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**“Agribusiness Essential for Food Security: Empowering Youth and Enhancing
Quality Products”**

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Challenges to the Development of Agro-processing Enterprises in Antigua and Barbuda

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Abstract

The economy of Antigua and Barbuda, a small island developing state, has suffered a number of setbacks in the past four years. The global economic downturn, the collapse of the company that was the second largest employer and the crash of two insurance companies, have led to a scarcity of jobs. This was also compounded by a reduction in visitor arrivals, in a country dependent on tourism. As a result, self-employment has expanded to earn a livelihood. The agricultural sector seems to provide more opportunities for self-employment and the Ministry of Agriculture has received increased applications for farm lands during this period. The increased applications, could possibly lead to more land being farmed, and have the potential for increased crop production. This increased production, presents an opportunity for value addition to increased income earned from the sector. This opportunity is to be encouraged, as providing food through the full utilisation of the value chain can lead to enhanced food security.

However, to properly develop this primary link in the value chain, there are a few challenges that must be overcome. These challenges include, but are not limited to: raw material availability and consistency of supply, high cost of production, limited support from government and non-government agencies, and low volume of production, resulting in limited export opportunities.

This paper looks at the challenges that need to be overcome so that agro-processing agri-businesses can make meaningful contributions to the value chain. The role of women, in agro-processing and their contribution to their households will also be examined; as well as, the definition of agro-processing/ago-industry and its role in the economy.

Keywords: agro-processing, value chain, agriculture, agri-business and raw material.

List of acronyms and abbreviations

CARICOM	Caribbean Common Market
FAO	Food and Agriculture Organisation
GDP	Gross Domestic Product
HACCP	Hazard Analysis and Critical Control Point
IICA	Inter-American Institute for Cooperation on Agriculture
ISO	International Standards Organisation
MDG	Millennium Development Goals
NAMDEVCO	National Agricultural Marketing and Development Corporation
OECS	Organisation of Eastern Caribbean States

SPS Sanitary and Phyto-sanitary

Introduction

Antigua and Barbuda a twin island country is a small island developing state. Antigua, the main island, is located at Latitude 16°N and Longitude 71° W. Antigua, the largest of the English-speaking Leeward Islands, is about 14 miles long and 11 miles wide, encompassing 108 square miles. Its highest point is Boggy Peak (1319 ft.) - recently renamed Mount Obama, located in the south western corner of the island. Barbuda, a flat coral island with an area of only 68 square miles, lies approximately 30 miles due north.

The nation also includes the tiny (0.6 square mile) uninhabited island of Redonda, now an uninhabited nature preserve. The current population for the nation is approximately 84,000 and its capital is St. John's, on Antigua.

Temperatures generally range from the mid-seventies in the winter to the mid-eighties in the summer. Annual rainfall averages only 45 inches, making it the driest of the Eastern Caribbean Islands and the northeast trade winds are nearly constant. Relative humidity is low, year-round (www.geographia.com).

Tourism continues to dominate Antigua and Barbuda's economy, accounting for nearly 60% of GDP and 40% of investment. The dual-island nation's agricultural production is focused on the domestic market and constrained by a limited water supply and a labour shortage stemming from the lure of higher wages in the tourism and construction sectors. Manufacturing comprises enclave-type assembly for export with major products being bedding, handicrafts, and electronic components. Prospects for economic growth in the medium term will continue to depend on tourist arrivals from the US, Canada, and Europe.

The country has in the last four years, suffered a number of economic setbacks. The world economic downturn which is still evident; the collapse of the company that was the second largest employer of the labour force and the crash of two major regional insurance companies, have led to an increased number of persons out of a job. Although recent figures of unemployment are not available, as a result of the above shocks, there must have been a significant increase in the amount of people not able to find work. Additionally, the global economic recession has caused a reduction in visitor arrivals and this impacts negatively on the country, as it relies heavily on tourism.

Being unable to find employment, persons have sought to become self-employed to earn a livelihood. Agriculture, including fishing, is seen as one of the ways to earn a livelihood and as such, the Ministry of Agriculture has received increased applications for farm lands during this period.

The increased demand for land, may possibly lead to more land being farmed, and could possibly lead to increased crop production. This increased production, needs to be captured since all of it may not be sold as fresh produce.

How can these extra produce be fully utilised? What are the opportunities that this situation presents? One possible answer could be, by adding value to the produce, and transforming it in some way, to a form that can be used in the future, through agro-processing. In a recent study on the *Agro-industry Potential for Antigua and Barbuda* (Little 2004), agro-processing was identified as an area with great potential for development in Antigua and Barbuda. However, a number of challenges currently prevent this potential from being fully realised and this paper will look at a few of these challenges.

Food processing techniques have been developed over time, as humanity felt the need to find a way to preserve food and to prevent food spoilage. Foods begin to deteriorate the moment they have been harvested or slaughtered. The earliest forms of food preservation included: drying, salting, fermentation, smoking and where the climate allowed-freezing (Nummer 2002). In more modern times, canning, bottling, machine drying, freeze drying, pasteurization and irradiation, have become common ways to preserve food, although many of the older methods of preservation are still being used today (www.preservearticles.com). One should stop to consider for a moment, that the majority of foods being sold in the supermarket are preserved in some way; only a small section of these supermarkets foods are actual fresh foods.

Definition of agro-processing and its role in the development of economies

In this paper, "Agro-processing industries can be described as industries that add value to agricultural raw materials, both food or non-food, though processing them into products (UNESCAP 2003 Report). Agro-industry on the other hand is defined as "the industry that

deals with the supply, processing and distribution of farm products” (<http://www.definition-of.com>).

Apart from providing a way to keep food preserved and to prevent spoilage, agro-processing contributes to the growth of economies. This contribution of agro-processing industry comes through the following:

Firstly, as a primary method of transforming raw agricultural produce into processed products, for consumption. Secondly, it is stated that agro-processing as an industry, constitutes a large portion of many developing countries’ manufacturing sector. Thirdly, agro-processed products are frequently the major exports from some developing countries. Fourthly, the processed food provides nutrients for the population by extending the availability of certain food items, making them available out of season (Little 2004).

Agro-processing therefore, has positive impacts on:

- Poverty alleviation by creating rural employment.
- Women empowerment - they are the major players in the industry.
- Increased farm income - A vibrant agro-processing industry will encourage farmers to produce more farm products, to which value can be added, that will bring higher incomes for raising the quality of life and standard of living.

The Importance of the Commodity Value Chain

The value chain is described as the activities that take place in a business and relates them to an analysis of the competitive strength of the business. The value chain analysis is one way of identifying which activities are best undertaken by a business and which are best provided by others. What activities a business undertakes is directly linked to achieving competitive advantage (FAO 2006.)

For the purposes of this paper, one looks to the commodity value chain which links the

steps a product takes from the farmer to the consumer. This includes research and development, input suppliers, production, processing, marketing and finance (www.namdevco.com).

NAMDEVCO in Trinidad is using the commodity value chain approach with hot peppers, in order to improve the competitiveness of this non-traditional agricultural product in Trinidad and Tobago, destined for both local and export markets. The benefits they expect from this approach are: buyers are assured of product quality, supply and safety through integrated systems from production to retail. Suppliers are more assured of a market and the benefits of economies of scale, improved access to markets and reduced time to respond to changing customer demand, as a result of better communication with chain partners. They also expect more rewarding business relationships.

This concept may be applied to agro-processing in Antigua, with necessary adjustments to the model being used, since NAMDEVCO is a centralised agency for receiving raw materials and marketing the products. Currently, there is an agro-processors association, but the individual members each procure, process, market and distribute their products to consumers. A detailed analysis of the commodity value chain approach would have to be undertaken to determine how it would work. If this approach were to be applied to the various agro-processing enterprises in Antigua and Barbuda, the processors would need to work together in a different way, than they do currently, in order to realise the benefits to be gained from this approach.

Food Security Situation in Antigua and Barbuda

“Food and nutrition security exists when all people at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy lifestyle” (FAO 2002). Food security is important for the development of a country

and its society. Where food insecurity exists, the country becomes unstable, development is hampered and the population cannot be productive.

The country of Antigua and Barbuda, as a member of the United Nations, has committed to achieving the Millennium Development Goals (MDG) 2015. In the government's 2009 mid-term report, the country made "tremendous progress in meeting the MDG and the eight anti-poverty targets with a 2015 deadline. But given the challenges that still lie ahead, we cannot afford to rest on our laurels", statement made by Hon. Dr. John Ashe, Ambassador to the United Nations. He went on to say that "the 2008 soaring food and fuel prices and the global economic downturn are impeding the advances in such targets as eradicating poverty and hunger...jeopardising the likelihood of achieving some of the Goals". The eight anti-poverty targets of the MDG are: eradicate extreme poverty and hunger, achieve universal primary education, promote gender equity and empower women, reduce child mortality, improve maternal health, combat HIV/AIDS, malaria and other diseases, ensure environmental sustainability, and promote a global partnership for development.

In its attempt to try to meet the MDG, the country used as a guide, the information from a *Country Poverty Assessment* conducted in 2005/2006 and which revealed that 18.3 percent of the population was poor and 3.7 percent was indigent. This was followed by a *Poverty and Social Impact Assessment*, conducted in 2009 to assess how the economic decline and food crisis had affected the population. One would remember that in 2007-2008, rising fuel and food prices threatened livelihoods and caused food riots in some countries worldwide. The riots were a clear indication that food insecurity could not be allowed to exist.

The government of Antigua and Barbuda was forced to look at ways to mitigate growing hunger and increase in poverty and to put in place a number of poverty reduction/alleviation programmes. This included a National Economic and Social Transformation

(NEST) Plan. This was aimed at economic re-balancing and sustained security for social welfare. The NEST Plan sought to enhance education at all levels, provide quality health care, strengthen social protection mechanisms and tackle crime and national security issues (www.antigua.gov.ag/povertyalleviationprogrammes).

Food and Nutrition security policy

In support of the NEST Plan and to enable the country to meet the MDG, the Antiguan and Barbudan government developed in 2012, the Antigua and Barbuda Food and Nutrition Security Policy. The goal of this policy is to "achieve sustainable food and nutrition security and to eliminate all forms of malnutrition in order to have a well-nourished and healthy population that can fulfil its aspirations to good health and economic well-being and effectively contribute to national socio-economic development". The policy has as one of the strategic objectives to "Ensure that a sufficient quantity of nutritious food of appropriate quality is available to all people in Antigua and Barbuda, through increased domestic production and sustainable level of imports, with special emphasis on a structured food import replacement programme".

These programmes come together to foster food and nutrition security in the country, and while all the targets have not yet been met, the country is on its way towards improving its food and nutrition security. As a means to further strengthen its goal of poverty reduction and to combat food insecurity, the government earlier this year signed with FAO and IICA a *Zero Hunger Challenge*. This project is aimed at the elimination of hunger and extreme poverty in Antigua and Barbuda within a period of two (2) years (2013-2014). The Zero Hunger Challenge has the following five objectives:

1. 100% access to adequate food all year round.
2. Zero stunted children less than 2 years, no more malnutrition in pregnancy and early childhood.
3. All food systems are sustainable.

4. 100% growth in smallholder productivity and income.
5. Zero loss or waste of food.

Agro-processing can help to meet four of these five objectives.

Role of agro-processing in food security

In a report of the Status of Food Insecurity in the World 2012, it was reported that for Antigua and Barbuda, the prevalence of undernourishment affected 20.5% of the population. This figure is the highest of all Caribbean countries except Haiti (FAO 2012). Agro-processing can help to address this situation.

Agro-processing as a means of adding value to agricultural commodities, can address food security issues in a number of ways. As a form of employment, persons in the sub-sector can earn a living which gives them access to food. As a way of prolonging the life of food, it allows availability of the food to be extended. Further by adding value to the food it reduces waste or loss of fresh foods. It also increases incomes from food by allowing the transformation of food from one form to another, along the value chain.

Characteristics of the agro-processing enterprises in Antigua and Barbuda and the role of women

Characteristics of the agro-processing enterprises in Antigua and Barbuda

According to membership in the Antigua and Barbuda Agro-processors Association (ABAA), registered in 2008, 83% of the members are female. Some (about 20%) of the female agro-processors are also the head of their households and the main income earner. At least 80% of the members depend on their enterprises for their livelihood, while the others practice agro-processing as a means to supplement their income. Included in the later group, are some members who are retirees.

The majority of the members are over 40 years of age (83%). The group has been

working together on an informal basis for more than twelve years. Additionally, members have represented agro-processing in Antigua in exhibitions both locally and regionally.

The main products processed are jams, jellies, hot pepper sauces, juices and juice syrups, milk products, pickles, dried fruits and dried herbal teas. Some processors also produce confectionary and baked goods. The majority (75%) operate what is considered cottage industries, working out of their homes. A small fraction (25%), have small processing units close to their homes. The majority of the agro-processors currently purchase packaging materials locally; while a small proportion (16%) order these items from overseas. Attempts have been made to purchase bottles collectively, but to date that has not been successful.

Most processors market their products themselves, and because of the small volumes are able to get all their products sold easily. The products are sold to local shops, restaurants and supermarkets, as well as, hotels and tourist shops.

Members of the association and a few other processors, have received training in basic food safety and food preservation. While they are aware of sanitary and phyto-sanitary measures, they have not internalised how it impacts their enterprises. None of the processing units or processes have been HACCP certified, or for that matter, any of the other international certifications related to agro-industry. Although many processors are not directly involved in trade, their products are sought after by visitors to the island who want a genuine Antiguan product to take back home and by returning residents who now reside abroad.

In general, the agro-processing industry in Antigua is characterised by high labour input, limited mechanisation, high cost of production and low output of products. In addition, there are limited laboratory facilities available for product testing and shelf-life studies. Also, there is no trained food technologist/technician at the government run Department of Analytical Services.

Financing for the sub-sector is mainly

through the Antigua and Barbuda Development Bank or the National Development Foundation. Other options are the regular commercial banks. In large part, the processors use their savings to start up their enterprises and get financing for large purchases like steam kettles, bottles and upgrading or building processing units.

Role of women in agro-processing

In many developing countries, women are the main persons employed in agro-processing (Bulletin de l'APAD 2000). In Antigua, most of the processors are sole proprietors and are owners and managers of their enterprises. All of the women in agro-processing in Antigua identified a need to either earn an income for their families or supplement what is earned. While many of the enterprises may not be seen as large income earners, the local processors earn enough to maintain an adequate standard of living.

From a parenting perspective, the women processors who have school age children are there when their children come home from school and for others they are grandmothers who are there for their grandchildren. This is known to have tremendous positive impacts on the development of children.

The role of agro-processing enterprises in Antigua and Barbuda should be viewed more from a socio-economic standpoint rather than a purely economic stand point. As small as these enterprises are, producing on average only 400 units per month; the processors are able to purchase supplies, market their products, use their time productively, employ other persons and make a contribution to society. Without these enterprises, they may fall in the category persons living below the poverty line.

Challenges facing the agro-processing sub- sector

One of the challenges is raw material availability and consistency of supply. The fruits and vegetables used by the local agro-processors are seasonal. The produce being biological in nature, are subject to seasonal availability and much variability. There are

large, small, sweet and sour fruits all on the same plant. Storage during the season is one way to deal with this challenge. Fresh produce are dried or dehydrated or frozen and stored for future additional processing. Twenty-five percent of the processors in the association have solar dryers. These are used both to make dried fruit products, as well as, to dry some other raw material for future use, for example leaves for making teas. The processors also own large chest freezers in which they freeze produce in season for future processing.

The consistency of supply of raw material is also linked to the biological nature of the produce. A farmer may plant one acre of hot peppers and harvest two thousand pounds per month, this season, then the next season the yield could be far less or pest attack may reduce the expected yield and then there is a short fall in the quantity available for sale. Additionally, Antigua being in the hurricane path has seen its share of storms. In the past five years, two major hurricanes - Ormar in 2008 and Earl 2010, dumped above average rainfall, resulting in flooding and loss of crops. The processors, who use hot peppers as a raw material, have suffered more than others who use other crops. The supply of hot peppers, seem not to coincide with the demand for hot peppers, and one processor have had to source hot peppers from other Caribbean countries, as far as Belize.

The second challenge to be faced is the high cost of production. The cost for labour in Antigua is very high compared with other Caribbean countries. In Antigua, the daily wage for unskilled agriculture labour is US\$30-37.00, whereas in Grenada or St. Vincent it is US\$17-19.00 and in Trinidad it is US\$22.00 (personal communication). To hire skilled labour demands a higher rate of pay of up to US\$56-74.00 in Antigua. Additionally, because the agro-industry sub-sector is so small, finding a person skilled in this area is almost impossible. Many processors do everything themselves, taking on help only at certain times. For example, when certain fruits are in season, they hire someone for a few days to help to pick, clean and sort the produce for storage. Because they are doing

most of the operations by themselves and without some basic equipment like fillers, it means that they are only able to do what one person is physically capable of doing. With the addition of a few basic pieces of equipment and training, the amount of work that can be done, will increase. The processors already can have tax and duties waived on equipment and materials for their processing facilities, but the process to benefit this needs to be improved, its currently time consuming-involving four different government departments.

In regards to utilities, agro-processors face the same rate charges for utilities: water, electricity and telephone as the domestic rate. This increases the cost to operate. The cost of equipment, labels, packaging and the shipping of the same, relative to the revenue generated from these enterprises, puts the price per unit of local product above the price of imported products. These local products then have to compete with the imported products, which sometimes cost half the price, unit for unit. These production costs represent a major hurdle to increasing the small scale agro-processor in Antigua and Barbuda.

Cost of transportation is another concern, since most agro-processors must deliver their goods to the points of sale. Six years ago, the cost of gasoline was about US\$3.00, today it is at US\$6.00. This is in addition to the wear and tear on the vehicles. Additionally, the small amount of products being transported cannot adequately cover the cost of the trip. One processor has found a way to devote a day of week for delivery of her products and thus is able to realise some savings on transportation.

Due to the small scale of production, products cannot benefit from volume discounts on purchasing, shipping of inputs or export of the finished product. Many enterprises are not able to export at all, because they cannot ship a full container of any product which is a minimum requirement for many shippers.

Challenge number three is the limited technical support from government or non-government agencies for agro-processing.

This was identified as major constraint for small and medium agro-processing enterprises in not only in Antigua, but in many CARICOM countries, at a meeting facilitated by Carib Export and held in the Dominican Republic, in March 2012.

The lack of laboratory facilities for product testing, nutritional labelling and quality assurance were identified as major constraints. Additionally, the cost for sending product samples to other countries to be tested is also prohibitive. For a nutrition label of one product, the cost in 2009 was US\$1500.00; all of the agro-processors in Antigua produce more than one product. This means that it would cost quite a tidy sum to provide nutrition labels for all their products.

There are also no dedicated food technology personnel in the public or private sectors to give technical support to the agro-processing industry. In the past, the Department of Analytical Services had staff trained in food technology and were able to offer services such as shelf life testing and product development. Those persons have migrated and have not been replaced. Some basic microbial tests can be performed, as well as, test for sugars, pH and moisture content. This situation limits the ability of local agro-processed products to meet international requirements for trade; as well as access to overseas markets and thus limits expansion of the enterprises.

The final challenge is limited ability to meet international food quality standards, thereby reducing trade opportunities. None of the agro-processing enterprises have either their process or their processing units HACCP certified. Only some of the processors have been trained in Good Manufacturing Practices. Agro-processors are also not knowledgeable about international standards such as ISO 2200 and 14000, etc.

Most processors practice rain water harvesting, which is commendable; but adequate systems for treatment and monitoring of the rain water are not in place. One processor was the beneficiary of an OECS Cleaner Production project in 2005 and received assistance to improve her water

catchment system using a first flush device. This is an area for future work.

Recommendations

The following are the recommendations for the study:

1. Conduct a commodity value chain analysis of the agro-industry in Antigua and Barbuda to determine where productivity can be improved, as well as improve competitiveness of the enterprises and strengthening of the entrepreneurial capacities of the processors.
2. Train agro-processors in
 - a. new techniques for agro-processing, using raw materials that yield greater nutritional returns; for example technologies for processing products from sweet potato, and cassava
 - b. International standards and food safety systems-HACCP, ISO, SPS
 - c. Good Manufacturing Processes and how to develop and use Standard Operating Procedures
 - d. Techniques to increase efficiency and lower cost of production, to include also costing and pricing of products
 - e. Trade facilitation and market access skills
3. Ensure that agro-processors can benefit from the government programmes that are provided for their support. In many cases, the processors don't know how to access the duties, and allowances available to them. The answers do not reside in one office.
4. Develop a system whereby agro-processors can make their orders for inputs and or raw materials (sugar, vinegar, bottles, labels, barcodes) at one central location/body/agency, who will then purchase for all and so realise bulk discounts where possible.

This may require strengthening of the Antigua and Barbuda Agro-processors Association.

5. Government to provide technical assistance to processors in food technology (look into short regular attachments by food technologists from universities or companies abroad-partnering with local processors for hands-on training) and product development, marketing of products
6. Provide a central source for accessing information and updates on new trends in agro-processing
7. Look at how agro-processors can produce some components for the National School Meals programme, for example fruit juices, fruits salad packs, etc.

Conclusion

Small scale agro-processing enterprises have an important role to play in the development of the economy of Antigua and Barbuda. Nevertheless, the challenges which these enterprises face will limit their contribution to fighting hunger and reducing poverty. Also, the contribution they can make to the overall GDP of the country will not increase if these challenges are not addressed. If given the necessary targeted interventions, the agro-processors can increase their productivity, expand their production, increase their revenues and gain access in overseas niche markets; as well as, strengthen this component of the value chain. This will redound well to achieving the goals of the government's programmes to fight hunger and alleviate poverty and also maximise gains from value addition enterprises.

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Table 1: GDP comparison by Sectors

GDP comparison by sectors	
Sector	GDP
Agriculture:	2.1%
Industry:	19.6%
Services:	78.3% (2012 est.)
GDP labour force by occupation	
Sector	GDP
Agriculture:	7%
Industry:	11%
Services:	82% (1983)
(Source: CIA Factbook)	