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Finding an Agricultural Development Model for St. Thomas, USVI – Adapting an Extension Approach to a Small, Densely Populated, Caribbean Island

Richard W.H. Pluke, Fintrac Inc., St Thomas, US Virgin Islands
richard@fintrac.com; (340) 776 7601

ABSTRACT.

St. Thomas, the busiest island of the US Virgin Islands, is small (81km^2) but has a population of 53,000 people (population density: 654.3 people/km^2) that does not include the 1.5 million annual tourists. While steep slopes make for attractive seascape views, it means that there is little suitable land for agriculture. Land zoned for agriculture is under constant threat of re-classification to make room for more lucrative residential/tourist/commercial developments. Agricultural inputs are scarce and costly. Water resources are limited and unreliable. Agricultural productivity is low and even though markets are strong and prices high, very few people can commit to full-time farming. Establishing a productive agricultural base that can economically support producers and justify continued government support may require the institutional support of non-traditional producers. These producers include small-scale, home gardeners. The fact that they outnumber full-time farmers reflects the urban characteristics of the island and helps understand the particular farming system found on St Thomas. Extension efforts that rely on full-time farmers as vehicles of change do not acknowledge the limitations of the St. Thomas farming system. Adapting to a different client type may be the best way of spending extension dollars. Broad, educational initiatives, community programs and an appropriate scaling of technological packages will feed into the general interest on the island for food security, lowered grocery bills and better food quality. Fundamental to these extension efforts is to make non-traditional producers believe that they can be active participants in the island's food economy.

KEYWORDS: Extension; St. Thomas, US Virgin Islands; urban agriculture

INTRODUCTION

All agricultural extension models are designed to create the highest level of productivity for the region and the farmers being served by the extension service. In most countries, the agricultural sector is well established and the extension service has evolved with agricultural development. The effectiveness of an extension approach will depend on its compatibility and familiarity with the farming sector. It must be noted that within a country or region's farming sector, there are a number of farming systems. The Food and Agricultural Organization (Dixon et al., 2001) classifies farming systems based on a number of key factors that include:

1. the available natural resource base;
2. the dominant pattern of farm activities and household livelihoods, including relationship to markets; and
3. the intensity of production activities.

It is important to recognize that there will be different extension programs that serve different farming systems. An extension package designed for a large, commercial farm growing only maize will be different than an extension package for a small, mixed-activity, family farm.

In 2005, Fintrac Inc. moved its headquarters to St. Thomas, US Virgin Islands. This international agribusiness development company began a small extension program alongside the territorial Department of Agriculture and the University of the Virgin Islands. The company has successfully used an extension model on its projects whereby a group of lead clients are selected to be agents of change within their community. The main focus is to position the farmer's production activities within a market-led value chain to get the most benefit out of market opportunities (Figure 1). This requires the orientation of the farm as a business and the development of excellent production capabilities to guarantee the timely delivery of produce to the market at the quantity and quality required. There is also a multiplier effect due to a network of beneficiary clients that observe and participate in the development of the lead clients' agricultural activities.

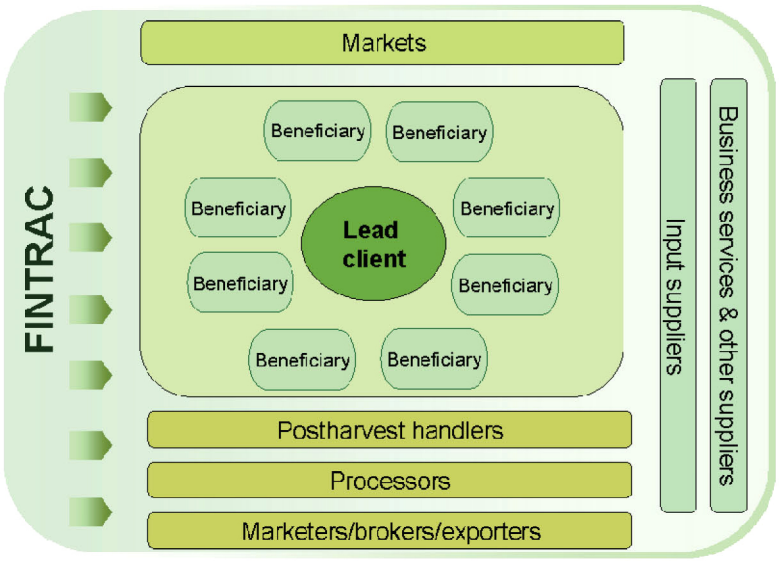

Figure 1. A market-led, value chain extension model

ANALYSIS

Market opportunities on St Thomas, USVI

This extension approach was brought to St Thomas in 2006 in the full knowledge that market opportunities on this island were very strong. While St Thomas is small at 83 km^2, it has a population of 53,000 and many more tourists. In 2007, there were 561,300 air visitors and 1,917,400 cruise ship passengers. (USVI Bureau of Economic Research, 2008). The economy of the US Virgin Islands is relatively strong, in part due to its ties with the United States of America. In terms of its gross domestic product (GDP) per capita, the US Virgin Islands is ranked fifth, behind the USA, the Bahamas, Puerto Rico and Trinidad & Tobago. Residents on St Thomas are able to buy a wide range of food products although high food prices do have an impact on food choices.

These high food prices do however strengthen market opportunities for island farmers. Early in 2008, a 63-item food basket survey was done comparing St Thomas supermarkets and supermarkets in Washington DC, USA. It was found that the price of the shopping basket came out at 50% higher in St Thomas than in Washington DC. Table 1 gives some of the price differences.

These food prices will continue to rise with the rising cost of fuel as the US Virgin Islands imports most of its food. This puts local farmers in a stronger position to compete against imports and to obtain higher income on sales. It is interesting to note that this study also found that tomatoes were cheaper in St Thomas. This attests to another market opportunity for local farmers. Wholesalers purchase relatively low quality produce to balance the high import costs. This creates a large quality differential between local and imported produce. This creates further leverage that local producers can use to improve their position in the market.

Table 1: Some selected price differences in the 2008 shopping basket survey

Product	Washington DC	St Thomas, USVI
Orange juice (half gallon)	$1.58	$5.09
Coffee (11.5 oz.)	$3.29	$5.59
Milk (half gallon)	$2.39	$ 3.47
Eggs (dozen)	$2.14	$2.27
Flour (5 lbs)	$2.79	$3.44
Dave Barber (retired head of the V.I. Labor Department's Bureau of Labor Statistics)		

The farming sector on St Thomas

Using the latest agricultural census data from 2002 (USDA, 2005) it quickly becomes apparent that the agricultural sector in St Thomas and St John (the census data lumps the two island's data together) is very weak. In 2002, there were 52 farm operators. 40 of these operators worked more than 200 days off the farm and only 5 of them were full time farmers. There are a total of 52 farms on the 2 islands than cover 460 acres (the total land area of St Thomas and St John is 35,410 acres). Of these 460 acres, there were only 44 acres that were considered harvested cropland. The revenue created by the islands' farms is also limited. Table 2 gives the market value of produce by crop type. These low incomes are largely due to the low yields being obtained on the farms. For all reported crops, yields were less than 30% of the average yields found in the USA.

Table 2: Market value of produce by crop type

Crop type	# of farms that grow them	Total market value ($)	Average market value/ farm ($)
Vegetables	26	120,623	4,639
Fruits & nuts	23	29,155	1,268
Horticultural specialties	8	77,727	9,716

Farming system characteristics of St Thomas

Agriculture needs land and it needs labor to work the land. The shortage of both greatly limits agriculture on St Thomas. Table 3 presents the population density of countries in the region and St Thomas' 643 people per square kilometer puts the island at the top of the list. Even without the influence of a high population, St Thomas does not have much prime agricultural land. The island is dominated by steep hills rising out of the sea. The soils are shallow and water resources are minimal. Land zoned for agriculture is under constant threat of being rezoned and developed for residential or commercial purposes. Labor costs are another feature of this farming system, where hourly wages exceed $12 an hour and where most day laborers expect to receive $100 for 8 hours of work. Even if farmers were able to afford these rates, there are also problems with availability - agricultural work is considered difficult and there are other options that are considered 'easier'. There is also little direct experience of agricultural labor on the island, the unfamiliarity of which makes acceptance more difficult.

SVI Bureau of Economic Research, 2008. http://www.usviber.org/publications.htm.

Table 3: Population densities of some states in the Caribbean region

Country	Population (k)	Physical Size (km2)	Pop. Density (per km2)
USVI: St. Thomas	53	83	643
Barbados	277	431	643
Puerto Rico	3,957	9,104	435
Martinique	402	1,128	356
Grenada	106	345	308
Haiti	8,558	27,748	308
St. Lucia	171	616	277
Trinidad & Tobago	1,340	5,128	261
St. Vincent	102	392	261
USVI: St. Croix	55	212	260
Guadeloupe	441	1,780	248
Jamaica	2,688	10,991	245
Dominican Republic	9,680	48,734	199
Antigua & Barbuda	85	435	196
St. Kitts	49	267	183
USA: FL	18,467	139,697	132
Cuba	11,237	109,886	102
Dominica	71	738	96
USVI: St. John	5	52	94
Turks & Caicos	35	497	71
Bahamas	335	13,962	24
Guyana	780	215,083	4
Suriname	518	163,820	3

There are also few agricultural inputs available on St Thomas. There are no dedicated agricultural input stores and so farmers have to buy products on-line and absorb high shipping costs or they buy them from garden centers. The problem with buying from home garden centers is that selection is limited and there are issues of suitability. Many products are only labeled for ornamental uses, which legally, makes them unavailable for horticultural purposes. Many of the island's farmers are also organic, which further restricts their agricultural input options. There is no organic premium paid for organic produce in the local market and so farmers are not compensated for the losses sustained under an organic production system.

Finally, the high food prices mentioned earlier attest to a high cost of living on St Thomas. A full time farmer has to be productive enough to cover most of the living costs of a family. As an indication of living costs, a person earning a salary of $50,000 in Miami, USA would have to earning a salary of $67,000 in St Thomas (SalaryExpert, 2008). As the data from Table 2 indicate, farms on St Thomas are presently not generating that kind of revenue.

Opportunities for the farming community of St Thomas

The farming system of St Thomas is a challenging one. It is difficult to make money growing traditional crops using traditional production systems. Agriculture, in the sense of a specialized group of citizens mass producing food for the greater population, may not be appropriate for St Thomas.

For example, the average per capita consumption of tomatoes in the USA is around 20 pounds a person. The 2002 production of tomatoes on St Thomas and St John was 18,245 pounds. Based on the U.S. average consumption figure, the tomato production in 2002 would have fed 912 people or 1.6% of the population. This is far short of providing food security for the island. At least tomato production in 2002 was better than 1997, where tomato production (3,280 pounds) would have only supplied about 164 people. While the efforts to grow a wide range of fresh foods for the island are commendable, they may be counter productive to the development of a viable agricultural sector. Most of these crops do not generate adequate profits. True sustainability of an agricultural system occurs when the farming activities create enough income to sustain the operation and the operators. This attracts others to farming and the sector develops. How then, can a farmer be profitable on St Thomas?

There first has to be adequate resources – land and water. The selection of agricultural activities has to be compatible with the constraints of the farming system. The following activities have characteristics that may circumvent the local constraints:

- High value, niche crops
- Activities with low labor requirements
- Mix of activities (year round income)
- Activities that have an intensive use of land (e.g. greenhouses)
- Value-added activities (but needs the production base)

It may be that the number of suitable activities is limited but that may be what it takes. One successful farmer in the 1990s grew nothing but basil under a shade house but he was successful enough to export to New York. This farm also created sufficient income to rebuild the shade house after a major hurricane.

Growing food locally

Having an agricultural sector that is focused on a small number of profitable activities does not mean that St Thomas should relinquish what food security it already has. In fact, there are many opportunities that would allow for an increase in food production. This can be accomplished by focusing in on the opportunities of the St Thomas farming system in the same way that acknowledging the constraints allows us to identify areas of weakness. The greatest resource St Thomas has is people. According the Economic Research Service of the USDA, urbanized areas "must have a core with a population density of 1,000 persons per square mile and may contain adjoining territory with at least 500 persons per square mile". The population density of St Thomas is 1,654 persons per square mile, which makes it an urbanized area. This urbanization is one of the constraints to traditional agriculture. It can also be an opportunity for an alternative production model – urban or peri-urban agriculture.

Urban agriculture fits the constraints of St. Thomas for a number of reasons. Most importantly, there is no need for large areas of land dedicated to agriculture. Urban agriculture can fit itself within urban development. Because of the scale of production, there is also no need to hire laborers as care of the plots can be done on an individual basis. The technology levels will also be relatively low, without the need of specialized agricultural machinery. At the most a rototiller and some spray equipment would be needed. Water is one of the main problems on St Thomas. Farmers have difficulty finding and storing the large quantities of water needed. Small scale operations are more able to

access the water needed. There are already many home gardeners who use house water, whether it comes from the municipal supply or from rain water captured from the roof. There are also grey water possibilities, where water from hand basins and showers can be used to water the garden.

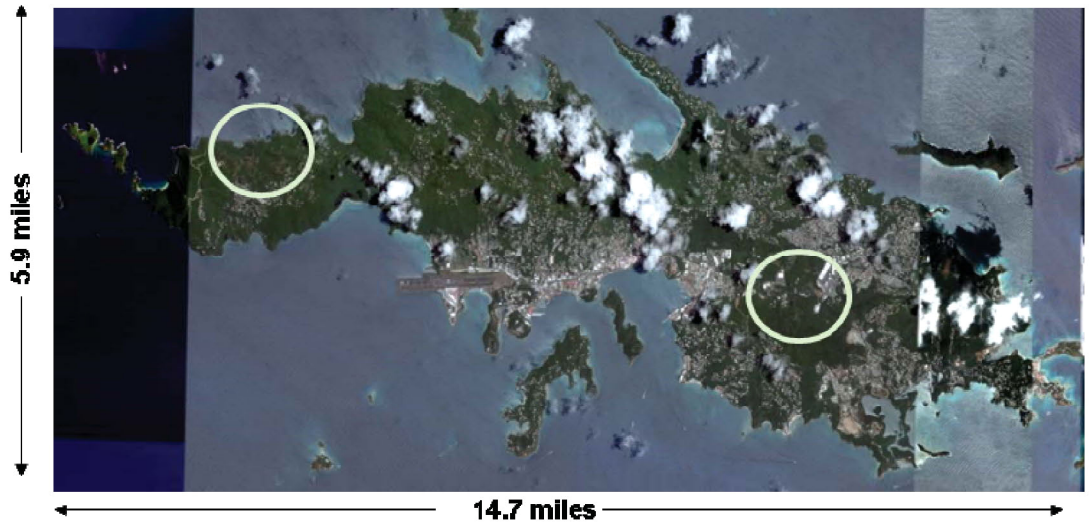

Figure 2. Satellite image of St Thomas showing urban development & the 2 main areas of agriculturally zoned land (circled)

The agrochemical inputs found in garden retail stores are more appropriate for urban agriculture – smaller packaging and easier instructions. Urban gardeners also have the advantage, when it comes to pest and disease control, of being able to give more attention to individual plants. This allows for more intensive control options such as hand picking and pruning.

Urban agricultural programs

The development of urban agricultural schemes in St Thomas is strengthened by the large number of home gardeners that already exist on the island. These people can be organized into a network of growers where extension and marketing initiatives can be directed. When developing an urban agricultural program there are a number of alternatives to consider. Some of the alternatives are given below:

1. Home gardens vs. cultivated urban plots
2. Individual vs. community gardening groups
3. Government supported vs. private
4. Organic vs. conventional
5. Sales orientated vs. personal consumption
6. Crop farming vs. livestock

Caribbean examples

There are already a number of examples of urban agriculture in the Caribbean. The best know example is the urban agricultural program in Cuba. This program arose as a response to the food shortages and economic problems that followed the loss of the Soviet Union's support after 1989. The period after 1989 is known as the 'Special Period'

and the promotion of urban agriculture began in 1991. The 'huertos populares' are the most obvious manifestation of the program and by 1995 there were an estimated 26,600 public garden lots. The Ministry of Agriculture, alongside the Havana city government created a Department of Urban Agriculture that provides extension support to these urban initiatives. The government also manages seed houses ('casas de semillas') that provide all the inputs. In addition to 'huertos populares', there are also 'organopónicos', 'huertos intensivos', 'autoconsumos' & 'campesinos particulares' that span the range of possible urban and peri-urban activities. It has been reported that these production technologies have proved themselves to be more productive, per unit piece of land than the large state farms (Caridad Cruz & Sánchez Medina, 2003).

In addition to Cuba, there are other examples of urban agriculture in the Caribbean region although information on the larger impact of these programs is difficult to come by. Many urban agricultural initiatives, such as those in Jamaica and Haiti, were instigated as part of larger urban development projects. Puerto Rico has had a well established urban agricultural program and recently celebrated the tenth Home Garden festival.

Urban agricultural extension packages

The extension materials for the urban agricultural activities will need to be tailored for the intended clients. This will include community groups, schools, churches, horticultural clubs, as well as individuals. A wider impact is expected when working with groups. The most important feature of an urban agriculture extension package is that all the relevant technological information is bundled so that a person can have quick success. The focus is to make it easy for busy, part-time growers to build a complete production system without going through a long establishment period. With so many other requirements for their time, early success strengthens initial enthusiasm, which then promotes sustainability and success for the urban agricultural program as a whole.

The information that is included in the extension material must be carefully chosen and presented in a way that does not confuse. It must be appropriate for urban requirements – urban landscapes are unique and traditional agricultural information must be adapted. Listed below are the broad areas of information that should be included in the extension packages:

- **Site planning** (plot layouts, terraces, storage, sun, light/shade, security)
- **Land preparation** if planting directly in the soil
- Construction of **specialist growing containers** (e.g. planting boxes & tires)
- **Planting medium** (soil mix, compost, free of contaminants)
- **Irrigation system** (flow requirements, pressure regulation, filters, pipe sizes)
- Production of **planting material** (nurseries, selection of healthy material)
- **Pest and disease** identification & control. Basic control toolkit.
- **Plant nutrition** & **water management**
- **Crop planning** (market reasons and ecological considerations)
- **Budgeting** & **record keeping**

DISCUSSION

There are significant constraints to traditional agriculture in St Thomas that have prevented the full development of an agricultural sector on the island. The main constraints to this development are a lack of suitable land, high labor costs, water shortages and a lack of inputs. Farmers need to assess potential activities and focus on those that will succeed, despite the inherent difficulties. It is thought that successful activities will either be niche, high value crops or alternatively, those crops that have low labor requirements such as fruit trees. The design of farm activities also needs to be carefully planned so that the farm is generating income throughout the year.

The realignment of the agricultural sector on St Thomas will probably mean that the successful farmers will have a narrower activity base and will not offer the wide range of food crops that they now plan for. This does not mean that food security on St Thomas needs to be compromised. St Croix shows immense agricultural potential and with dependable transport links between the two islands, quantities of locally produced food on St Thomas could be far higher than it is now. Even closer to home, food crops could be produced in an urban agricultural program.

Urban agriculture is a realistic approach to St Thomas. With a population density of 1,654 persons per square mile, St Thomas should be considered an urban location. There are successful urban agricultural examples in the Caribbean, most notably in Cuba, which can be used to help direct efforts in St Thomas. Home gardeners, already active on the island, can be recruited to spearhead the efforts. Extension materials developed for urban activities must be tailored and bundled to ensure early success. In conclusion, the establishment of an energetic urban agricultural program will stimulate local production of food crops, increasing food security and so freeing the traditional agricultural sector to find a profitable, sustainable set of activities that best fit the constraints and opportunities found on St Thomas.

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