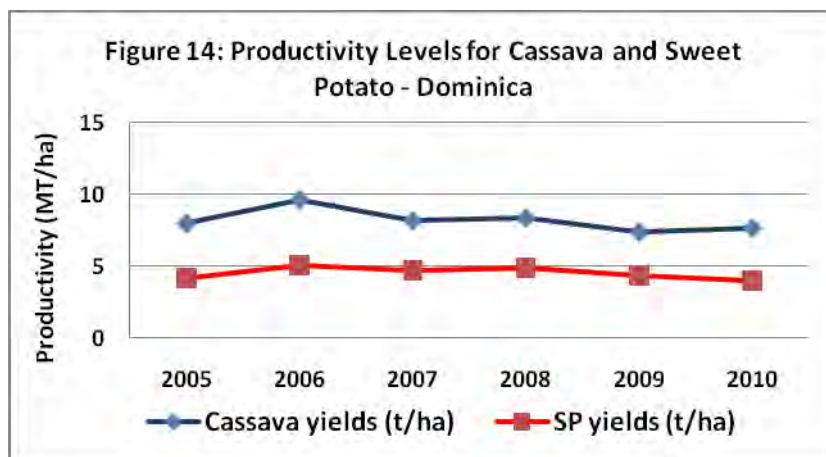
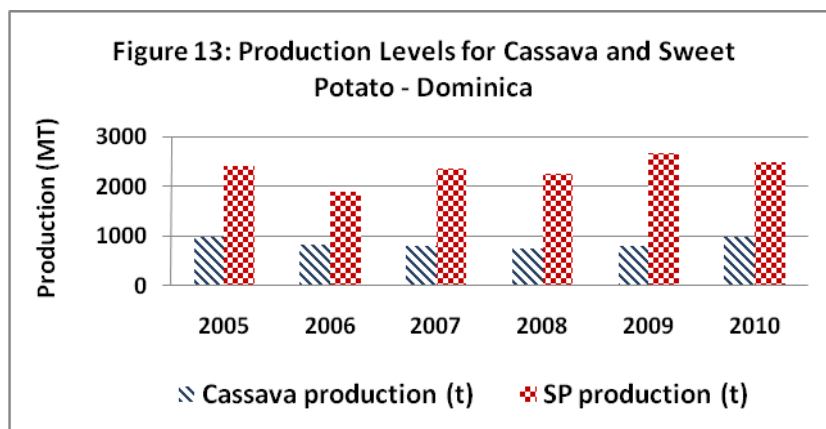




DOMINICA

2.2.2.1 Overview of the Business and Marketing Environment

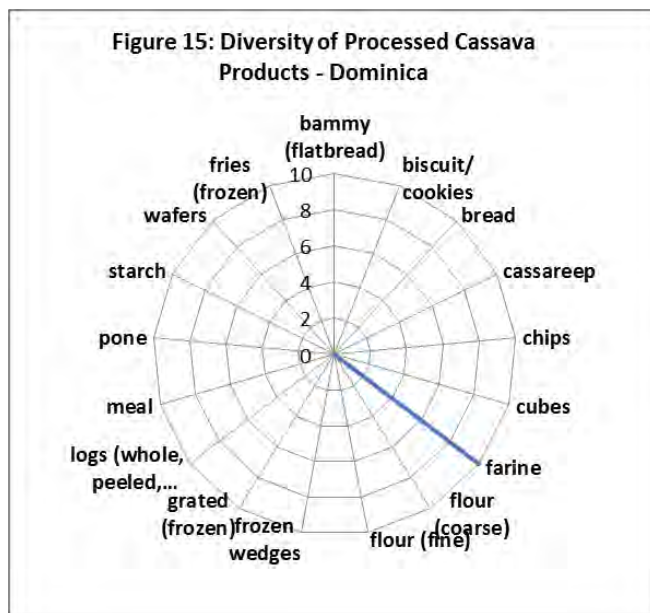
All the surveyed processors in Dominica are small, sole proprietorships and on average have no less than 3 years of experience in processing of farine which is the only processed cassava commodity being produced. No sweet potato processing was recorded in the survey conducted among the processors. Most processing operations are based in the home. As generally observed throughout the region, there is at least one head/manager with 0-4 employees possessing various technical and managerial skills. Almost all processors surveyed in Dominica (77%) were trained in traditional methods. The head/manager and technical/managerial staff have largely been trained by a Government agency. There was no indication as to whether or not alternative avenues for learning were available to them. In addition, none of the surveyed processors were members of a support organisation or group.



In terms of production, Dominica has been seeing increases in cassava and sweet potato (SP) yields (Figures 13 and 14). There was a notable fall in production for both commodities in 2008, but post-2008 figures show increasing levels for cassava. Sweet potato suffered a slight fall in productivity in 2010 (Figure 14). However, production has been fairly stable. Dominica averages at 868 tonnes (on average 8.21 t/ha) for cassava, and 2361 tonnes (on average 4.56 t/ha) for sweet potato over the period 2005 - 2010.

Given the high levels of production of sweet potato, there should be a ready supply of raw material should processors become interested in pursuing processing.

The main varieties of cassava being used by processors in Dominica are the bitter and sweet cassava. Given their small operation size, processors, on average, take in between 501 – 750 lb of cassava each month. However, this exists over a very wide range. There were at least two processors taking in between 26-50 lb of cassava and at least one processor for whom over 1,000 lb was the normal operation size. Cassava is sourced mainly from the processor's own farm or from a non-contract local farmer. Overall, processing seems to account for a minority share of the use of cassava and sweet potato in Dominica.



There is also an extremely narrow product range for cassava (Figure 15). Farine was the only product being produced by the surveyed processors. This concentrated product range, although indicative of a product that is receiving high demand, suggests that processors may be ignoring other potentially lucrative market opportunities.

Further, none of the processors were registered enterprises nor did they have an established brand name or other differentiator in the market. As seen with other small processors in Barbados,

processors in Dominica tend to move small quantities of their products at any given time. This seems to be a precautionary measure as 10/12 (83%) indicated that they did not have a ready market for their product. This suggests that marketing and product development are major areas for intervention. Similarly, these weaknesses may be contributing in part to the majority of the surveyed processors reporting that they experience demand beyond their ability to meet/supply for at least part of the year.

Processors were almost equally divided on whether or not their processing operation was profitable: 55% found it profitable while 45% disagreed. However, with the

exception of just one, the processors indicated that they were willing to change the way they did business to improve profitability.

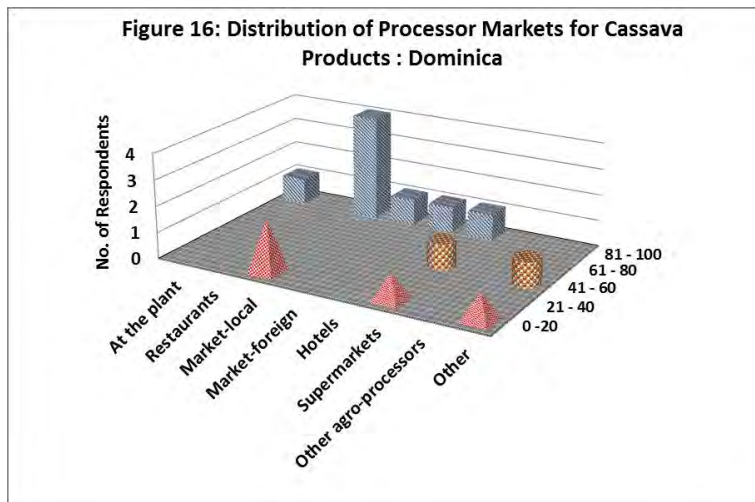


Figure 16 shows the preferred markets (y axis) based on the number of processors who supply this market type (z axis – no. of respondents) and the volume of product normally sold there on the forward-most axis (x coordinate of 0-20% to 81 – 100%). Most processors (46%) sell their product in the local fresh produce market (Figure 16). However, the distribution of markets is

interesting in that it shows a pattern of securing at least one profitable market while servicing any other available secondary options with substantially smaller volumes of the products (Figure 16). Consequently, the processors in Dominica showed a rather narrow market base. However, all of the surveyed processors were interested in pursuing export markets. CARICOM, the US and EU and then Canada were the preferred target markets for export.

3. PROCESSING

- Adequate volumes of raw material (cassava) for processing needs – between 751 – 1,000 lb/month. No data given for sweet potato;
- Preferred cassava varieties = 7U, bitter white, sweet. No data given for sweet potato;
- Cassava product range = more diverse (6/17) than sweet potato (1/6)

**2.2.3 GUYANA****4. MARKETING & DISTRIBUTION**

- Narrow market base. Primary market = local;
- Most processors have a registered brand;
- 75% of all processors have a ready market;
- Preferred export markets: USA, EU and Canada, then CARICOM

2. PRODUCTION

- Production and productivity (t/ha) average:
 - Cassava: 16,568 t/yr; 10.8 t/ha
 - Sweet potato: 1,549 t/yr; 1.86 t/ha;
- Production levels have remained fairly constant (2005 - 2010);
- Backward integration: most processors produce their raw materials on own farms

Highlights

- 8 processors surveyed;
- Primarily sole owner and family enterprises;
- Processor's pick:
 - Cassava: '7U'; 'bitter white'; 'sweet'
 - Sweet potato: not stated;
- Preferred products:
 - cassava: bammy (flatbread), cassareep, starch, chips, farine, biscuit/cookies, flour (fine);
 - Sweet potato: chips;
- Most processors indicated that their cassava operation was profitable. All responding sweet potato processors were profitable

5. CONSUMPTION & FEEDBACK LOOPS

- 63% of cassava processors have received specific product requests;
- Only ½ of sweet potato processors reported the same

1. INPUTS

- Planting material is readily available locally

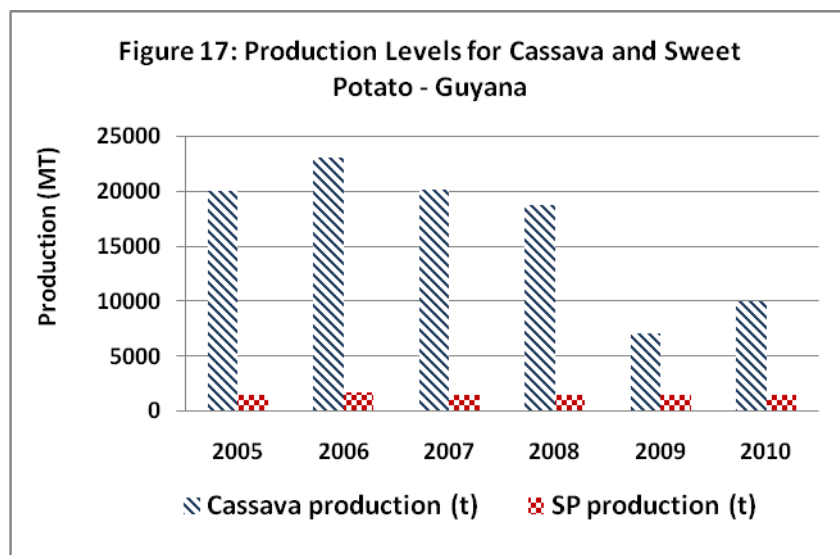


GUYANA

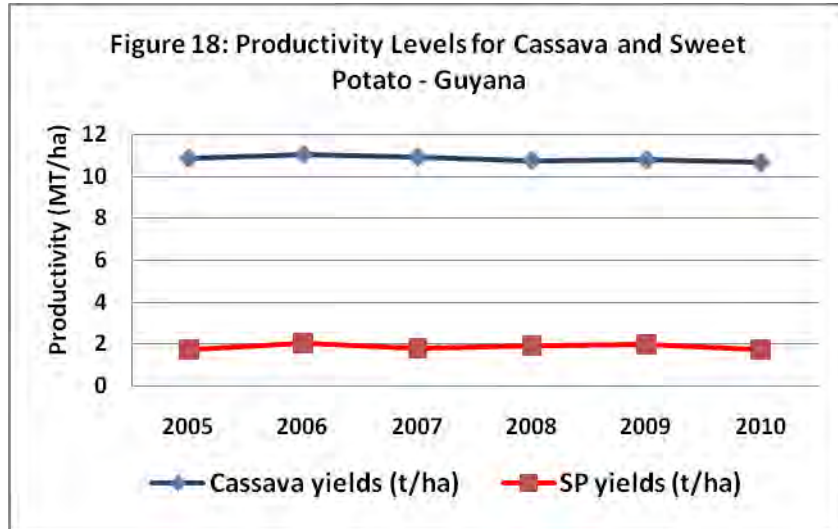
2.2.3.1 Overview of the Business and Marketing Environment

The most common form of root and tuber enterprises in Guyana were sole proprietorships and family-owned. However, unlike the micro-enterprises in Barbados and Dominica, these enterprises tended to be a bit larger – the majority of those surveyed having one head/owner with 1-2 managers and under 20 employees. These were also more experienced in processing (half of the sole ownerships had over 20 years of experience, while the family-owned had between 6 and 15 years). In addition to hired staff, unpaid labour (e.g. from family, friends, neighbours, etc.) plays an important part in meeting labour needs as the operations mainly use manual techniques for processing. 75% of the processors noted that their processing techniques were based on traditional methods. The next most common source of training in processing was through apprenticeships in an established organisation and a mixture of formal and traditional experience. Again in contrast to Barbados and Dominica, processors mainly operate from either a dedicated facility away from the home or within a separate/dedicated operating area at home. This suggests a greater degree of investment – at least in infrastructure – in the processing activity.

Cassava production has traditionally dominated production of sweet potato (SP) and continues to do so (Figure 17). Guyana produces about 16,568 tonnes of cassava each year as compared to 1,549 tonnes of sweet potato. There is a notable difference in farm productivity between the two crops as well. Cassava yields average at 10.8 t/ha, while sweet potato is just 1.86 t/ha.

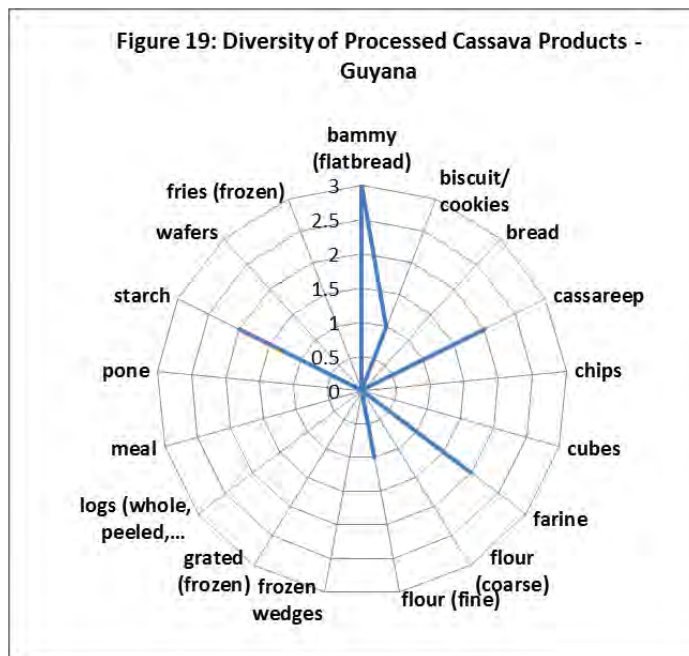


More so than in most countries, productivity levels have remained fairly constant (Figure 18). The most popular cassava varieties for processing in Guyana were the 7U Bitter White (1 year) and the sweet, 3 Months Uncle. No data was given for sweet potato. Most processors are vertically integrated and supply their own raw material. Any additional

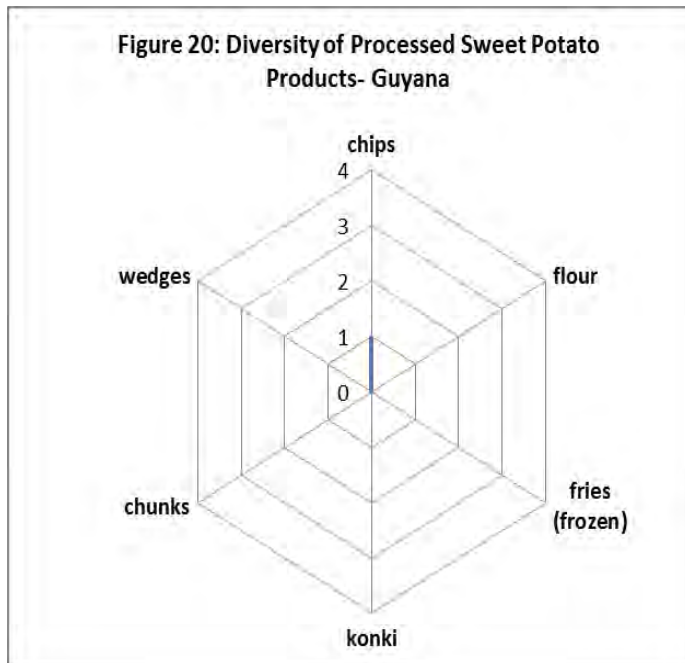


input is sourced locally from the wholesale market and/or non contract farmers. Cassava products are also much more diverse than sweet potato products (Figures 19 and 20). Bammy (flat bread), cassareep, farine and starch are the most popular commodities. Guyana shows a much more diversified outlook

for cassava processing than any of the other countries surveyed with the exception of St Kitts & Nevis. The production of food additives such as cassareep and starch is rare amongst the processors. In the case of sweet potato, the processors only reported on the production of chips (Figure 20).



The average processor in Guyana takes in between 751 and 1,000 lb of cassava each month. Two of the processors surveyed reported taking in over 1,000 lb each month for their processing activity. All the processors reported excess demand for their products for at least part of the year. This suggests that there is still scope for improving demand-supply arrangements for these products - as a result of seasonal demand increases and/or great reluctance on the part of processors to increase production volumes beyond a minimum level to sustain operations.



Most processors indicated that their cassava operation was profitable. All responding sweet potato processors were profitable. 75% of the processors surveyed reported that there was a ready market for their product(s). Within this sub-set, the sole proprietor and family-owned businesses seemed to have the most secure market arrangements. Corresponding with their ready markets was attention to establishing a registered brand for their products. This is indicative of a fair degree of sophistication in product development and approach to processing.

Restaurants and supermarkets are the preferred markets for cassava products (Figure 21). Figures 21 and 22 show the preferred markets (y axis) based on the number of processors who supply this market type (z axis – no. of respondents) and the volume of product normally sold there on the forward-most axis (x coordinate of 0-20% to 81 – 100%). Restaurants are targeted by a larger number of processors and seem to prefer more sizable volumes (41- 60% and 81-100%). On the other hand, supermarkets seem to be receptive to variable volumes ranging from 21-100% of processor supplies. Altogether, cassava processors have a nice spread/diversity of markets.

In the case of sweet potato products, supermarkets are most preferred (Figure 22). They are targeted by a larger number of processors than restaurants and, as with cassava, seem to be accepting of small and large volumes of the products. In contrast to cassava, the spread of markets is less diverse.

Although local markets are predominantly targeted at present, processors have keen interest in exporting to foreign markets. The preferred export targets are the USA, EU and Canada, and then CARICOM.

Figure 21: Distribution of Processor Markets for Cassava Products : Guyana

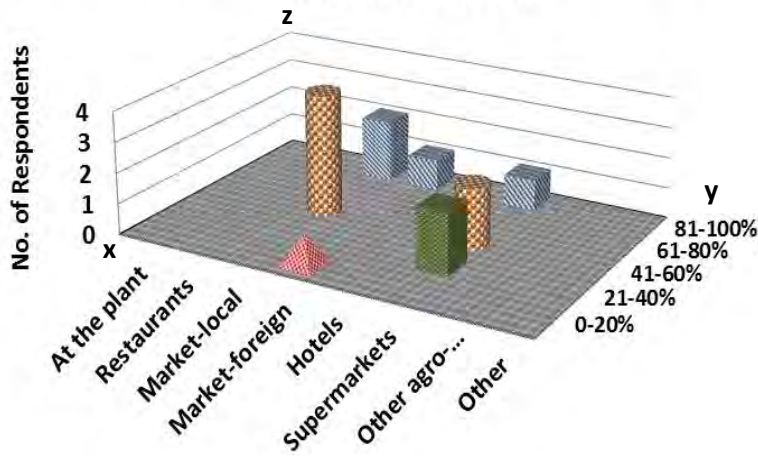
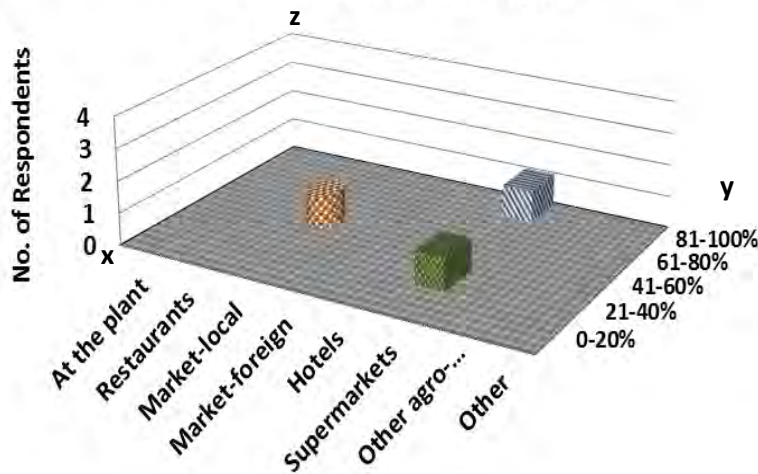


Figure 22: Distribution of Processor Markets for Sweet Potato Products : Guyana



3. PROCESSING

- Adequate volumes of raw material (cassava/sweet potato) for processing needs – between 751 – 1,000 lb/month and 151-200 lb/month respectively.
- Preferred source of raw material = local wholesale and retail markets;
- Preferred varieties:
 - Cassava = sweet, bitter, Blue bud,
 - Sweet potato = white flesh, Purple fibreo;
- Both cassava and sweet potato product ranges narrow:
 - Cassava = 3/17;
 - sweet potato= 1/6

2. PRODUCTION

- Production and productivity (t/ha) average:
 - Cassava: 16,155 t/yr on 875 ha = 18 t/ha
 - Sweet potato: 28,883 t/yr on 1,737 ha = 17 t/ha;
- Slight fall in productivity levels for both cassava and sweet potato from peak circa 2005

**2.2.4 JAMAICA****Highlights**

- 13 processors surveyed;
- Most enterprises are private companies;
- Processors' pick:
 - Cassava: 'sweet', 'bitter', 'Blue Bud';
 - Sweet potato: 'white flesh', 'Purple fibreo';
- Preferred products:
 - cassava: bammy (flatbread), chips, biscuit/cookies;
 - Sweet potato: konki;
- 69% of processors indicated that their cassava operation was profitable. All responding sweet potato processors were profitable.

1. INPUTS

- Planting material is readily available locally

4. MARKETING & DISTRIBUTION

- More diverse markets for cassava than sweet potato. Primary market = local;
- Most processors have a registered brand;
- 77% of all processors have a ready market;
- Preferred export markets: USA, EU, and Canada and CARICOM.

5. CONSUMPTION & FEEDBACK LOOPS

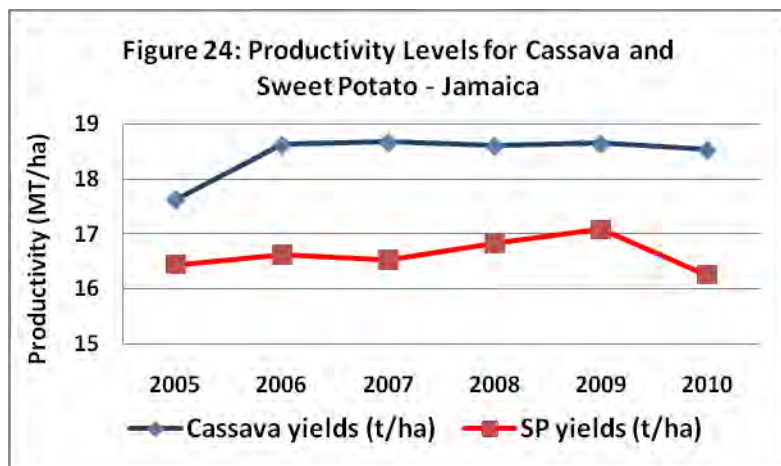
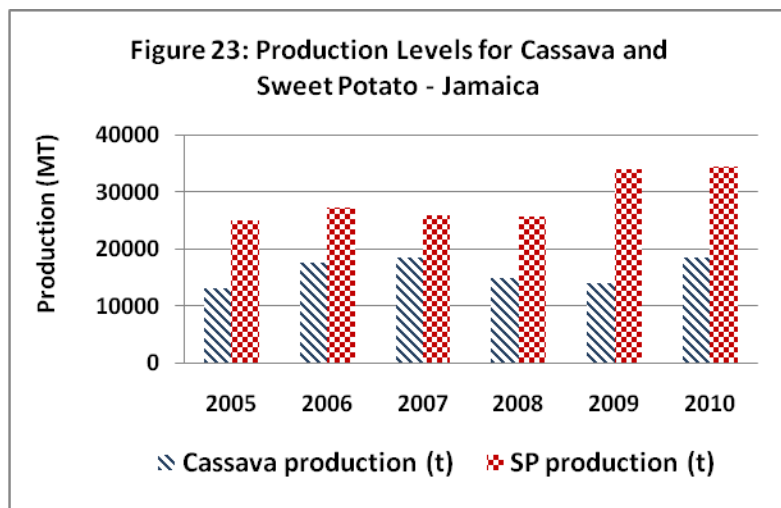
- Just 44% and 17% of cassava processors had received specific product request



JAMAICA

2.2.4.1 Overview of the Business and Marketing Environment

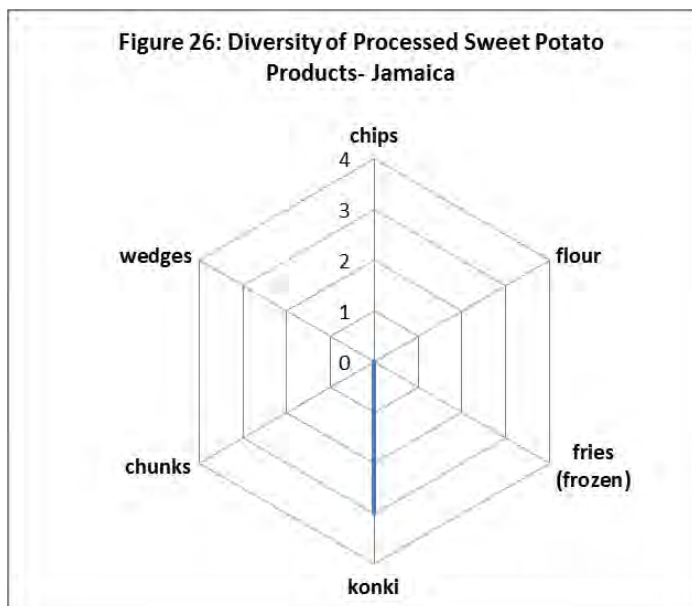
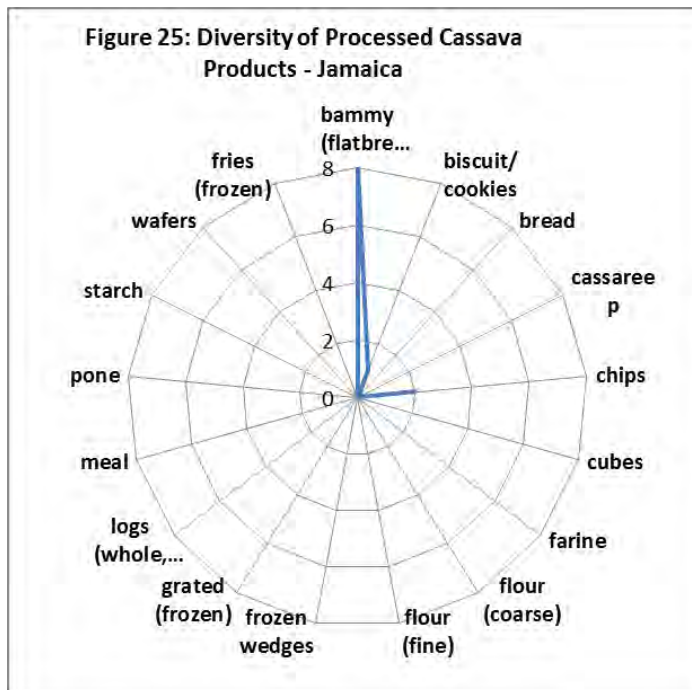
The processors surveyed in Jamaica were very experienced in processing – 77% of them having worked in this area for more than 6 years. In fact, a notable proportion of processors had more than 20 years of experience. Private companies were the most notable amongst the most experienced processors. Traditional learning (39%) was the most common avenue for gaining processing skills in Jamaica. This was followed by formal training (23%) and apprenticeships at another establishment (15%). Most processors surveyed (10/13) were registered with the local food authorities. This suggests that, at the very least, most processors are aware of the local authorities and the regulations that govern small food operators. Incidentally, most processors work out of a dedicated facility away from the home which indicates a great degree of investment in the processing operation and perhaps, also in food safety.



Traditionally, sweet potato (SP) production has been greater than production of cassava (Figure 23). However, while there has been a 40% increase in cassava production over the period 2005 - 2010, sweet potato production increased by only 5% in that same period. This suggests that cassava production is becoming increasingly popular. In 2010, an estimated 998 ha of cassava was being produced compared to 2,122 ha of sweet potato.

In terms of productivity (tonnes/ha), cassava yields have been consistently higher than those for sweet potato (Figure 24).

Cassava averages at 18 t/ha while sweet potato averages at 17 t/ha across 2005 – 2010. However, the trend for both cassava and sweet potato show a slight fall in productivity in 2010 when compared to 2005 levels. The most popular varieties of cassava for processing amongst surveyed processors were the Sweet, Bitter, Blue Bud, and Colombian. In the case of sweet potato, the most popular varieties were the White Flesh and Purple Fibreo.



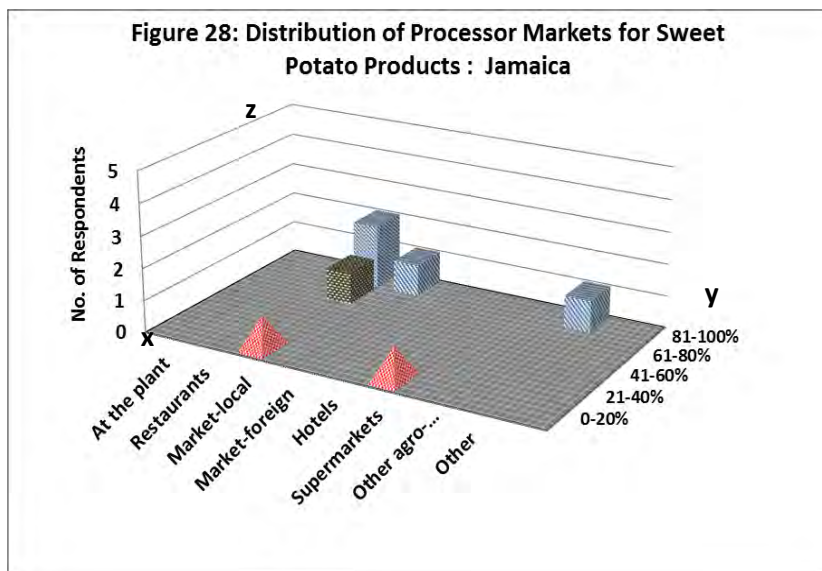
Processors prefer to buy their raw material from the local wholesale and retail markets. In general, processors use over 1,000 lb of cassava and sweet potato each month in their processing activities. Smaller volumes between 151 – 200 lb/month were most commonly used for sweet potato. It was also observed that processors were much more particular in choosing the cassava variety to work with as compared to sweet potato.

Most processors (10/13) said that they have a ready market for their cassava products. Branding of their product seems to also be an important aspect of establishing/maintaining this market. The larger volumes processed for cassava is reflected in the comparatively wider diversity of products made with cassava as compared to sweet potato (Figures 25 and 26).

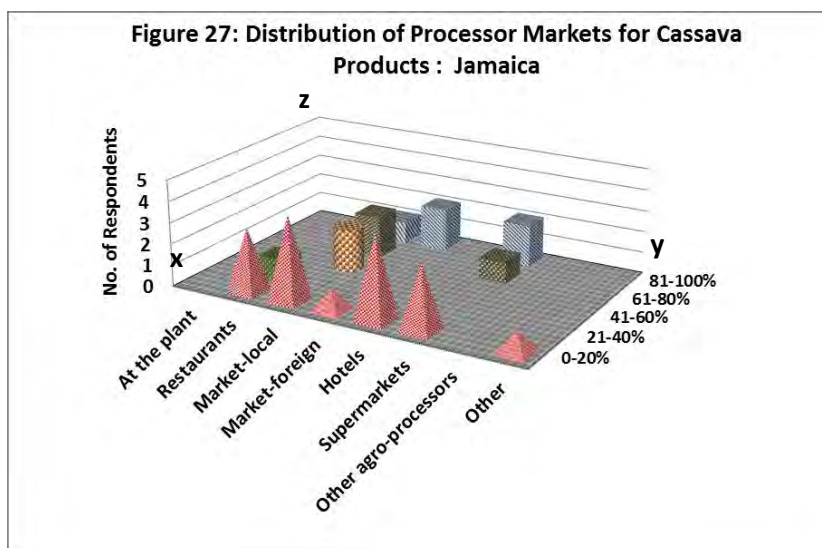
Bammy (flatbread) is by far the most popular cassava product in Jamaica (Figure 25) and is followed by chips and biscuits/cookies. In the case of sweet potato, only konki was being

produced by the surveyed processors. In comparison to other countries such as Guyana and St Kitts & Nevis, product diversification is low in Jamaica.

Figure 27 shows the preferred markets (y axis) based on the number of processors who supply this market type (z axis – no. of respondents) and the volume of product normally sold there on the forward-most axis (x coordinate of 0–20% to 81–100%). It shows that although processors typically sell their cassava products at many outlets, restaurants, hotels and supermarkets are the most popular as they receive products from the larger proportion of processors (Figure 27).



These markets accommodate the range of small (0–20%) to large (>61%) volumes of products from processors. In the case of sweet potato, processors supply a more narrow range of markets where restaurants dominate (Figure 28). The majority of the surveyed processors supply almost all of their products to a single, preferred market, while favouring restaurants and hotels for disposing of the remainder. Only a few processors (44% and 17% for cassava and sweet potato, respectively) had received specific product requests.



As found in the other countries, the majority of processors in Jamaica seem to follow a reserved production regime, thus

creating instances where demand occasionally exceeds supply. This suggests that there is scope for market development to support processors and their suppliers (i.e.

producers) in adequately meeting current demand. Despite this situation, most processors²³ (9/13) consider their processing activity with cassava to be profitable.

One common marketing interest shared by all processors is greater exportation. Priority markets noted for cassava products included the US (9/13), EU (8/13) and Canada and CARICOM (7/13 respectively). In contrast, only 2/13 processors were interested in exporting their sweet potato products to the US, EU and Canada. There was no interest in marketing sweet potato products to other CARICOM countries.

²³All of these were private enterprises. Interestingly, the only operation reported as being unprofitable was the one state-run enterprise.



2.2.5 SAINT KITTS & NEVIS

Highlights

- 7 processors surveyed;
- Most enterprises are sole proprietorships and family-run businesses;
- Processors' pick:
 - Cassava: 'sweet', 'Sugar', 'St Lucia sweet';
 - Sweet potato: 'sugar', 'Purple Vines', 'Flour';
- Preferred products:
 - Cassava: bammy (flatbread), biscuit/cookies, flour (fine);
 - Sweet potato: chips, konki, flour;
- 86% and 100% of processors profitable for cassava and sweet potato, respectively

3. PROCESSING

- Adequate volumes of raw material (both cassava and sweet potato) for processing needs – between 26 and 50 lb/month;
- Preferred source of raw material:
 - Cassava = imports, sweet potato = own farm and non-contract farmers;
- Preferred varieties:
 - Cassava = sweet, sugar, St Lucia sweet;
 - Sweet potato = sugar, purple vines, flour;
- Most diverse product ranges observed for both cassava and sweet potato:
 - Cassava = 10/17
 - sweet potato = 4/6

2. PRODUCTION

- Production and productivity (t/ha) average:
 - Cassava: no local production reported. Reliance on imports – avg. 4 t/yr;
 - Sweet potato: 196 t/yr on 28 ha = 8 t/ha;
- Dramatic improvement in 2006 from which point onwards productivity remains consistent

1. INPUTS

- Sweet potato planting material is readily available locally;
- Cassava mainly sourced by imports

4. MARKETING & DISTRIBUTION

- Primary market place = local and at processing place/plant;
- Few processors have a registered brand:
 - Cassava = 29%
 - Sweet potato = 33%;
- 57% of cassava and 75% of sweet potato processors have a ready market;
- Preferred export markets: USA, CARICOM, EU then Canada;

5. CONSUMPTION & FEEDBACK LOOPS

- Most processors experience periods of excess demand;
- Just 43% and 50% of cassava processors had received specific product requests

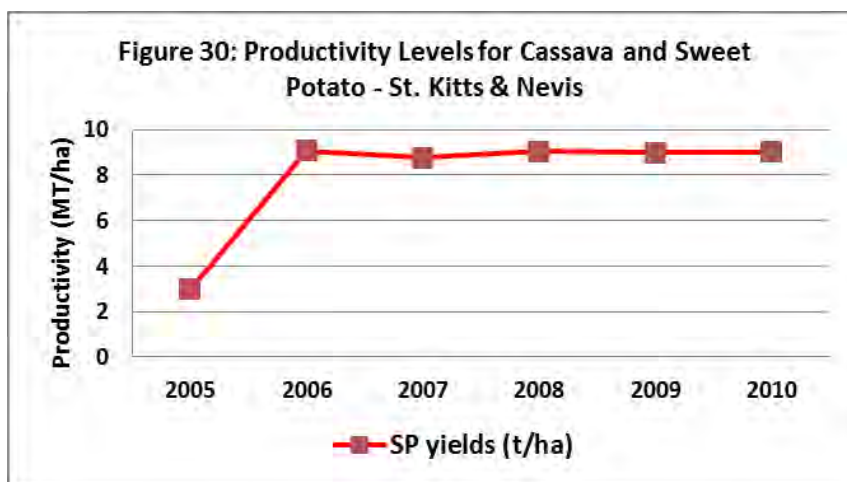
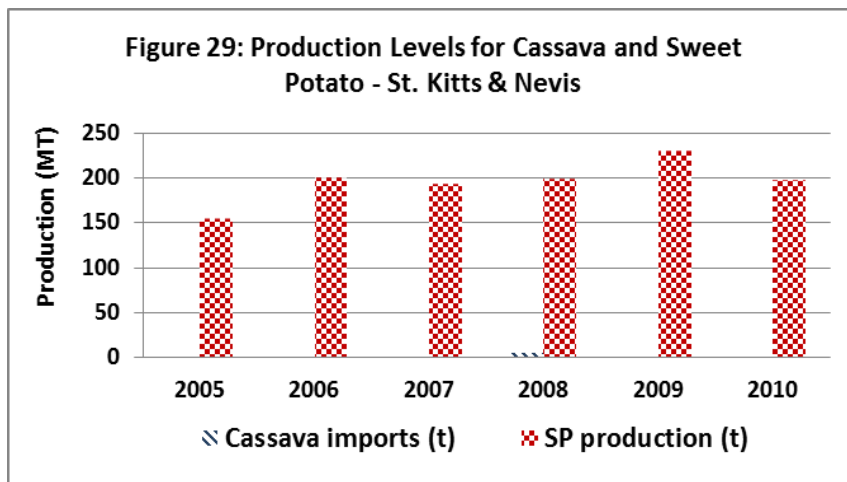


St. Kitts & Nevis

2.2.5.1 Overview of the Business and Marketing Environment

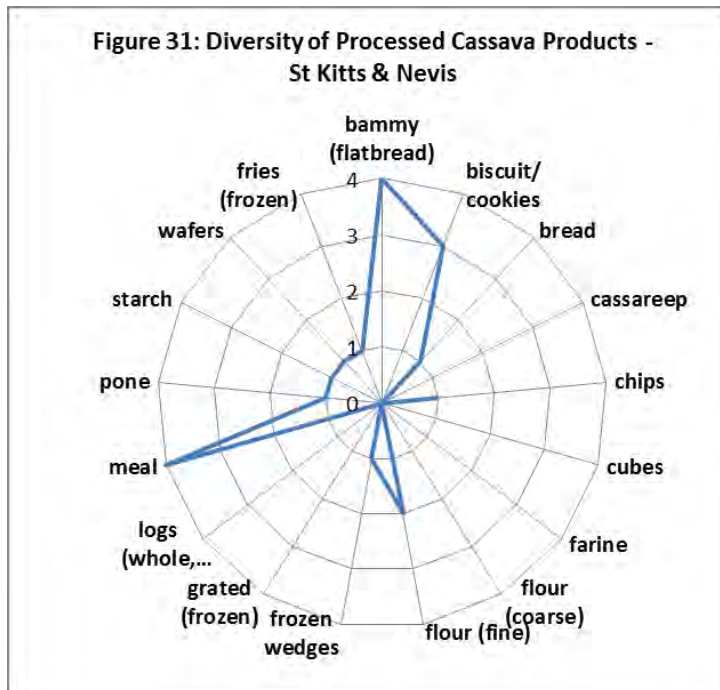
All the processors surveyed in Saint Kitts & Nevis (SKN) were either sole-proprietorships or family-run businesses. Most have more than a decade's worth of experience in processing but remain micro-enterprises relying on own/family and/or seasonal labour. Labour demand is relatively low as most processors desired just 6 – 10 seasonal workers in 2010. Given this situation, some kind of cooperative agreement amongst processors to support each other's activities may be a useful course of action.

Enterprises are mainly run out of the home kitchen (86%) but evidence suggests that training in food processing and food safety – possessed by the majority of processors – is well observed. 71% of the processors have been visited by local food safety/health regulators to verify the standards of their operation. However, only 1/7 is registered as a food processor.

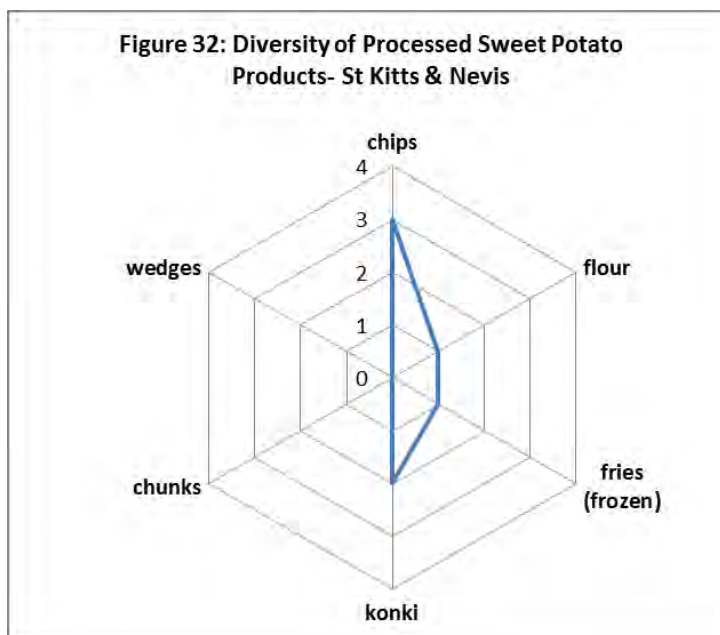


There is no production of cassava reported for SKN. As a result, processors seem to be entirely dependent on imports of cassava (UN Comtrade Database 2013). As shown in Section 2.2.5, these are relatively small volumes averaging at 4t each year. In contrast, producers in SKN have been doing a good job in producing sweet potato (Figures 29 and 30). Production averages at 196t and since a dramatic improvement in 2006, productivity has remained consistent

at about 8t/ha (Figure 30). While this consistency is commended, when compared to regional leader²⁴ Barbados (23t/ha) and Jamaica (18t/ha) it becomes evident that there is considerable scope for improvement.



The main varieties of cassava used in processing are the Sweet cassava, Sugar, St Lucia sweet, Salt, Negro, Mingo Sweet and Coconut. These are imported in small quantities ranging between 26 and 50 lb each month. Sweet potato varieties such as the Sugar, Purple Vines, Flour and Ellen John are sourced in similar volumes each month. Sweet potatoes are mainly sourced at the local retail market or through non-contracted farmers.

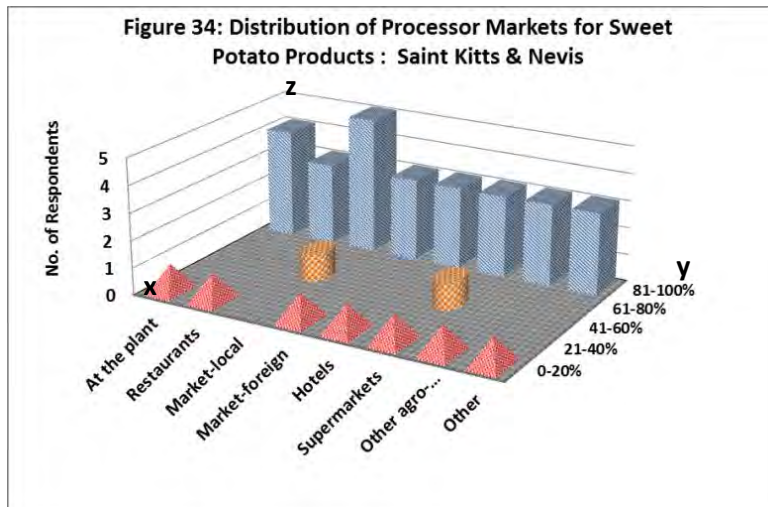
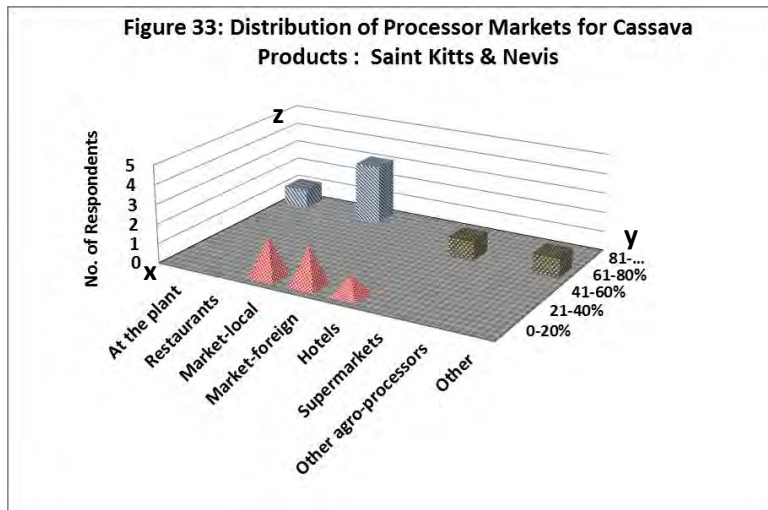


Processors however take in relatively small quantities of raw material for their operations – taking in just 26–50 lb of cassava and sweet potato, on average, each month. Only one of the processors surveyed took in between 51 – 100 lb/month. Sweet potato is largely bought from the local retail market and from non-contracted farmers. In general, processors noted that they were able to obtain sufficient volumes of cassava but indicated some

challenge in obtaining sufficient sweet potato for their needs.

²⁴That is, in terms of productivity (t/ha).

Processors in SKN were also much more diverse than in any of the other countries surveyed. Besides cassava and sweet potato, they regularly processed many other fruits and vegetables. SKN was the most diverse of all the countries surveyed in processing and demonstrated the largest number of processed products observed for both cassava and sweet potato (Figures 33 and 34). A total of 10 cassava and 4 sweet potato products were being processed. The most popular cassava products (Figure 33) were bammy (flatbread), cassava meal and biscuit/cookies. The most popular sweet potato products (Figure 34) were chips and konki.



Figures 33 and 34 show the preferred markets for cassava and sweet potato products (y axis) based on the number of processors who supply this market type (z axis – no. of respondents) and the proportional volume of product normally sold there on the forward-most axis (x coordinate of 0-20% to 81 – 100%). The main market for cassava products was the local market. This market attracted both a large number of processors and a greater proportion of their products (Figure 33).

In the case of sweet potato, the local market, restaurants and the processing plant attracted the larger proportion of

sales (Figure 34). Moreover, the comparatively larger proportions of products sold in the available markets suggests that sweet potato products are better received there than the cassava products.

Branding of cassava and sweet potato products was poor in SKN. Just 1/5 sweet potato processors and 2/7 cassava processors had a registered brand for his/her product. This, then, should be an important aspect of market development for SKN. However, cassava products fare better than sweet potato in the targeted markets. Most processors (57% for cassava and 75% for sweet potato) have a ready market for their products, but as seen with other Caribbean countries, processors practice a reserved production plan which results in occasional excess demand for their products. However, processors are interested in improving their production and business practices to position themselves for entering export markets. The preferred export targets were the USA, CARICOM, the EU and lastly Canada.

3. PROCESSING

- Adequate volumes of raw material (both cassava and sweet potato) for processing needs – usually over 400 lb/month;
- Preferred source of raw material:
 - Cassava = non-contract farmers and own farms;
 - Sweet potato = non-contract farmers;
- Preferred varieties:
 - Cassava = sweet, sugar, St Lucia sweet;
 - Sweet potato = sugar, purple vines, flour;
- Product diversity can be improved for both cassava and sweet potato:
 - Cassava = 5/17
 - sweet potato = 2/6

4. PRODUCTION

- Production and productivity (t/ha) average:
 - Cassava: 762 t/yr on 117 ha = 6.6 t/ha;
 - Sweet potato: 2,158 t/yr on 1,825 ha = 1.4 t/ha;
- Cassava productivity lower than peak in 2007 but increased by 40% 2009-2010;
- Slight downward trend in sweet potato productivity

**2.2.6 SAINT VINCENT & THE GRENADINES****Highlights**

- 11 processors surveyed;
- Most enterprises are sole proprietorships and family-run businesses;
- Processor's pick:
 - Cassava: 'bitter', 'Punt Stick', 'sweet';
 - Sweet potato: 'Black Vine', 'Lovers Name';
- Preferred products:
 - Cassava: farine, biscuit/cookies, flour (coarse);
 - Sweet potato: konki, chips;
- 55% and 100% of processors indicated that their operation was profitable for cassava and sweet potato, respectively

1. INPUTS

- Planting material is readily available locally

4. MARKETING & DISTRIBUTION

- More diverse markets for sweet potato than cassava. Primary market place = local and at processing place/plant;
- Few processors have a registered brand:
 - Cassava = 29%;
 - Sweet potato = 33%;
- 55% of cassava and 75% of sweet potato processors have a ready market;
- Preferred export markets: CARICOM, then the USA, EU and Canada

5. CONSUMPTION & FEEDBACK LOOPS

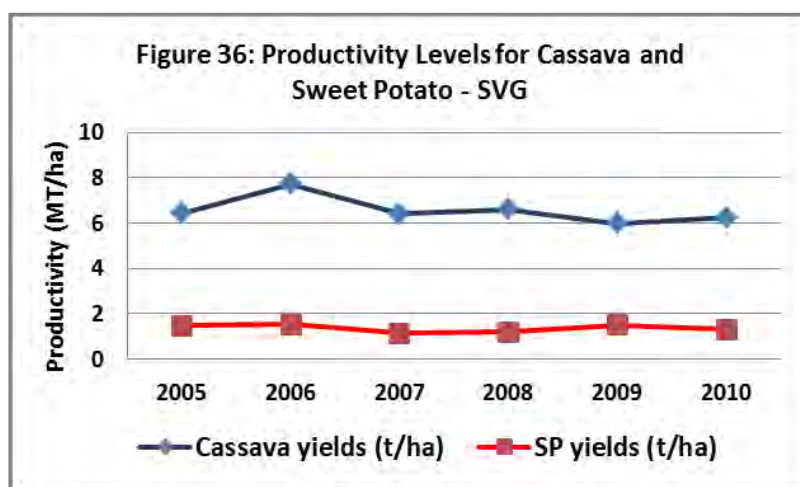
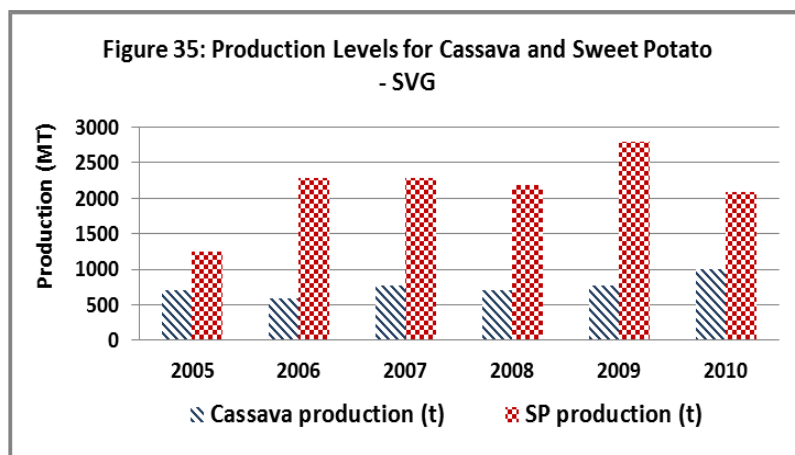
- Most processors experience periods of excess demand;
- Just 43% and 50% of cassava processors had received specific product request



2.2.6.1 Overview of the Business and Marketing Environment

Most processors (82%) surveyed in St Vincent and the Grenadines (SVG) are sole proprietorships where the owner supplies all the labour for the enterprise. Most have a separate facility away from home for their processing activities.

Production of sweet potato (SP) has traditionally surpassed that of cassava (Figure 35), although productivity in cassava (t/ha) has been much higher (Figure 36). Over the period 2005–2010, cassava productivity averaged at 6.6 t/ha whereas sweet potato productivity averaged at just 1.36 t/ha. Production in both crops, however, has been on the increase since 2005 – production increasing by 40% and 68% for cassava and sweet potato, respectively.

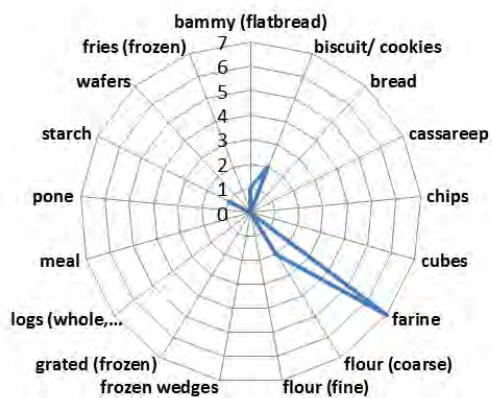


Reports from processors suggest that there are no difficulties in obtaining sufficient quantities of raw materials for processing. In fact, despite their small size, processors in SVG utilize comparatively larger volumes of both cassava and sweet potato than processors in other Windward Island countries surveyed - the majority (82%) use in excess of 400 lb each month. A notable proportion of those surveyed (45%) even procured over 1,000 lb of cassava each month. Most of their raw material is procured from non-contract local farmers and from the processors' own farms. This indicates some extent of vertical integration in the

processing of roots and tubers.

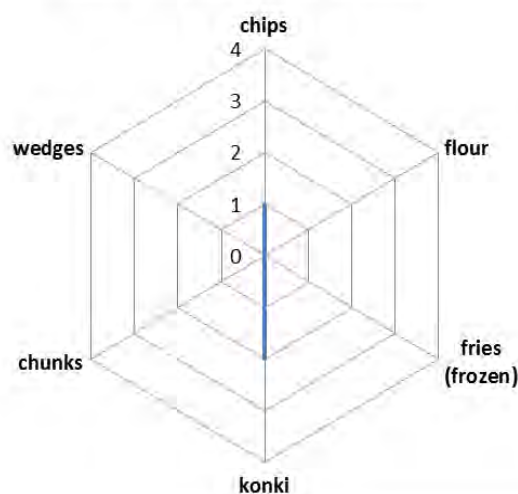
The main varieties of cassava being purchased by processors were the bitter cassava, Punt Stick, Sweet Cassava, Bowess, Butter Stick and Cotton Stick. The preferred sweet potato varieties were Black Vine and Lover's Name. There were 5 cassava and 2 sweet potato products being produced by the processors surveyed (Figure 37 and Figure 38, respectively). In comparison to countries such as St Kitts and Nevis and Guyana, this is a narrow product range. Farine was the most popular cassava product, while konki was

Figure 37: Diversity of Processed Cassava Products - St Vincent & the Grenadines



the most popular for sweet potato. The majority of processors have a ready market for their cassava (55%) and sweet potato (75%) products. Their responses also suggest that their level of production of sweet potato products (Figure 38) is sufficient for their present markets as the majority of them do not experience excess demand.

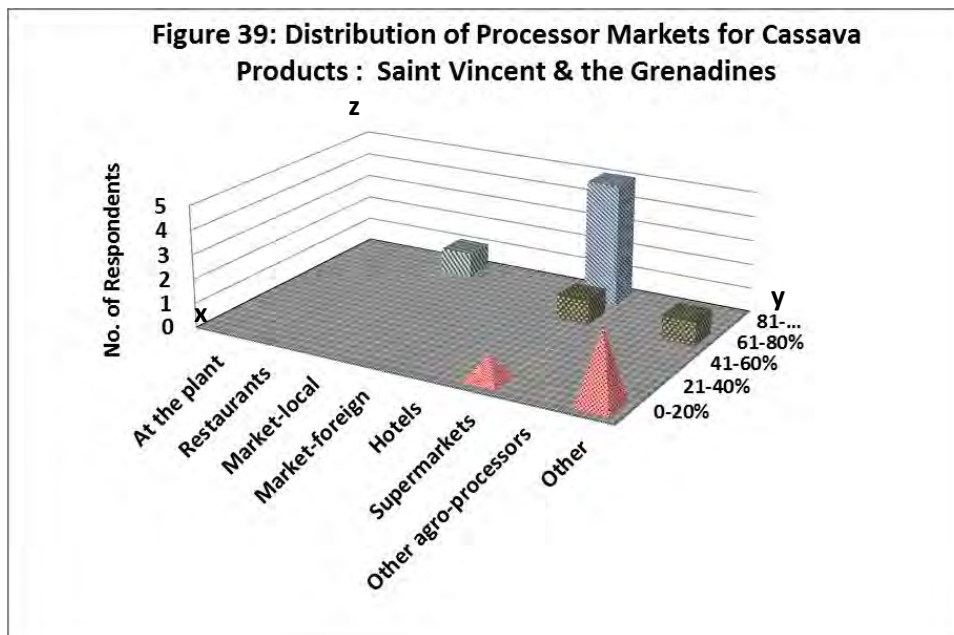
Figure 38: Diversity of Processed Sweet Potato Products- St Vincent & the Grenadines

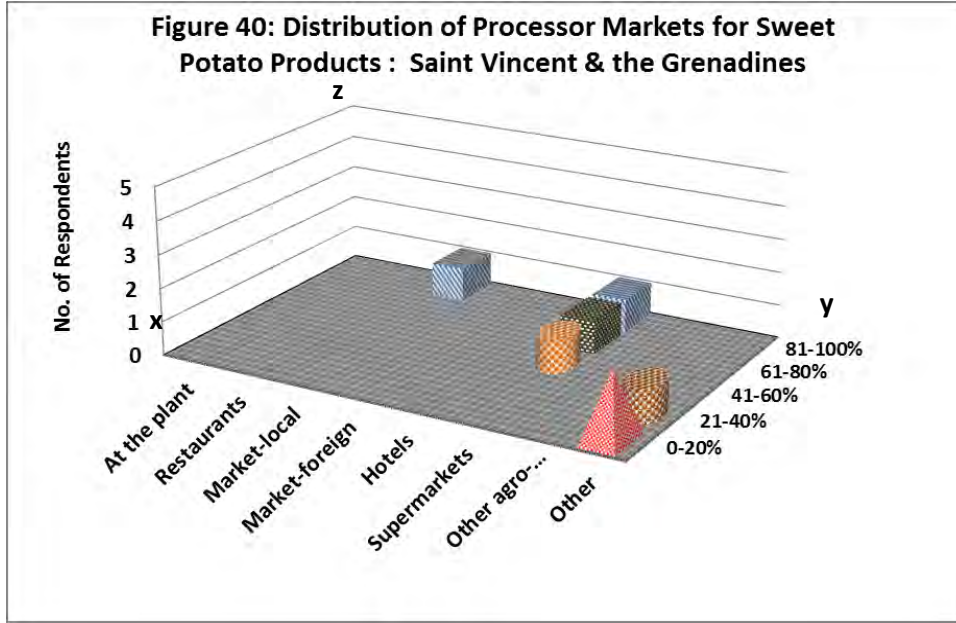


Figures 39 and 40 show the preferred markets for cassava and sweet potato products (y axis) based on the number of processors who supply this market type (z axis – no. of respondents) and the proportional volume of product normally sold there on the forward-most axis (x coordinate of 0-20% to 81 – 100%). The surveyed processors have a comparatively smaller market set, targeting mainly supermarkets, the local fresh market as well as other private buyers who mainly took in relatively smaller volumes (other - Figures 39 and 40). There was also a similar convergence on a few markets for both cassava and sweet potato products. The preferred markets for cassava and sweet potato were the

supermarkets which received the largest proportion of products from the greatest number of processors. In the case of the latter, a large number of processors supplied relatively small volumes (between 0 and 40%) to other markets as well.

Of those processors who manufacture cassava products, 55% think that their operations are profitable. In contrast, all the responding processors of sweet potato products said that this was profitable for them. All processors are interested in exporting their products to foreign markets. The preferred target is actually within CARICOM (73%), with the US, EU and Canada following (64% each).





3. PROCESSING

- o Adequate volumes of raw material (both cassava and sweet potato) for processing needs – usually <400 lb/month. Companies take in >1,000 lb/month;
- o Preferred source of raw material:
 - Cassava = non-contract farmers, local retail market and own farms;
 - Sweet potato = own farm and non-contract farmers;
- o Product diversity can be improved for both cassava and sweet potato:
 - Cassava = 7/17
 - sweet potato= 3/6

2. PRODUCTION

- o Production and productivity (t/ha) average:
 - Cassava: 1,316 t/yr on 107 ha = 12 t/ha
 - Sweet potato: 335 t/yr on 50 ha = 6 t/ha;
- o Cassava productivity lower than peak in 2007 but increased by 40% 2009-2010;
- o Slight downward trend in sweet potato productivity

**2.2.7 TRINIDAD AND TOBAGO****Highlights**

- o 24 processors surveyed;
- o Most enterprises are sole proprietorships but with the largest number of companies;
- o Processor's pick:
 - Cassava: 'Butter Stick', 'MX';
 - Sweet potato: 'Chicken Foot', 'Red Skin', 'White Skin';
- o Preferred products:
 - Cassava: chips, farine, fries, wedges, cubes, biscuit/cookies, pone, logs;
 - Sweet potato: chunks, wedges;
- o 96% and 91% of processors indicated that their operation was profitable for cassava and sweet potato, respectively

1. INPUTS

- o Planting material is readily available locally

4. MARKETING & DISTRIBUTION

- o More diverse markets for sweet potato than cassava. Primary market place = local and at processing place/plant;
- o Few processors have a registered brand:
 - Cassava = 22%
 - Sweet potato = 36%;
- o 100% of both cassava and sweet potato processors have a ready market;
- o Preferred export markets: USA, Canada and then CARICOM

5. CONSUMPTION & FEEDBACK LOOPS

- o Most processors experience periods of excess demand;
- o Just 35% and 27% of cassava processors had received specific product requests

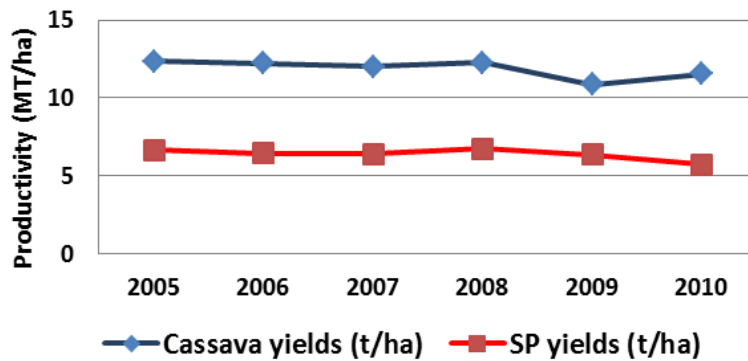
2.2.7.1 Overview of the Business and Marketing Environment



Trinidad & Tobago

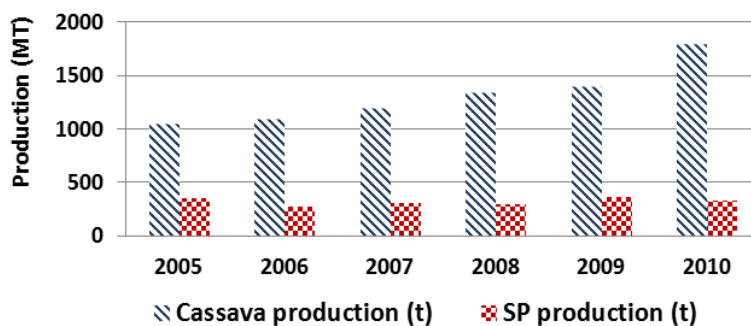
Processors in Trinidad and Tobago were, as in the other countries primarily sole proprietors (50%). The majority of this segment of those surveyed had more than 10 years of experience in processing. Partnerships, representing 21% of those surveyed were similarly experienced, while family-owned enterprises (17% of those surveyed) were generally less experienced (<10 yr). A majority (91%) of the processors (mainly the sole-proprietors, partnerships and family-owned) operated from the home kitchen or a dedicated processing space at the home but separated from the kitchen. However, just over half (54%) of the enterprises had been regularly visited by the local food regulatory institution.

Figure 42: Productivity Levels for Cassava and Sweet Potato - Trinidad & Tobago



The production of cassava is notably greater than the production of sweet potato in Trinidad and Tobago (Figures 41 and 42). On average 1,316 t of cassava is produced each year compared to 335 t/year for sweet potato (SP). The productivity of cassava is also much higher (at 12t/ha), averaging at twice that of sweet potato.

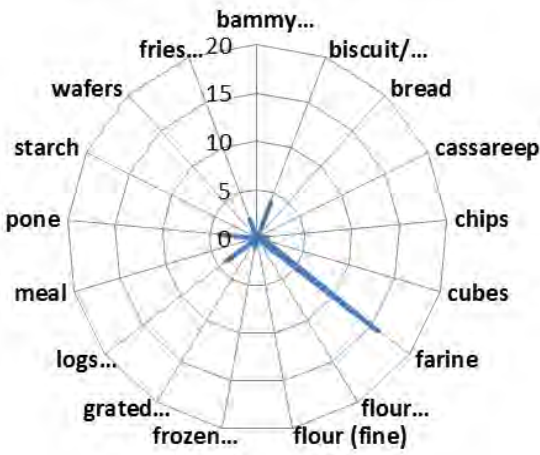
Figure 41: Production Levels for Cassava and Sweet Potato - Trinidad & Tobago



Processors indicated that the supply of both cassava and sweet potato were adequate for their operations. A majority of the surveyed processors (12/24) utilize less than 400 lb of

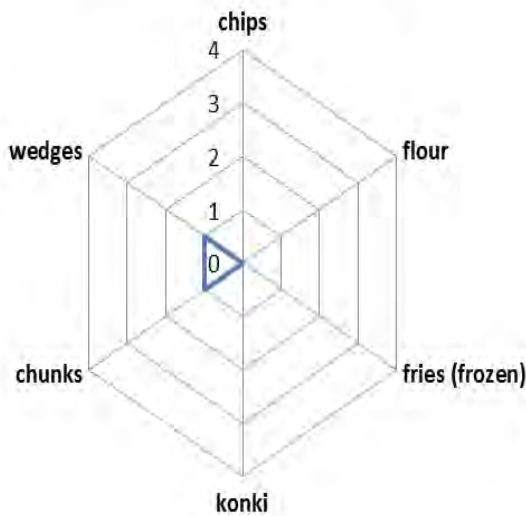
cassava each month. A similar observation was made for sweet potato. However, 3 enterprises took in over 1,000 lb of cassava each month.

Figure 43: Diversity of Processed Cassava Products - Trinidad & Tobago



The preferred varieties of cassava were the Butter Stick and MX. The most popular sweet potato varieties were the Chicken Foot, Red Skin and White Skin. For cassava, the preferred arrangements for obtaining raw material for processing were from non-contract local farmers, their own farms and the local retail market. For sweet potato, non-contract local farmers and own farms were the most popular sources.

Figure 44: Diversity of Processed Sweet Potato Products- Trinidad & Tobago



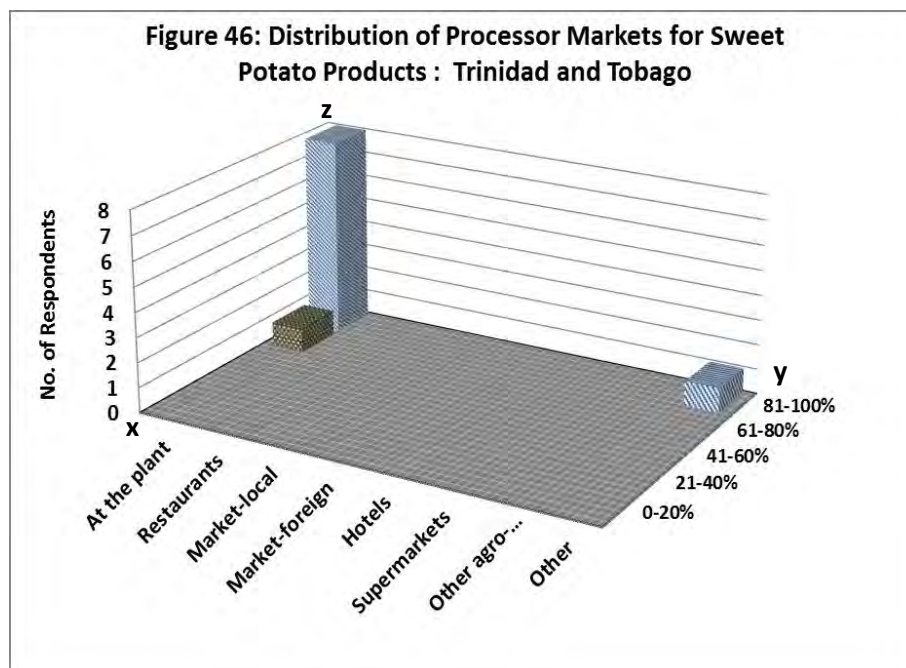
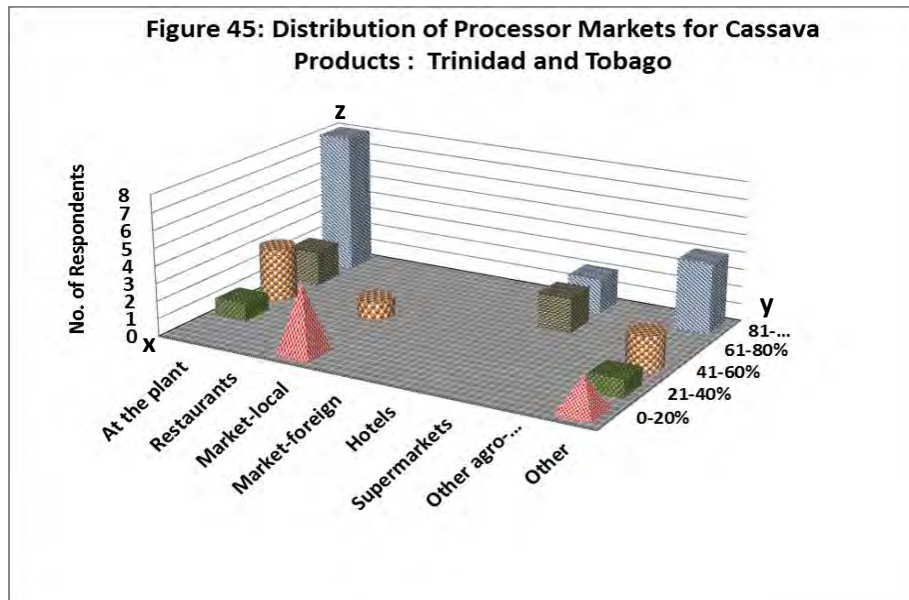
Processors in Trinidad and Tobago produced a fairly diverse range of cassava and sweet potato products when compared to other surveyed countries. Eight cassava and 2 sweet potato commodities are being produced (Figures 43 and 44). The preferred cassava products were farine, pone, biscuits/cookies and whole, peeled logs (frozen). The main sweet potato products were wedges and chunks (Figure 44).

Cassava products enjoyed a much wider market spread than that seen for sweet potato (Figures 45 and 46). These figures show the preferred markets for cassava and

sweet potato products (y axis) based on the number of processors who supply this market type (z axis – no. of respondents) and the proportional volume of product normally sold there on the forward-most axis (x coordinate of 0 - 20% to 81 – 100%).

Cassava products are currently being sold in large quantities and by a greater number of processors at the place of processing/plant, in other private arrangements (Other), and at the supermarkets.

A large number of processors also sold small quantities (between 0 - 20%) at local markets (Figure 45). In stark contrast, almost all sweet potato products are bought at the processing base of operations (Figure 46). The large quantities being moved at this point of sale suggest a close affiliation between processors, the equity of their product and their customers.



Based on their experiences, all processors think that there is a ready market for their products. In fact, 71% said that they experience excess demand for their product.

21% experience this excess demand sometimes and just 8% are currently not experiencing demand greater than their ability to supply. This no doubt contributes to the observation that 96% of cassava processors and 91% of sweet potato processors considered their operations to be profitable.

However, only a small proportion of processors in both cassava and sweet potato had registered brands. Just 22% of cassava processors and 36% of sweet potato processors had a brand name for their products. This suggests that there is significant scope for expanding business marketing and supply to the markets currently being targeted.

There was overall consensus on a desire to export. The preferred market was the USA (32%), followed by Canada (27%) and CARICOM (23%). There was unanimous agreement on the willingness to alter business operations in order to meet requirements for these export markets.



3 Building Enterprises: Guidelines for Business and Product Development

3.0 Getting Started: Business Planning

3.1 Product Development: Getting the *right* product to the *right* buyer

- 3.1.1 Preparation - Getting a Sense of where things are
- 3.1.2 Understanding the Needs of New Products - Identification & Screening of Product
- 3.1.3 Research - Assessing the Opportunities
- 3.1.4 Pilot Production - Getting the Internal & External Requirements Right
- 3.1.5 Commercialisation

3.2 Operations Management

- 3.2.1 Process Design for Food Safety Management
- 3.2.2 Employee Training
- 3.2.3 Selecting Appropriate Equipment
- 3.2.4 Food Packaging
- 3.2.5 Labelling

3.3 Financial Management

3.4 Managing Clientele: Building Equity with Customers

3.5 Positioning in the Value Chain

3.0 GETTING STARTED: BUSINESS PLANNING

Planning is an essential tool for the modern agribusiness in managing risks and makes use of available data (e.g. farm records) to make better business decisions. These plans enable the agribusiness operator to analyse the impact of decisions on the performance (production, market, financial, etc.) of the business before implementing a new practice or pursuing a particular course of action. At the very least, a business operation and marketing plan are recommended.

The objective of the plan is to be useful and not complicated! Some templates are given below as a guide. Of course, the plan should be modified to suit your operation and to make it easy to use for you.

3.1 PRODUCT DEVELOPMENT: GETTING THE RIGHT PRODUCT TO THE RIGHT BUYER

Product and process development (often abbreviated to product development) may be defined as generating ideas for new or improved products, selecting the best ideas, and developing these into commercially successful products (Wheatley et al. 1995²⁵). The aim here is to create value – the basic principle of which is to produce or provide a product or service that has sufficient value for customers or end-users that they will pay for that product or service (Boehlje et al. 1999²⁶). Specifically, innovations in product development tend to be motivated by opportunities for growth and profitability through innovation in new products, processes and markets²⁷.

Successful product development depends on the integration of activities across the three major operating areas for the product: production, processing and marketing. Integrating these activities focuses on ensuring that actions undertaken at each stage support and are in sync with each subsequent one so that there is a smooth and aligned progression. Consequently, the focus is on product *and* process development. Where 'product' defines what will be produced (i.e. the end product), 'process' explains how this will ultimately be accomplished. This will be the focus of this chapter in providing guidance to small processors on product development.

²⁵ Wheatley, C., Scott, G. and Best, R. 1995. Adding Value to Root and Tuber Crops: A Manual on Product Development. The International Center for Tropical Agriculture (CIAT).

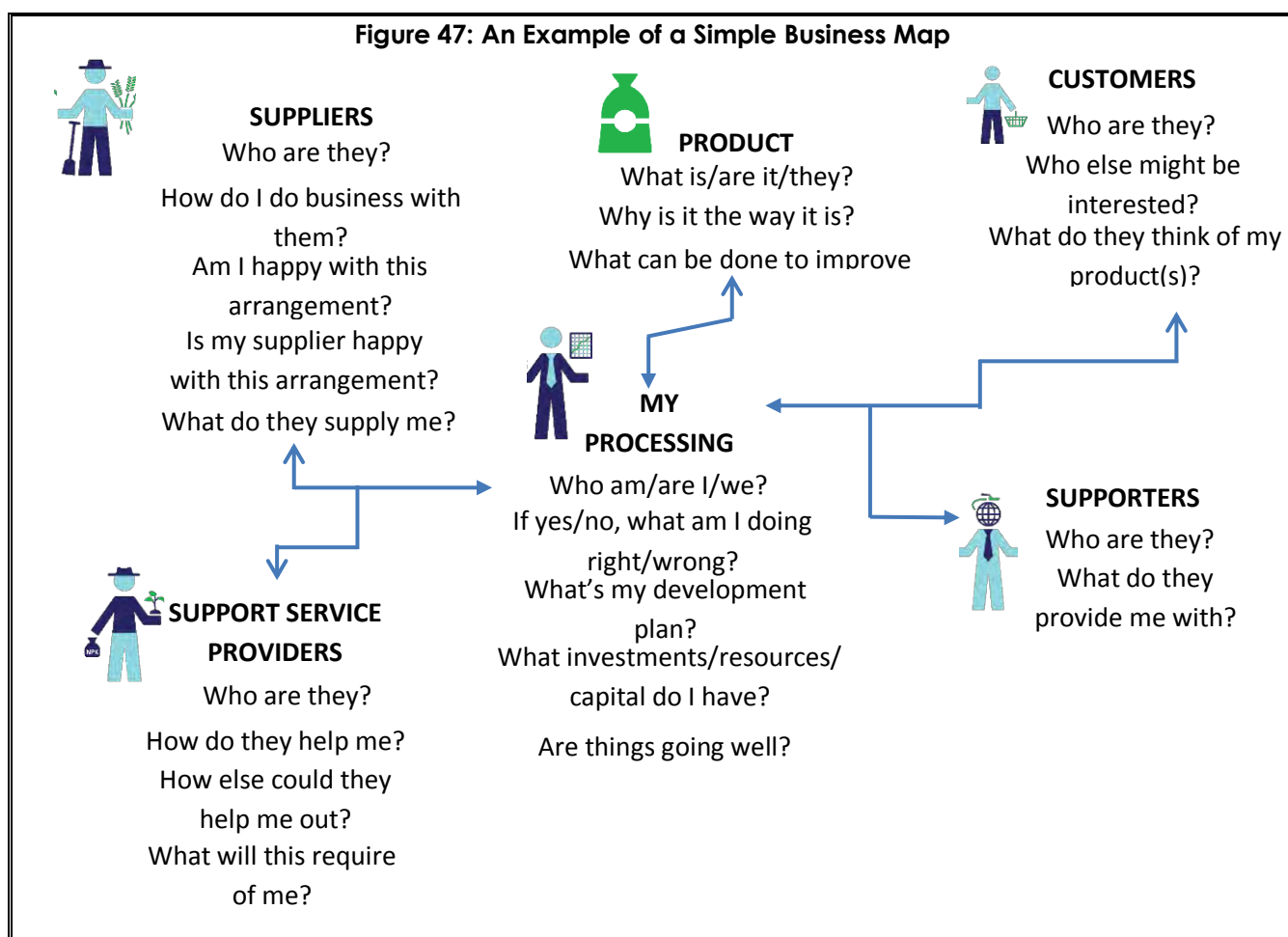
²⁶ Boehlje, M., Hofing, S., and Schroeder, R. 1999. Value Chains in the Agricultural

Industries. <http://www.centrec.com/articles/value_chain_ag_industry/value_chains_in_ag_industry.pdf>

²⁷ Smeal College of Business. 2006. Product and Service Innovation in Small and Medium-Sized Enterprises. The Pennsylvania State University. <<http://www.smeal.psu.edu/cmtoc/cmtoc/research/nistnpsd.pdf>>

3.1.1 Preparation – Getting a Sense of Where Things Are

The preparation step focuses on defining important aspects of your business that will give you a sense of where you are today before you start off on a new venture. A recommended approach to doing so is to do a business map (Figure 47). The business map captures all the major relationships and/or interactions that the processing operation has and gives brief details on what can be called upon or further pursued in developing the new product. As seen in Figure 47, it is necessary to consider how your processing operation affects or is affected by the major relationships. These represent areas of possible advantage which you would want to capitalize on, or challenges which you will have to take account of.



Taking the time to appraise your current situation is beneficial for several reasons. Firstly, it gives you a clearer idea of what is available for you to work with besides just your

equipment, operating space and own hands. This starts a process of identifying the range of resources that are available to you and which you may wish to call upon in developing the new product, as well as identifying the places and/or people that can be existing and potential sources of ideas. Secondly, this process by its nature introduces new considerations into the dynamics of your enterprise which helps you in defining the strategy within which your enterprise can operate – very beneficial if the new product is a success, but still rewarding even if it is not.

3.1.2 Understanding the Need for New Products - Identification & Screening of Product

Successful new products satisfy a need or want of the buyer in a way that creates so much satisfaction that the person is inclined to buy it again. Where should you begin in conceptualising this new product? The idea here is to start at the end and work your way backward: first identify what consumers are buying and interested in buying, then create a draft of what the finished product could be like based on your observations of consumers. What need or want does the product match or satisfy? Be as specific as you can and consider elements of how the consumer is likely to think about and respond to the product. For example, its taste; look (the product as well as its packaging); can it be eaten as is or must it be cooked/heated; can it be eaten one-handed; would it go well together with another food/product that the consumer is regularly buying; can it be opened, stored and re-opened during its use? etc. Many consumers make a purchase based on these kinds of considerations and so the product must essentially give an answer to these preferences.

It was found that most processors of roots and tubers in the Caribbean have an intimate relationship with their customers – so much so that they regularly receive special requests for new products to be developed. This should be one of the first avenues explored in getting fresh ideas. In focusing on the consumer and the intended use of the product, you can then create a broad list of options and categories from which the best ideas can be short-listed based on the outcomes of your Preparation. This then leads to an Idea Screening phase where you rank the best ideas. This is in addition to your own assessment of your ability to produce the new product based on your current situation. Some sample points are presented below for consideration using a rudimentary scale to score/rank each idea as high (very desirable) or low (very undesirable).

Checklist for Screening	Product idea #1		Product idea #2	
	High	Low	High	Low
i. How well does the product idea match up to the general preferences of consumers for similar products (i.e. a sweet or salty snack; drink; frozen treat, etc.)				
ii. What are the major inputs or elements that have to go into getting the product to meet these preferences? Are you able to do this given your current resources or resources that you can access? (Done in conjunction with the Research steps below).				
iii. What are the chances for this product succeeding on the market?				
iv. Can the product be priced competitively and still turn a profit?				

3.1.3 Research –Assessing the Opportunities

Now that you have short-listed those ideas which seem most hopeful, it is necessary to do more in-depth examination of the requirements for creating the new product and its likelihood of succeeding. This activity seeks to map out all requirements for the new product and to prove that it can truly be a worthwhile venture. Some of the critical assessments to be done at this stage are discussed below.

3.1.3.1 Market and Consumer Assessment

This stage entails getting a clear idea of who the real and potential buyers are; whether or not they are or would be interested in buying your product; why and how much of it, If yes; (why not, if no); and where they would prefer to do so (phew!!). This can be a very intense exercise but is well worth it to get the product concept right. In addition, doing this early will give you insights into how best to design and promote the new product. Table 6 shows a simple survey that can be used to assess consumers and their demand for the product idea. In Section 1.4.3 a summary review of the market environment for root and tuber products is done, as a starting point on some of the key elements that you should consider.

3.1.3.2 Product Concept Testing

The product concept revolves around what you hope the consumer will think about your product once it is seen and/or consumed. This may be assessed in two ways: firstly, by testing consumer preferences for the new product's characteristics during the market and consumer assessment, or secondly, as a tasting/testing after the new product has been manufactured.

3.1.3.3 Process Design

That is, specifying a process for production that is within your capability but does not compromise the product characteristics. This is the operational aspect of your research which explores how you are going to put all the elements of your new product idea together.

Table 6: Simple Survey for Assessment of Consumer preferences for a New Cassava Bread Product

Characteristics	Product Preferences			
What customers want from a cassava bread				
<i>Size/shape</i>	<input type="checkbox"/> loaf <input type="checkbox"/> 12 slices <input type="checkbox"/> 9 - 11 slices <input type="checkbox"/> 6 - 10 slices <input type="checkbox"/> < 6 slices	<input type="checkbox"/> Flatbread/ bammy <input type="checkbox"/> 12 <input type="checkbox"/> 9 - 11 <input type="checkbox"/> 6 - 10 <input type="checkbox"/> < 6	<input type="checkbox"/> Hops/ buns <input type="checkbox"/> 12 <input type="checkbox"/> 9 - 11 <input type="checkbox"/> 6 - 10 <input type="checkbox"/> < 6	<input type="checkbox"/> Soda bread <input type="checkbox"/> 12 <input type="checkbox"/> 9 - 11 <input type="checkbox"/> 6 - 10 <input type="checkbox"/> < 6
<i>Additional ingredients</i>	<input type="checkbox"/> whole wheat <input type="checkbox"/> savoury herbs <input type="checkbox"/> coconut	<input type="checkbox"/> cheese <input type="checkbox"/> meat <input type="checkbox"/> none	Other (please specify):	
<i>Preferred Price</i>	<input type="checkbox"/> \$5 - \$10 <input type="checkbox"/> \$10 - \$15	<input type="checkbox"/> \$10 - \$15 <input type="checkbox"/> \$15 - \$20		
<i>Need for refrigeration</i>	<input type="checkbox"/> Yes		<input type="checkbox"/> No	
<i>Expected shelf life of the product</i>	<input type="checkbox"/> 1-2 days <input type="checkbox"/> 3 - 5 weeks <input type="checkbox"/> at least 1 week		<input type="checkbox"/> 1-2 days <input type="checkbox"/> 3 - 5 weeks <input type="checkbox"/> at least 1 week	
<i>Preferred purchase frequency</i>	<input type="checkbox"/> every 1-2 days <input type="checkbox"/> every 3 - 5 weeks <input type="checkbox"/> at least once per week			
<i>Light or Heavy bread</i>	<input type="checkbox"/> Light		<input type="checkbox"/> Heavy	

<i>Cutting</i>	<input type="checkbox"/> Firm	<input type="checkbox"/> Soft	<input type="checkbox"/> In between
Re-sealable pack	<input type="checkbox"/> Yes <ul style="list-style-type: none"> <input type="checkbox"/> Plastic pack <input type="checkbox"/> Brown paper <input type="checkbox"/> Cardboard box 		<input type="checkbox"/> No <ul style="list-style-type: none"> <input type="checkbox"/> Plastic pack <input type="checkbox"/> Brown paper <input type="checkbox"/> Cardboard box

This would involve finding out what will be required or the recipe to meet the product characteristics you detailed before, as well as smaller matters such as making sure that all the elements and/or ingredients (including packaging/storage) can be obtained without hassle. Perhaps the most important aspect to consider is the replicability of the process - that is the ability to replicate or expand on your successes in producing the new product. This is essential to ensure that you can later produce the new product at the level necessary for the market. **The section on Operations Management below gives more details on process design.**

3.1.3.4 Estimating Cost of Production and Profitability

This follows from specifying the process design and its elements. Here you should calculate the cost for one unit of the product and add to that the profit (i.e. contribution margin) that you would want to make on each unit. This final figure will be the selling price. Another important assessment for the pilot stage is to determine the level of production that will allow you to break even – that is, to allow you to at least recover all your costs. This level of production would represent a benchmark that you would have to exceed in order to be profitable, and thus determine the scale or scope at which you will have to produce. Of course, you must carefully consider whether or not your available resources (i.e. labor, finances, etc.) and strategy will allow you to exceed this benchmark. To make sure that your selling price is acceptable take the price of a similar or competing product as a benchmark. The break-even level for your operation tells you how many units of the product need to be sold to cover all your fixed expenses. This is calculated as:

$$\text{Breakeven point in units} = \text{fixed costs} / \text{contribution margin}$$

Similarly, you can calculate the amount that you must produce (N) to reach a target profit level. Assuming fixed costs of \$1,500, a target profit level of \$963 and a unit contribution margin of \$1.07, the level of production to meet this (N) is calculated as:

$$N = (\text{fixed costs} + \text{target profit}) / \text{unit contribution margin}$$

$$= \frac{(\$1,500 + \$963)}{\$1.07} = 2,302 \text{ units of the product}$$

Table 7 provides a template for doing these calculations. After determining these or while specifying them, it would be good to talk to institutional partners who may be able to give guidance on how best to go about doing the research. This may be particularly useful in doing market research for an export market.

Table 7: Estimating Cost of Production and Profit for a Cassava Processing Enterprise

Cost Component	Direct inputs	Quantity	Total Cost (\$)
Direct materials	raw cassava	1,000 (lb)	1,100.00
	water	3 units	30.00
	sugar	100 (lb)	200.00
	salt	10 (lb)	25.00
	pepper	10 (lb)	30.00
	Sodium Benzoate	20(oz)	10.00
Packaging	bag	900	270.00
	label	900	180.00
Labour	man hrs	20	240.00
Other			100.00
Total Cost per batch			<u>2,185.00</u>
Unit cost (\$)		900	2.43
Selling price per unit (\$)			3.50
Unit Contribution Margin			1.07
Profit			<u>963.00</u>

3.1.4 Pilot Production – Getting the Internal and External Requirements Right

The focus here is on starting production of the new product on a limited basis to get the process exactly right and to determine its feasibility. The process is influenced by both your own internal coordination of the business, and the inputs from partners outside of the business (e.g. suppliers of raw material). Thus, particular attention should be paid to replicability, the findings of the consumer assessments, as well as profitability. At this point problems evaluated will show up, as well as some you may not have considered. These will challenge you to find solutions. If a feasible solution cannot be found, then you may need to put that idea aside for now and work on another.

3.1.5 Commercialization

Using all of the knowledge and experience proven in the pilot production stage, you can now replicate and expand the manufacturing of the new product to meet your target market(s). However, you should still be on the lookout for new challenges that may arise in coordinating production of larger volumes, promoting and distributing the goods, as well as the financial demands of the scale of operation.



Experimenting with new product recipes

Recommended material on product development using root and tuber crops:

SME Toolkit Caribbean

<http://caribbean.smetoolkit.org/caribbean/en/content/en/243/Deciding-on-a-Business>

Adding Value to Root and Tuber Crops: A Manual on Product Development

http://www.fao.org/sd/erp/toolkit/BOOKS/adding_value.pdf



Processing for Prosperity

<http://www.fao.org/docrep/015/i2468e/i2468e00.pdf>

3.2 OPERATIONS MANAGEMENT

Managing the processing enterprise requires more than just producing the product in most cases.

3.2.1 Process Design for Food Safety Management

Careful attention is given to the process design because it is necessary to define quality characteristics and potential dangers, as well as to forecast the quality of a finished product (Rozpendowska 2004²⁸) with the objective of creating production conditions which guarantee optimal quality products. Specifying the processing system was briefly mentioned in the section on new product development, but here greater detail is given on process design as an important element of successful management.

Two key aspects of food safety are recommended to begin with Good Hygiene Practices (GHP) and Good Manufacturing Practices (GMP). GHP identifies the activities to be carried out during the production and processing of a food product to assure the relevant health quality of the food product. Similarly, GMP focuses on the routine

²⁸ Rozpendowska, M. 2004. GMP/GHP and HACCP Systems – Experiences of Small and Medium Food Enterprises in Poland. Quality Enhancement in Food Processing Through HACCP. Asian Productivity Organization. <<http://www.apo-tokyo.org/publications/files/agr-14-hacccp.pdf>>

practices of a company and how these serve to determine the extent to which the produced food represents the desired/required quality (Rozpendowska 2004²⁴).

It is recommended that processors build the GHP/GMP guidelines into a hazard analysis, critical control point (HACCP) system. HACCP is an independent food safety assurance system specific to the food sector. It emphasizes a systematic, scientific, proactive and preventative approach to identifying and assessing the hazards associated with a food operation and defines the means of their control (Raju 2004²⁹). This system imposes the duty of defining and assessing hazards and monitoring the critical points. In this way, it provides a very critical assessment of a food processing system and allows for appropriate interventions or contingencies to be introduced to ensure quality and safety by minimising or completely eliminating any possible dangers. As a result, it is useful to the food processor and the food industry in identifying, prioritizing and controlling major food risks and assuring consumers that the products are safe to the extent that science and technology allow (Raju 2004).

The intention here is that processors define a set of principles and practices that will be carried out to ensure food quality and safety while providing evidence of these being conducted. Primary principles and components for the HACCP system include:

1. *Critical process and product parameters* which identify the requirements for a safe and wholesome product which meets the target (or minimum) quality standards. Herein, GHP and GMP are defined.

Why Small Processors should try HACCP System for Food Processing Design:

1. *Reduced risk of food-borne diseases*
2. *Increased awareness of basic hygiene*
3. *Increased producer confidence in his/her own product*
4. *Opportunities for branding and product differentiation*
5. *Increased consumer confidence and equity in the product being bought*
6. *Expanded opportunities for market access and presence*

Remember, when it comes to Food Safety...

Prevention is better than cure!

²⁹ Raju, K. 2004. Implementing HACCP in SMEs – Concept vs. Consumer Participation, Business Culture and Policy Approach.

2. *Hazard identification and assessment* to define potential risks/threats to the processing system.
3. *Specification of control measures* that will be taken at critical points to remedy threats/risks while not compromising the process and product parameters.
4. *Monitoring and measuring* for giving evidence of practices carried out. Record keeping and proper documentation of activities are critical here.
5. *Validation and verification* where independent verification (e.g. in collaboration with local health or standards authorities) is undertaken periodically to reassure consumers and food health regulators.



There are many available guidelines for establishing a HACCP system. These may be useful:

Hazard Analysis and Critical Control Point (HACCP) System and Guidelines for its Application:

<http://www.fao.org/docrep/005/Y1579E/y1579e03.htm>



Guidance Document: Implementation of Procedures based on the HACCP Principles, and facilitation of the Implementation of the HACCP principles in certain good businesses:

http://ec.europa.eu/food/food/biosafety/hygienelegislation/guidance_doc_haccp_en.pdf

Requirements for a HACCP based Food Safety System

http://www.foodsafetymanagement.info/bron/cms_file/66_english_Option%20A%20Requirements%20for%20an%20HACCP.pdf

3.2.2 Employee Training

The quality of employees is important to the quality of the end-product. It is therefore necessary that employees receive adequate training, instruction and supervision until they are properly aware of their responsibilities and are capable of performing them effectively. Activities and procedures should be based on the GHP/GMP protocols discussed before.

3.2.3 Selecting Appropriate Equipment

The selection of suitable products, and the process by which to make them, requires very careful consideration (Azam-Ali et al. 1992). Appropriate food technology implies affordable, locally produced and locally repaired, reliable technology that has a suitable scale and complexity of operation for the people who will operate it (CTA

1992³⁰). To that end, the processor should focus on the benefit to the manufacturing process as well as the ease of obtaining and maintaining the equipment chosen.

3.2.4 Food Packaging

The product should be packaged with its intended use in mind. Therefore, aspects of your packaging such as the type of packaging material, its characteristics, environmental considerations (e.g. disposal/recycling, etc. as well as information on appropriate disposal where necessary) and whether or not the consumer could be encouraged to re-use the package in some thrifty way should be carefully considered.

3.2.5 Labeling

A label refers to any legend, work or mark attached to, included in, belonging to or accompanying any goods or package.

A label should provide the following information:

- Identity
- Net content
- Name and identifiable business address of processor, packer, importer, distributor
- Country of origin
- Ingredient listing
- Date marks

Optional information includes:



- Pictorial representation of the product
- Nutrient content claims
- Health claims
- Storage instructions

A standard nutrition label required for export to the USA

Nutrition Facts		
Serving Size 1 cup (228g)		
Servings Per Container 2		
Amount Per Serving		
Calories 250	Calories from Fat 110	
	% Daily Value*	
Total Fat 12g		18%
Saturated Fat 3g		15%
Trans Fat 3g		
Cholesterol 30mg		10%
Sodium 470mg		20%
Potassium 700mg		20%
Total Carbohydrate 31g		10%
Dietary Fiber 0g		0%
Sugars 5g		
Protein 5g		
Vitamin A		4%
Vitamin C		2%
Calcium		20%
Iron		4%
*Percent Daily Values are based on a diet of other people's secrets.		
	Calories:	2,000 2,500
Total Fat	Less than	65g 80g
Sat Fat	Less than	30g 25g
Cholesterol	Less than	300mg 300mg
Sodium	Less than	2,400mg 2,400mg
Total Carbohydrate		300g 375g
Dietary Fiber		25g 30g

³⁰ CTA. 1992. Small-scale Food Processing – A guide for Appropriate Equipment. The Center for Technical Cooperation on Agriculture ACP-EU (CTA). <<http://www.fao.org/WAIRdocs/x5434e/x5434e00.htm>>

- Special recipes

 <p>Food processor</p>	<p>Recommended material on food processing equipment:</p> <p>Small-scale Food Processing – A guide for Appropriate Equipment. The Center for Technical Cooperation on Agriculture ACP-EU (CTA). http://www.fao.org/WAIRdocs/x5434e/x5434e00.htm</p> <p>Azam-Ali, S. 2003. Small-scale Food Processing: A Directory of Equipment and Methods. Second Edition. London, United Kingdom.</p>
 <p>Multi-purpose grater</p>	<p>Recommended material on labeling:</p> <p>CARICOM Regional Standard for Labelling of Pre-packaged Goods http://www.ftbs.org.tt/documents/LabelingofPrepackagedGoods-CRSDCS66200x.pdf</p> <p>Food Label Requirement Made Simple: A Guide for the FDA Food Label Regulations http://www.tpgtex.com/PDFs/Food%20label%20requirements%20made%20simple.pdf</p> <p>Recommended contacts for food processing equipment/technology:</p> <p>Caribbean Industrial Research Institute (CARIRI) http://www.cariri.com/index.php/analytical-chemistry-and-microbiology-services/biotechnology</p>

3.3 FINANCIAL MANAGEMENT

Financial management should be considered as simply keeping track of the money earned and spent so that you can accurately determine whether or not a profit is being made. There are many kinds of financial documents, but two that are useful to business planning and management are highlighted. The common attribute of the two is that there are schedules of expected returns and costs. These are detailed below:

- (a) **Operations Budget** - a budget is an estimate and plan for what is going to happen. Seldom does anything turn out exactly as planned, or budgeted, but it is essential to anticipate and estimate what is expected to happen. Budgets are a must when seeking financing from lenders and are essential to properly managing your business activity.

The operations budget should be prepared for each individual enterprise activity. It projects costs and returns over a production period and forms the basis for constructing whole farm, partial, and cash flow budgets. An enterprise budget includes all of the expected costs and returns associated with operating one enterprise in a particular manner.

A simple operations budget is shown in Table 8. The budget compares the expected or budgeted expenses, revenues and resulting profit against what actually happens during the course of the operation. This accounts for changes that occur in the real world (e.g. sudden increase in price of an input or an unexpectedly large order) and which may affect the plan. The difference between the budgeted values and the actual values is the variance. This value can be either positive (indicating savings on the budgeted expense or a higher price for the product) or negative (indicating an overrun on the cost or lower price for the product). In either case, it is informative and gives the processor an idea of which areas of the processing operation may be most subject to change and so may require re-planning or more careful control/monitoring.

Table 8: Sample Operations Budget

Activity Category	Summary Details	Budgeted (\$)	Actual (\$)	Variance (\$) (Actual-Budgeted)
EXPENSES				
Direct materials	Raw cassava - 1,000 lb @ \$1.10/lb Water - 3 units @ \$10/unit Sugar - 100 lb @ \$2/lb Salt - 10 lb @ \$2.50/lb Pepper - 10 lb @ \$3.00/lb Sodium benzoate - 20 oz @ \$0.50	1,395.00		
Packaging	Bags - 900 @ \$0.30/bag Labels - 900 @ \$0.20/label	450.00		
Labour	Man hrs - 20 @ \$12.00/hr	240.00		
Other		100.00		
Total Expenses:		2,185.00		
REVENUES				
Sales	900 @ \$3.50 each	3,150.00		
PROFIT		963.00		

- (b) **Sales and Purchases Ledger** – these two documents represent a record of all sales of goods and purchases of inputs on a day-by-day basis. The information in these is put into the cash flow statement which is the next recommended financial document (Tables 9 and 10).

Table 9: Sample Sales Ledger

Date	Transaction	No.	Debtor (\$)			Sales (\$)
			IN	OUT	BALANCE	IN

Table 10: Sample Purchases Ledger

Date	Transaction	No.	Creditor			Stock	Equipment
			IN	OUT	BALANCE	OUT	OUT

- (c) **Cash Flow Statement** – this is a financial document that records all the cash inflows (i.e. income, grants, investments, etc.) and outflows (i.e. expenses for operations, equipment, repayment of loans, etc.) of the business. The net cash flow position at the end of the reporting period (e.g. this can be monthly or at any other interval that is not too demanding) is the difference between total inflows and total outflows. Table 11 below shows a simple cash flow statement for a processing operation.

Cash outflows are in red to make the distinctions easier. It starts with net earnings (i.e. net income that you are starting the period in question with) to which is added the net cash flow from operations (i.e. difference between operating inflows and outflows) and the net cash flow from financing activities (i.e. the difference between investments and financing expenses).

The cash flow statement is useful because it gives a clear picture of which inflows and outflows are most important to the business. Even before starting the business, you could prepare an *expected* cash flow statement. In this way you can more clearly demonstrate the potential or worth of your enterprise when discussing with lending agencies or grant funders who will want a picture of the return on investment.

Table 11: Sample Cash Flow Statement

Company ABC CASH FLOW STATEMENT 1 st Quarter 2013 (Jan-Mar 2013)		
Cash Flow From Operations	\$	\$
Net Earnings (A)		2,500.00
<i>Additions to Cash</i>	200.00	
Sales receipts	4,200.00	
Other receipts	450.00	
Total Cash Inflows from Operations (i) <i>(Sum of all additions to cash)</i>		9,850.00
<i>Subtractions from Cash</i>		
Purchases (Inventory goods)	1,000.00	
Staff wages/Labor	2,000.00	
Payment to suppliers	700.00	
Total Cash Outflows from Operations (ii) <i>(Sum of all subtractions from cash)</i>		3,700.00
Net Cash from Operations (B) <i>(i - ii)</i>		<u>6,150.00</u>
<i>Cash Inflow from Investing</i>		
Grant funding	5,000.00	
Total Cash Inflows from Investing (iii)		5,000.00
<i>Cash Outflow from Financing</i>		
Payment on loan/credit	1,800.00	
Total Cash Outflows from Financing (iv)		1,800.00
Net Cash from Financing Activities (C) <i>(iii - iv)</i>		<u>3,200.00</u>
CASH FLOW FOR 1ST QUARTER (A+B+C)		<u>11,850.00</u>



Putting it all together

Recommended material on small business management:

SME Toolkit Caribbean

<http://caribbean.smetoolkit.org/caribbean/en/content/en/243/Deciding-on-a-Business>

✚ Starting a Value-Added Food Business

<https://nifti.wikispaces.com/file/view/ValueAddedFoods-small.pdf>

3.4 MANAGING CLIENTELE: BUILDING EQUITY WITH CUSTOMERS

"A company's current customers provide the most reliable source of future revenues and profits."

Lemon et al. 2001

Increasingly, customers want to become engaged in meaningful experiences and to become immersed in authentic relationships (SearchCRM 2013³¹). This can be created with either a service or a product, and forms the basis for creating customer equity and building clientele. Customer equity refers to the value of potential future revenue generated by a customer's continued

purchases over their lifetime. The idea is that by creating a sense of satisfaction or appreciation in your customer, you may be able to create long-term customer relationships characterised by repeated purchases of your product or brand (Storbacka 1994³²; Rust et al. 2004³³). Many successful businesses – small and large – think that it is easier (and less costly) to get a current customer to use your product more often or more of your range of products, than it is to get a new customer (Blattberg and Deighton 1996³⁴). In the case of the latter, given that many of the root and tuber processors surveyed produce other processed commodities in addition to root and tuber products, this may be an important consideration. Furthermore, customer equity can be incorporated into the promotion and marketing strategy for your product/business. This concept is linked to relationship marketing and is also touted as a great way to gain marketing advantages in niches (Strategic Business Team 2013³⁵). Below are a few tips for building customer equity into your business, promotion and/or marketing strategy:

- (i) Build a relationship of trust and reliability with partners and customers**– Doing this involves looking at not just your product(s), but more importantly, at the way you do business – inclusive of arrangements with suppliers of raw materials and retailers (if used). Customers tend to evaluate both the product and the person/business supplying the product in creating equity. In particular, they value 'good/positive' relationships over 'bad/negative' ones and are more likely

³¹ SearchCRM. 2013. Building Customer Equity: How to create addicted customers. Excerpts from Addicted Customers by John Todor. <<http://searchcrm.techtarget.com/feature/Building-customer-equity-How-to-create-addicted-customers>>

³² Storbacka, K. 1994. The Nature of Customer Relationship Profitability. Helsinki: Swedish School of Economics and Business Administration.

³³ Rust, R., Lemon, K. and Zeithaml, V. 2004. Return on Marketing: Using Customer Equity to Focus Marketing Strategy. Journal of Marketing. Vol. 68; 109 – 127.

³⁴ Blattberg, R and Deighton, J. 1996. Manage Marketing by the Customer Equity Test. Harvard Business Review. July-August 1996.

³⁵ Strategic Business Team. 2013. 10 Relationship marketing Strategies for Building Customer Relationship.

<<http://www.strategicbusiness.com/small-business-marketing-strategy/relationship-marketing-10-strategies-to-building-a-strong-customer-relationship/>>

to be successfully engaged through the former. From a marketing perspective, this can be considered a direct marketing strategy of engaging consumers. This good/positive relationship will enable you to more clearly determine what is most important to the customer and to begin to identify your critical strengths and hidden vulnerabilities in aligning the product and/or service with these preferences. In this way, your business strategy can be refined.

The trusting relationship must be built upon the sense of safety, wholesomeness, taste, etc. that the consumer values (e.g. based on your consumer assessment) and your ability (and assurance) to always deliver on this. In fact, communicating these (e.g. through packaging, labeling, brand name, etc.) is a good way to create a positive association with the product.

(ii) Deliver experiential value based on customer preferences - This focuses on the way the product and your promotion are put together to create a sense of value (satisfaction) and a positive association in the consumer/customer. For example, by organizing simple client events (inclusive of product demonstrations on local TV or in public, food tasting at the supermarket or other central locations, or networking with hotels or other businesses to make samples available) which give the customer the opportunity to experience your product and to establish a favorable opinion of you. Of course, the product should lend itself to the approach you choose (e.g. a quickly prepared product if on a TV show or live demonstration). If you have a range of products that lend themselves to unique and interesting uses it might be worthwhile to create an online presence that allows persons to see and engage with you (e.g. website, Facebook page, etc.).

(iii) Build a strong brand identity – Brand identity simply refers to what you want the product to be known/ recognised for or considered as. Not only does this make identifying your product amongst others easier, it also creates a distinguished reference name/point by which consumers establish an association with you and/or your product. Important elements of your brand identity should include a good slogan, attractive logo (hence packaging is important) and a theme that is unique (Strategic Business Team 2013).

3.5 POSITIONING IN THE VALUE CHAIN

The value chain represents the set of processes and activities undertaken by businesses to add value to a product (good or service) such that this meets customer expectations

in meaningful ways. Understanding value chains for root and tuber products can give processors new opportunities for working with other actors in their chain to improve profit, and to create avenues for using feedback loops with customers to keep businesses and their products competitive.

Properly positioning your business in the value chain is aimed at improving the long-term performance of the business. This is done by linking internal business activities with external activities (i.e. taken by value chain partners) and regulations (i.e. the food safety and market standards) that work to ensure that products reach consumers in the way that they require. Thus, for the small processor, positioning in the value chain involves two elements:


(i) Coordinating internal activities such that:

- *Value-creating aspects of the business are never compromised.* This requires that important aspects of the product and business identity which create customer equity (e.g. product quality guidelines, relationships with partners, product labeling, etc.) are never compromised. This creates the basis for consistency and thus sustainability of your brand or product identity to partners and customers.
- *Compliance with market standards and wholesale/ retail requirements is built into the processing operation.* This requires that process and product standards are set-up, adhered to, and verified so that buyers are certain of the quality standard of the product.
- *Establishing stable supply relationships and arrangements (e.g. contractual buying) with suppliers and buyers* to ensure that input and output functions are conducted in a timely manner. Stable supply arrangements are mutually beneficial: farmers benefit from a guaranteed market, while processors secure the quality and volume of input needed. This is important to the enterprise's positioning in the value chain because it recognizes the processor's role in creating new/additional market opportunities for farmers and support actors who facilitate the movement of the product (e.g. transporters/distributors); and

(ii) Coordinating with external requirements such that:

- *Regulatory requirements (food processing license, permits, etc.) are conformed to and verified* as needed to ensure that product identity/brand is not compromised and so that the public can be certain of this.
- *The processing operation is integrated with partners in the value chain.* This is important to value chain development and can be done in collaboration with some form of cluster (i.e. cooperative, farmer group, industry association, etc.) or by the processor vertically integrating within the chain. The former seeks to build

the relationship across the value chain that is critical for stabilising production, processing and other support services. Vertical integration tries to increase the number of chain activities related to the product that are performed by the business/actor. For example, the processor takes responsibility for producing his/her own raw material (as seen for some of the processors in the surveyed countries), in addition to processing, transport, marketing and customer engagement. In this way, the processor becomes a chain partner and has input into the way the value chain is managed, as well as creating opportunity for performing new functions in the value chain, which in turn could see new products or services being developed.

 <p>Product diversity</p>	<p>Recommended material on small business positioning and support:</p> <p>Food Processing and Agribusiness http://www.kpmg.de/16338.htm</p> <p>The Global Cassava Strategy http://www.fao.org/docrep/006/y0169e/y0169e04.htm</p>
 <p>Creating value for customers</p>	<p>Value Chain Redesign http://www.im.ethz.ch/education/HS08/Kagemann_Oesterle_Value_chain_redesign.pdf</p> <p>Boehlje, M., Hofing, S., and Schroeder, R. 1999. Value Chains in the Agricultural Industries. http://www.centrec.com/articles/value_chain_ag_industry/value_chains_in_ag_industry.pdf</p>



4 Intervention Points: Putting Efforts where they are needed most

4.0 Introduction

4.1 Improving/Innovating Processor Operations

4.1.1 Business Management and Good Management Practices

4.1.2 Improvements in Food Safety Management

4.2 Facilitating Technology Transfer and Capacity Building

4.2.1 Establishing Good Practices Centres/Hubs

4.3 Support Systems

4.3.1 Improving the Effectiveness of Support Systems and their Delivery Mechanisms

4.3.2 Support to Business Development for Small Entrepreneurs

4.4 Value Chain Coordination

4.4.1 Support to Improved Farm Productivity

4.4.2 Meeting Excess Demand

4.4.3 Development of a Commodity Chain Partnership System

4.5 The Way Forward

4.0 INTRODUCTION

Development partners have expressed considerable support for the expansion of value-added processing of roots and tubers at all levels - recognising the potential for improvement of food and nutrition security, enterprise development and creation of sustainable livelihoods. In this context, the findings of the survey on cassava and sweet potato processing are meaningful in providing evidence for future training, capacity building and technological interventions. The findings are also beneficial to the individual country stakeholders and their partners in identifying areas for focus.

The interventions proposed for adoption are based on the following main principles which are then expanded upon in the various key recommendations for the design and implementation of the broader program for enhancing the value-added processing of roots and tubers in the Caribbean, through the transfer of improved technologies. These key principles are:

- (i) Horizontal cooperation to create/leverage networking/collaborative advantages amongst processors and development assistance partners;
- (ii) Appropriate and scaled intervention programs which build a basis upon which processing enterprises can continuously upgrade/expand.

The main program recommendations are now presented in section 4.2.

4.1 IMPROVING/INNOVATING PROCESSOR OPERATIONS

4.1.1 Business Management and Good Management Practices

Improved management should be a first-line intervention to allow processors to first realise the potential benefits of improving their product within the scope of their current operations (i.e. largely based at or near home, limited mechanisation, etc.). As a first step, it demonstrates the added value to competitiveness (i.e. product quality, conformance to consumer expectations, etc.) that can be derived from simply paying closer attention to operations management. This, maybe more than any other intervention, is most within the capacity of processors to immediately do. This intervention should be informed by an audit of current processor practices to specify corrective management practices in the process. It should also include capacity building in working capital and financial management which was identified as an important area for training (See Table 4 on page 18). The objective of this focus would be to improve product conformance to food safety standards/regulations and to

improve the production process and practices to ensure this compliance (i.e. good management practices) which is detailed next.

4.1.2 Improvements in Food Safety Management

Food product quality is hinged upon proper food safety standards. The approach to doing so should be holistic and follow along a harmonious set of good agricultural practices (GAPs) and good manufacturing practices (GMPs) such that the process is also influenced to yield safer and more standardised products. This would help create a better balance between training in food processing and food safety (Table 14). In addition, this process could see closer cooperation with local food safety agencies to create a basis for higher processor registration with food authorities and eventually traceability in expanding marketing and trade. Also, the fact that most employees, including senior-level staff, had comparatively less training in food safety warrants a focus on 'training of trainers' as well as on enabling/facilitating their ability to do so by providing infrastructure and technical assets. This may be facilitated through the Good Practice Centers advocated next.

4.2 FACILITATING TECHNOLOGY TRANSFER AND CAPACITY BUILDING

4.2.1 Establishing Good Practices Centers/Hubs

Opportunities to learn more about best practices and innovation were important requests from processors in the region (see Figures 5 and 6 and Table 5). In addition to being an indicator of a priority area for intervention, avenues for this kind of sensitisation also offer opportunities for networking and building collaborative advantages. Although few processors are currently members of a networking association/group (16%), local collaboration offers opportunities for creating critical mass which would improve the cost-effectiveness and reach of on-going and future interventions in training, capacity building and general access to information and technical resources. These need not be formal networks, but rather a forum/resource for increasing processors' access to business and/or technical support services/interventions at the national level, as well as reducing the coordinating costs to the various partners offering these services.

4.3 SUPPORT SYSTEMS

4.3.1 Improving the Effectiveness of Support Systems and their Delivery Mechanisms

Research and development institutions were the preferred suppliers of business support services while Government programs were the most accessed. This provides an opportunity for greater cooperation amongst national service providers to do joint

interventions. This would greatly reduce overall costs and avoid unnecessary duplication of effort. Moreover, Government, as a strategic partner, could best facilitate the expanded involvement, cooperation and reach of service providers.

4.3.2 Support to Business Development for Small Entrepreneurs

A micro-enterprise fund is proposed. The aim of this fund would be to supplement the reinvestment practice that most processors are already doing to finance their operations by filling a 'gap' not currently attended to by banks and other lending organisations. By establishing a revolving fund system, micro-enterprises can access finance to invest in small-scale/appropriate mechanisation and expansion of their operations. This would accelerate the rate of development of businesses with the potential to do so. The fund should also have a strong business and marketing development capacity-building component to help increase the success rate/utility of investments. Also, in the interest of broadening value chain coordination, the micro-enterprise fund could be used in a community/regional development context to facilitate consistent supply and farm-level improvements that contribute to competitiveness. This could be an incentive to motivate the formation of closer commodity partnerships and value chains, which is explored next.

4.4 Value Chain Coordination

4.4.1 Support to Improved Farm Productivity

The aim is to produce a tuber of lower cost/unit which conforms to the processing needs expressed by processors. The focus here should take two forms:

- (i) Identification and validation (socio-economic assessment of impact of adoption) of varieties which best meet processor requirements for processing viz current and future industry objectives (e.g. application of appropriate technology, food and nutrition security, etc.). Processors had a preference for 'MX', 'Bitter Cassava', 'Butter Stick' and 'Sweet Cassava'; and 'Black Vine', 'Chicken Foot', 'Red Skin' and 'White Skin' for sweet potato. These demonstrate characteristics that are desirable to processors and thus may offer a starting point for this kind of research.
- (ii) Improving farm management to reduce costs and build on existing efficiencies, as several Caribbean producers have already demonstrated capacities for high field productivity (i.e. yield/ha).

4.4.2 Meeting Excess Demand

Forty-eight percent (48%) of cassava processors and 73% of sweet potato processors in the countries surveyed experience unmet demand for their products. This is an important avenue for increasing profitability and expanding the scope for business development. However, the findings suggest that the key issue is one of production scale (i.e. low throughput/turn-over of raw material) as opposed to inadequate supplies of raw materials. In light of this, it might be that it is the requirements of the processing activities (i.e. duration of operations or low scale of operation) which hinder processors from responding to market demand. In meeting excess demand, careful coordination between supplies of raw materials, processing activities and movement to the market/buyers is needed. This may be facilitated through a commodity chain partnership system which is detailed next.

4.4.3 Development of a Commodity Chain Partnership System

This is a system for establishing formal linkages between processors of varying scale with producers and other partners in the sub-sector to create and/or exploit areas of collaborative benefit such as supply coordination; advisory services on packaging and labeling (i.e. sourcing bottles, labels, etc.); improved storage methods; and bulk purchase of common production inputs. This could be established around Good Practice Centers (4.3.1). Further, in the area of new product development, this collaboration of efforts would be meaningful to small enterprises which seem to have better consumer equity and thus are able to both receive requests from consumers for new products, and infer the level of acceptability of other new products to their local consumer base.

4.5 The Way Forward

Several recommendations and areas for interventions based on information gathered from the processors and producers are elaborated upon in this publication. A set of recommendations on how to stimulate the development of the value-added processing have been identified for the root and tuber crop industry, particularly for cassava and sweet potato. This information is intended to contribute to the further development of the value added processing of the root and tuber crops in an effort to improve the performance and to increase the competitiveness and sustainability of the industry, all in an effort to boost food security in the Region.

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ANNEX: LIST OF ESTABLISHMENTS INTERVIEWED BY COUNTRY

BARBADOS				
	NAME OF BUSINESS	ADDRESS	TELEPHONE & E-MAIL CONTACT	NAME OF RESPONDENT
1	BADMC	Fairy Valley Plantation House Fairy Valley, Christ Church	246-428-0250 adrian.kirton@badmc.org	Adrian Kirton
2	O's	#4 Harmony Lodge, Lashley Rd St. Philip	246-416-3283 theostoute@hotmail.com	Theophilia Stoute
3	Five Acres Farm	Hillaby, St. Andrew	246-822-5775	Wayne Smith
4	Delhare Enterprises	Almond Drive, Seaview, Road St. Philip	246-423-3440 dell@caribsurf.com	AdellaHarewood-Young

DOMINICA				
	NAME OF BUSINESS	ADDRESS	TELEPHONE & E-MAIL CONTACT	NAME OF RESPONDENT
1	Jeannette's Platin	Dix Pax	615-3033	Teannette Graham
2	Vera's Platin	Morpo	265-9129	Vera darroux
3	No Name	Tranto Dix Pas	767-285-5899	Titre George
4	No Name	Morpo		Kimani Mitchel
5	Daniel's Cassava Bakery	Point Salybia	617-5058	Daniel Frederick
6	No Name	Good Hope	225-7210	Eulina Jacque
7	Wadada'sPlatin	Good Hope		Andrew Seraphine
8	No Name	Tranto Dix Pas	616-1555/277-4543/446-0080	Vansley vigilant
9	Aimamble'sPlatin	Good Hope, Dominica	448-2753	Aimable Bonnie
10	No Name	Tranto	614-4816	Mauville Graham
11	No Name	Good Hope	245-9736	Kathleen Laurent
12	Clarence Platin	Good Hope		Clarence Seraphine
13	No Name	Dix Pas		Matthew Graham
14	No Name	Good Hope	276-5583	Pierre Labassiere

GUYANA				
	NAME OF BUSINESS	ADDRESS	TELEPHONE & E-MAIL CONTACT	NAME OF RESPONDENT
1	Major's Food Manufacturing	13 Victoria Village, East coast Demerara	592--256-0462	Kwame Wilson
2	Pat's Cassava Bread and Development	Lot 32 Anns Grove East Coast Demerara	592-615-1438	Patricia Sam
3	No Name	Ann's Grove village, East Coast, Demarara		
4	Prestige Manufacturing and Bottling Enterprise	10 La Grange, West Bank Demerara, Guyana	592-264-3720 prestigefoodsguyana@gmail.com	Ram Prashad
5	Natives of Guyana Products	101102 Soesdyke, East Bank Demerara	592-261-6436 tontie31@yahoo.com	Marcia Gonsalves
6	Superior Snacks	210 Mon Repos Block 8 East Coast Demerara	592-234-1650 superior.catering@yahoo.com	Shahezade Lam
7	Blue Flame Women Group	Hosororo Hill BarimaWaini	592-678-6746 christinajames_1@yahoo.com	Christina James
8	Surya Delight	42cc Eccles, East Bank Demerara	592-233-2738suryadelight@yahoo.com	Suresh Paryag

JAMAICA				
	NAME OF BUSINESS	ADDRESS	TELEPHONE & E-MAIL CONTACT	NAME OF RESPONDENT
1	Tijule Company Limited	30 Paisely Avenue, Palmer Cross May Pen, Clarendon	876-986-9598 mailto:Tijule01@yahoo.co mtijule@cwjamaica.com	Juliette Newell
2	Twickenham Bammies	c/o Rada, Hope Gardens Kingston 6 (Twickenham Park, St. Catherine	876-977-1158/61 adminadmin@radajamaica.com. jm	Corna Gooden
3	St. Bess Bammies	New Building, Nain St. Elizabeth	876-961-8614	Sinthea Ashman
4	Cake Shoppe	157 Old Hope Road, Kingston 8	876-970-2231 cakeshoppe@yahoo.com	Sherine Davis
5	Pastry Passions Ltd	Shop 17, Sovereign Centre, Kingston 6	pastrypassionshome@gmail.co m	Karen Summons
6	Brick Oven	26 Hope Road, Kingston 10	876-978-5767/946-2153 info@brickovenjamaica.com	Arlene Miles
7	Mello Bammy	Lydford, St. Ann	876-852-9527	Sherma Clarke
8	Flower Hill Producer Corporation Ltd	Flower Hill Dist. Salt Spring P.O. St. James	876-381-3680	Edna Edwards
9	Jamaica Producer (JP) Foods	Agualta Vale, Annotto Bay, St. Mary	876-968-8525	Florence Reid
10	Stansam's Bammies St. Bess Organic Foods	Main, St. Elizabeth	876-963-6311 preacherwitter@yahoo.com	Joy Samuda & Stanford Witter
11	Central Food Packers	Central Village, Spanish Town St. Catherine	876-984-3118 sunrite@cwjamaica.com	Christopher Campbell
12	RadaLucea	Lucea P.O. Hanover	876-468-9082 williamsonc@rada.gov.jm	Charmain Hepburn Williamson
13	Charleston Bammies	40 Greendale Road, Mandeville, Manchester	876-963-8636	Carol Bloomfield

ST. KITTS AND NEVIS				
	BRAND NAME	NAME	ADDRESS	TEL. NO.
1	Teen	Emontine Thompson	Browne Hill, St. John, Nevis	1(869)469-5871
2	Maureen Stapleton	Maureen Stapleton	Cotton Ground, St Thomas Parish, Nevis	1(869)469-8047
3	Dypresco	Olvis Dyer	Pump Road, Charlestown, Nevis	1(869)469 5350
4	Alison Cornelius	Alison Cornelius	Cotton Ground, St. Thomas Parish, Nevis	1 (869)669-3093
5	Patricia's	Patricia Blake	Stoney Grove, Nevis	1(869)660-1024
6	Kate's Delight	Kate Pemberton	Old Road, St. Kitts	1 (869)465-9983
7	Carton's Farm	Arabella Nisbett	Boyd's Village, St. Kitts	1(869)465-1774
8	Sheila Harris	Sheila Harris	Parray's Housing Project, St. Peters, St. Kitts	1 (869) 465-2357
9	Loretta Patrick	Loretta Patrick	Stone Castle, Tabernacle Village, St. Kitts	1 (869) 465-1952

ST. VINCENT AND THE GRENADINES				
	NAME OF BUSINESS	ADDRESS	TELEPHONE & E-MAIL CONTACT	NAME OF RESPONDENT
1	Clifford Huggins	OWIA		Cena Huggins
2	Mr. P Seet Potato Chips	Enhams McCarthy	784-496-5217	Rene Russell
3	RJ's Products	Calder ridge	784-458-0587	Cecela&Glenda Jack
4	Priti' Farine	Victoria village	784-593-9759	Melvina Dean John
5	Fancy Unity Farmers Cooperative	Fancy, Sandy Bay Post Office/	784-533-6934	Maxwell Francis
	(North Windward Tourism Assoc Fancy Chapter)	VC 0204	tajoekaiso@live.com	
6	Cyrus Snacks	Daphne	784-456-5037 cyrus-snacks@hotmail.com	Elizabeth Cyrus
7	Quality Farine	Dorsetshire Hill	784-432-9907/433-0021	Christelle Hamilton
8	Cassava Processing Plant	P.O. Box 70 Kingstown, St. Vincent	784-570-6583 pearsie559@yahoo.com	Cauldric Browne
9	Greaves Family Farine	Dorsetshire Hill	784-526—9811	Tommie Greaves
10	E&D's Snacks (Enterprise)	Cane garden	784-456-2163	DecildaMcKenzie
11	J. Kinghts	Dorsetshire Hill	784-458-4631	June/Malcom Knights

TRINIDAD				
	NAME OF BUSINESS	ADDRESS	TELEPHONE & E-MAIL CONTACT	NAME OF RESPONDENT
1	D Pone Emporer	120 6th Street		
		Barataria	868-759-5565 ponemporer@yahoo.com	Michael Thomas
2	Adella Pierre	Amazon Road, Farm 43	868-667-8404	AdellaPierre
3	Triniestyle Company Limited	Xia Ave, Monroe Road Cunupia	868-475-4183 triniestyle@hotmail.com	TarranGuyadeen
4	KV's	LP 140 Half Mile Mark Todd's Road, Freeport	868-671-5031 nirmalramthal@yahoo.com	NirmalRamthal
5	The National Marketing & Development Corporation	E16 Caroni North Bank Road, Piarco	868-669-7092	Ayoub Mohammed
6	T&T AgriBusiness Association	11 Eastern Main road Tunapuna	868-645-9204 ttabasec@gmail.com	Allister Glean

TOBAGO				
	NAME OF BUSINESS	ADDRESS	TELEPHONE & E-MAIL CONTACT	NAME OF RESPONDENT
1	No Name	Glamorgan, Sheep Pen Trace	868-290-6461	Lucille Nurse
2	No Name	Goodwood Main Road	868-795-6511	Hugh Beckles
3	No Name	Goldenlane Main Road	868-750-9685	Hilton Quashie
4	No Name	Job Street Belle Garden	868-660-6289	Carlton Beckles
5	No Name	Zion Hill, Belle Garden	868-377-8893	Irvington Sylvester
6	No Name	Louis D'Or Land Settlements	868-351-6529	Patricia Groden-Duke
7	Tobago Original Farine	Pentland Trace, Plymouth	868-367-8558	Pearl Isles
8	No Name	Windsor Trace, Mt. St. George	868-299-16499	Carlene Wright
9	Samuel Nurse	Zion Hill, Belle garden	868-317-9560	Samuel Nurse
10	No Name	Louis D'Or	868-660-5647	Agatha-Lucy O'Neil
11	No Name	Bamboo Hill Les Coteaux,	868-639-2909	Marcia Fournillier
12				Ursula Cooper
13	Audrey's Sweet Hand	Scarborough Market	868-660-0279	Audrey Sebro
14				Natalie Edwards
15				Thomas Small
16	Sheryl's Delight	Concardia	868-380-5399	Sheryl Jemmott
17	M&G Farine Delight	Les Coteaux	868-463-2600	Marcia Elder



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