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THE IMPACT OF MARKETING ON THE USE OF CHEMICALS FOR BANANA PRODUCTION IN TWO CARIBBEAN STATES

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INTRODUCTION

Modern approaches to marketing emphasise the pivotal role of the final consumer in determining the systems of production and marketing. In fact, it is not uncommon to consider marketing as "*determining the needs and wants of target markets and delivering the desired satisfactions more effectively and efficiently than competitors*" [Kotler 1983]. Since the needs and wants of different target markets may necessarily require differing production systems characterised by different levels of sustainability, it is clear that the marketing process will have a major effect on agricultural production systems and their sustainability.

The concern of this particular paper is the extent to which the demands of the market influence the choice of agricultural production systems for bananas in St. Lucia, the largest exporter of bananas in the Windward Islands and Trinidad and Tobago, a minor exporter of bananas. Specifically, it examines how marketing can impact on the use of chemical inputs.

APPROACH TO THE STUDY

First, the marketing systems for bananas in Trinidad and Tobago and St. Lucia were compared. The comparison was based mainly on information obtained from a survey of farmers (described below) and from Nurse-Sambury (1991) in the case of Trinidad and Tobago and from WINBAN and Lawrence (1982) in the case of St. Lucia.

Analysis was then carried out to

determine the levels of chemical input in banana production in St. Lucia and Trinidad and Tobago. In the case of Trinidad and Tobago, the information was obtained from a survey of 227 banana farmers carried out in 1991. This survey was designed to determine the farming systems in which banana production exists, specific aspects of production including yields, input use and profitability, the marketing channels, characteristics of the farmers, (such as age, gender etc.) as well as their attitudes to farming.

In the case of St. Lucia, the information on chemical input use was obtained from the Windward Island Banana Association (WINBAN). This information consisted of the quantity of inputs purchased and distributed by the St. Lucia Banana Growers' Association (SLBGA), and the input use of seven WINBAN case farmers for whom actual resource use was monitored over the year.

Using these sources, the means for chemical inputs used by banana farmers in St. Lucia and Trinidad and Tobago were calculated. A comparison of the banana production systems, with respect to chemical input use in the two countries, was then attempted and included a brief examination of the economic efficiency of the production systems as determined by Gross Margin Analysis.

EXPORT MARKETING OF BANANAS IN THE WINDWARDS

Until the turn of the twentieth century, sugar was the dominant export crop in the Windward Islands (St. Lucia, St. Vincent,

Grenada and Dominica). However declining terms of trade coupled with low efficiency in the industry caused a search for alternative crops such as arrowroot, nutmeg, limes, cocoa, and bananas. During the 1930's banana production was established as a viable alternative to the sugar industry, since it required minimal capital outlay, could be grown either on large estates or small hilly plots, could be intercropped with food crops and would fruit all year round.

Throughout the 1950's and 1960's, trade in bananas emerged as an extremely important industry, aided for the most part by specialised trading arrangements with the United Kingdom. In 1953, a special licensing agreement for importation of bananas into the United Kingdom was announced, restricting imports of bananas from non-Commonwealth countries. In 1954, Geest Ltd. entered into arrangements with the various Banana Growers' Associations in the Windward Islands who grouped together in 1958 to form WINBAN. The main functions of WINBAN (based in St. Lucia) are to negotiate contract agreements with Geest Ltd., administer insurance schemes, co-ordinate bulk purchasing of inputs, and conduct research into banana production.

The independent marketing company i.e. Geest Ltd. operates a modern refrigerated shipping service to the Windward Islands. This company covers all freight costs, loading and unloading charges, and distribution and marketing costs. In the United Kingdom, Geest Ltd. sells bananas on a wholesale basis to green-ripeners at a price known as the Green Market Price¹. These middlemen then undertake the subsequent ripening and distribution operations. The price paid to the farmer in St. Lucia is dependent therefore on the Green Market Price and the price paid to SLBGA by Geest Ltd. SLBGA subsequently determines the price to be paid to the farmer after subtracting the costs of various services rendered, such as chemical inputs, Leaf Spot control, aerial spraying, as well as adding premiums for spraying and deflowering. The price that the farmer receives is usually a small percentage of the Green Market Price.

In its formative years, WINBAN was mainly concerned with increasing the volume of fruit exported to the United Kingdom, and the

emphasis on fruit quality did not become a major issue until the 1960's when the United Kingdom also imported bananas from other countries including Jamaica. The need to regulate the quality of bananas from the Windward Islands culminated in the passage of the Banana Act of 1969 in St. Lucia, St. Vincent and Grenada and in 1971 in Dominica. Since these Acts were passed in 1969, changes in the banana industry (such as new field packing techniques) have necessitated passing of various amendments and between 1972 and 1986 revised versions of the Act were passed in all four Windward Islands.

The basic objectives of these Acts are the improvement, protection and maintenance of the quality of export bananas from the Windward Islands. WINBAN was appointed as the authority responsible for all current practices recommended to improve or preserve fruit quality through the enforcement of the accompanying legislation.

In recent years, the quality of Windward Islands bananas has come under increasing scrutiny from persons and institutions in the United Kingdom. It is felt that fruit from the Windward Islands is of inconsistent quality, with particularly poor quality being shipped during the second half of the year (WINBAN 1992).

With the immediate prospect of increased competition from Central and South American banana producers resulting from the integration of the European market, WINBAN's present marketing strategy is to attempt to become more competitive through improved quality and through increased productivity (WINBAN 1992), thus much of the Research and Development effort is geared to this end.

Table 1 compares some productivity factors of Windward Island banana production with that of Central America and presents an idea of the advances in productivity that must be achieved if the Windward Islands are to compete effectively with other suppliers.

MARKETING OF BANANAS IN TRINIDAD AND TOBAGO

In Trinidad and Tobago, the estimated consumption of bananas for 1989 was 9,000 tonnes with the annual production for this year

estimated to be 6,500 tonnes.

Table 1: Productivity of Windward Islands And Central American Banana Production

Productivity Factor	Windward Islands	Central America
Total Production/ha (tonnes)	14.82	66.05
Bunches produced/ha/yr.	1575	2520
Bunches Harvested/ha/yr.	1102.5	2267.5
Av. Bunch Weight (kg)	13.61	29.48
Field Losses (%)	30	10
Shrinkage (%)	5	20
Ratoon Rate (bunches/yr/ha)	1.8	3.5

Source: WINBAN Newsletter, Vol. 2 No. 2 1992.

In the survey carried out, 78% of the farmers interviewed, reported that they sold their bananas at the farm gate to itinerant vendors. The majority of the others, sold their bananas directly at public markets.

The major marketing channel that exists for bananas in Trinidad is sale by farmers to itinerant vendors who then take the produce to the wholesale market where it is sold to retailers. These retailers then sell the commodity in retail markets and roadside outlets [Nurse-Sambury 1991].

At the retail level, there is no rigid grading system in operation for bananas, and consumers are generally willing to purchase bananas of variable quality, although lower prices are offered for lower quality produce.

With respect to the functioning of this system, it is interesting to note that 73% of the farmers interviewed were of the view that marketing was the major problem preventing the emergence of bananas as a major agricultural industry in the country. They identified improvement of the price system, the offer of a guaranteed market scheme for this commodity and better public market facilities as the major marketing incentives needed to expand banana production in Trinidad.

USE OF CHEMICAL INPUTS IN BANANA PRODUCTION

Mean Chemical Input Use for St. Lucia

The statistics relating to the SLBGA sales and distribution of convert to inputs to farmers for 1990 are presented in Table 2 on a per hectare basis. These figures present the national mean use per hectare of the inputs specified. These means were obtained by dividing the total inputs distributed by SLBGA for 1990 by the total acreage of bananas in St. Lucia and assumes that all of these inputs are applied only to banana acreages on the farms on which they are utilised.

Table 2: Distribution of Inputs by St. Lucia Banana Growers' Association (1990)

Type of Input	Total Distributed	Total Dist./Ha
Fertilizer (kg)	12,593,450	1758
Herbicide (L)	130,996.4	18.29
Nematicide	2,215,348	309.28
Insecticide (L)	20,660	2.88
Furadan	96,719	13.50

Source: WINBAN

According to this analysis the mean national use of fertilizer for St. Lucia is in excess of 1750 kg/ha, and over 18 litres/ha of herbicides are used.

It is often widely speculated however, that not all banana inputs sold by the SLBGA are used exclusively for banana production. Some may instead be used for production of non-banana agricultural activities. In Table 3, an attempt to made to allow for this occurrence. Data from five WINBAN case farmers indicates that the banana acreage was 70% of the total farm acreage. Therefore, if it is assumed that all the inputs supplied by the SLBGA are applied equally to the total farm acreage then 70% could be used for banana production.

More detailed data were obtained from WINBAN relating to seven (7) banana farms for which actual resource use was collected over a one year period. The data pertaining to chemical use on these farms are presented in Table 3. An

examination of the data reveals that fertilizer use averages 2150 kg/ha across these farms and that herbicide use averages 12.36 L/ha.

Table 3: Mean Recorded Use of Chemicals by WINBAN Farmers

Type of Input (unit)	Mean Use/ha
Fertilizer (kg)	2149.82
Herbicide (litres)	12.36
Nematicide (kg)	17.79
Insecticide (litres)	7.41
Blue Diothene (Roll) ²	4.94
Twine (Roll) ²	4.94

INPUT USE IN TRINIDAD AND TOBAGO

A survey of banana farmers in Trinidad and Tobago revealed some interesting observations. The results of interviewing 227 farmers across the country revealed a relatively low frequency of chemical input for production of bananas. Thus, although fertilizers are the most commonly used chemical input for the sample, they are applied by less than 25% of the sample. Herbicides and nematicides are utilised by only 19% and 2% of the sample, respectively. This information is presented in Table 4.

Data on the mean use per ha of fertilizers, herbicides, nematicides and insecticides are presented in Table 4 and reveal that fertilizer use averaged 127 kg/ha for those farmers who utilise this input and herbicide use averaged 4.7 L/ha.

Table 4: Frequency of Use of Chemicals in Trinidad

TYPE of Chemical	No. of Farmers	% of Farmers
Fertilizer	49	23.56
Herbicide	39	18.75
Nematicide	4	1.92
Insecticide	28	13.46
Manure	21	10.01
Fungicide	7	3.37
Ant Bait (Mirex)	7	3.37

Source: Farm Management Information System (FMIS) Survey, 1992.

Table 5: Mean Use per Hectare of Chemical Inputs in Trinidad

Type of Input	Mean Use/ha.
Fertilizer (kg)	127.01
Herbicide (L)	4.70
Nematicide (kg)	0.50
Insecticide (L)	3.21

Source: FMIS Survey, 1992

GROSS MARGIN ANALYSIS

Table 6 presents data relating to sales, cost of production per acre and Gross Margin for each of the production systems. The data for St. Lucia was obtained from profiles of the seven WINBAN case farmers previously mentioned. For these farmers, the sales/ha averaged 15 - a figure similar to that quoted in Table 1. Cost/ha averaged 1290.06 and Revenue had mean value of \$1877.46 per acre. (All figures are quoted in US dollars).

Table 6: Economics of Banana Production in St. Lucia and Trinidad

	St. Lucia (US\$)	Trinidad (US\$)
Sales/ha (tons)	15.01	1.01
Cost/ha	1280.06	83.12
Revenue/ha	1877.46	93.45
Gross Margin/ha	597.40	10.33

Sources: WINBAN Farm Profiles
FMIS Survey

For Trinidad, the mean sales/ha recorded for farmers in the sample was 1 tonne/ha. With an average revenue/ha of \$893.45 with resulting Gross Margin/ha of \$10.33. Production is definitely more profitable in St. Lucia.

CONCLUSION

As evidenced from the description of the two systems in this paper, the marketing channel for St. Lucian bananas is more complex than that for Trinidad - involving commodity organisations the SLBGA and WINBAN as well as the

independent marketing intermediary Geest Ltd. The system is a highly regulated one, and the commodity is subject to a strict process of grading along the marketing continuum - at the point of delivery from farmer to SLBGA, from the SLBGA to Geest and from Geest to the distributor and ripener in England. There is thus a continuing drive by WINBAN to maintain and increase fruit quality.

By comparison, the marketing system in Trinidad appears to be a relatively unregulated one, with a large number of producers who sell to both a large number of vendors and also retail directly. Final sale is to a relatively less discerning and demanding consumer than in the case of St. Lucia. The large number of intermediaries in the system increases the competition between them, allowing farmers to sell a lower quality product with relative ease.

The data presented reveal marked differences in the use of chemical inputs for the two production systems encountered. In the St. Lucian case, fertiliser use as recorded by WINBAN case farmers, was 17 times higher than that recorded for the Trinidad sample. Herbicide use in St. Lucia was 3.45 times higher than in Trinidad based on data from WINBAN case farmers. The data presented by the SLBGA show fertiliser use to be nearly ten times higher in this island and herbicides used in quantities nearly 3 times as high as in Trinidad. In addition, other inputs such as diothene - used in St. Lucia for sleeving bananas in (St. Lucia) to prevent fruit damage due to mechanical means or through thrips infestation - are not utilised by any of the Trinidadian farmers. The only chemical for which recorded use was higher in Trinidad than in St. Lucia was insecticide, for which, use in Trinidad was 1.6 times higher than that recorded by the SLBGA. This, however, may be an indicator of the importance of low volume aerial spraying of insecticides in the Windward islands as opposed to high volume ground spraying as practised in Trinidad and Tobago. It must also be noted that insecticide use was recorded for only 13% of the Trinidad sample on an area represented by approximately 195 acres of bananas while the average use for St. Lucia is estimated on over 17,700 acres.

The data presented for the islands of Trinidad and St. Lucia thus reveal that the demands of the target markets can influence the type of production system utilised. A market that is not demanding of physical appearance will result largely in a production system with little emphasis on this characteristic. If the revenue obtained from production of this commodity is relatively small, then one can expect that farmers will use a low level of purchased inputs. This is indeed the case in Trinidad where the very small gross margins recorded reflect the secondary nature of commercial banana production in the Trinidadian farming system. (Banana was reported as the major crop on only 12% of the sample).

On the other hand, a market in which the consumer demands a fruit of impeccable quality based on appearance, will necessitate a production system that can deliver this feature. Systems of production, which rely heavily on the use of fertilizers and pesticides to increase the productivity of the system and enhance the appearance of the fruit, will therefore be pursued in an effort to meet the market requirements.

The unwelcome effects of the latter system may be pollution of ground and surface waters as well as reduction of indigenous wildlife species; results of a system that clearly cannot and should not be sustained. At present, very little quantitative data exists with respect to the impact of this chemical use on the environment, but the present patterns of use underscore the need for further examination of the sustainability of the systems of production that currently exist in the Windward Islands.

The sustainability debate has increased markedly over the last twenty years. The major issue fuelling this awareness has been the concern that past and current activities of man have begun to endanger his very existence. There is thus a concern that mankind may not be able to maintain future activity at desired levels.

This prospect has led to the need for agricultural scientists to find or develop sustainable agricultural production systems. To achieve such systems, a number of necessary conditions have been identified. These conditions include the following.

Economic Efficiency/Viability-Agricultural production systems will only be sustainable if they allow producers to obtain the economic rewards (e.g. profit) necessary to ensure their consumption activities. This condition will exist once market forces continue to dominate the organization of society and the distribution of resources.

Minimum Environmental Degradation - Agricultural Production systems will only be sustainable if the resultant degradation of natural resources is sufficiently small, so that these natural resources maintain their intrinsic properties over time. We include in these natural resources, the human resource whereby sustainable agricultural systems must maintain the health and nutrition of human populations.

Institutional Persistence - Agricultural production systems will only be sustainable if they allow societies to maintain the cultural and social institutions necessary to maintain the integrity of the society. In other words, if agricultural production systems lead to the destruction of the social fabric of the society, future activity will be endangered no less than by environmental degradation or economic inefficiency.

There are normally a variety of alternative agricultural production systems and these systems, since they involve different transformations of natural and manufactured inputs into commodities, would be characterised by different levels of agricultural sustainability.

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Footnote:

¹ The Green Market Price refers to the price obtained for green bananas delivered to the importers own ripening depot or to independent ripening companies.