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An Integrated Approach to Small Farmers' Development in the OECS Countries— The CARDATS Experience

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CARDATS is an agricultural development project which offers a multi-disciplinary package of services to limited groups of small farmers in each of the OECS Member States within the Caribbean Community. The package of services includes assistance in farm planning, provision of inputs, production technology, and marketing. The *modus operandi* is based on the concept that sensible and effective coordination of all the links in the productivity chain—from planning, through production, to marketing—is essential for successful farming.

Over the more than six years of its existence, the project's most persistent concern has been to improve the economic returns to the farmers with whom it has been associated. Since

these farmers have, for the most part, been food crop growers, the production of vegetables and other root crops has received greatest attention in CARDATS' farm programming.

CARDATS' programs, as described above, must obviously have an impact on associated rural communities. Similarly, rural situations influence, in some measure, the development processes undertaken in these programs. Within the CARDATS experience are many instances where farmer attitudes and responses to project initiatives are apparently conditioned by social and cultural influences. It is evident that these must be clearly understood and appreciated if meaningful and lasting small farmer development is to be achieved.

One envisages economic agricultural development as an integral component in the development of the rural community. Since agriculture is commonly the only significant economic activity in the rural environment, there is urgency in many communities to upgrade it to the level of an efficient business capable of supporting and sustaining much of the costs involved in developing other aspects of rural life.

The basic concepts at the centre of CARDATS' approach to small farmer development in the OECS States are first, that the materials and services essential for efficient, businesslike production must be available to the farmers at adequate levels; second, that the delivery of these materials and services must be timely. These requirements for effective farming are not unusual. In fact, they are considered normal in the production of sugar, bananas, and other export crops. However, programs for timely provision and delivery of essential goods and services to the small food crop producers in the project area are unusual and in many places have never been attempted.

In the case of the export commodities it is not unusual for a single institution, usually a commodity association, to oversee and coordinate the supply of materials and services (including planning, supply of inputs, technological advice, and marketing) to the growers. On the other hand, food crop farmers are serviced by a number of independent, autonomous bodies, usually Government departments or statutory boards, which—however well-intentioned—experience considerable difficulty in achieving the kind of coordination and integration of services that the farmers need. Thus, extension services, input supply houses, credit institutions, and marketing boards frequently work at cross purposes and the farmers experience shortages, failures and loss. Perhaps the time has come to service local food production by small farmers more adequately and to restructure the supporting institutions in a manner more conducive to increased productivity and profitability for the said farmers.

Objectives of the CARDATS Project

The CARDATS project's long range objectives are to assist the OECS Governments in their efforts to promote small farmer development, leading to increased domestic food and export crop production and marketing on a sustained basis, contributing to solving the problems of rural unemployment, as well as stimulating better rural conditions.

CARDATS' immediate objectives are as follows:

1. to improve farmers' skills in agricultural production and marketing;
2. to implement efficient and effective small farm production systems;
3. to assist, through the promotion of coordination and training, the institutions supporting small farmer production and thereby rendering them capable in due course of undertaking the essential support functions now being performed by CARDATS;
4. to promote the organization of farmer groups capable of ensuring the supply of essential services and inputs to small producers;
5. to provide services and inputs to small farmers; and
6. to develop and demonstrate improved management systems through which the required services and inputs to small farmers can be delivered on a cost effective basis.

Description of Project Area

The seven small island states which together constitute the Organisation of Eastern Caribbean States (OECS) are Antigua and Barbuda, Commonwealth of Dominica, Grenada, Montserrat, St. Kitts-Nevis, St. Lucia, St. Vincent and the Grenadines. These territories share the same currency and have combined area of 1,170 square miles and a population of 520,000.

In 1966, all the countries joined the Caribbean Free Trade Association (CARIFTA). Since 1974 they have been members of

the Caribbean Community and Common Market.

Dominica, Grenada, St. Lucia and St. Vincent and the Grenadines collectively called the Windward Islands, have rugged land relief, abundant precipitation (approximately 60"-80" per annum), and lush, tropical vegetation. In the Leeward Islands (Antigua and Barbuda, Montserrat and St. Kitts-Nevis) the topography is less rugged and the precipitation lower (approximately 40"-60" per annum).

The natural resources of the areas are very limited—except for an abundance of lovely beaches and pleasant climatic conditions. All of the islands, Antigua to a lesser extent, have volcanic soils suitable for a number of crops. However, water shortages in the Leewards, and rugged and hilly regions of the Windwards limit extensive agricultural production and restrict the areas of arable land.

Until recent times the economies of the countries have been dominated by plantation agriculture with sugar cane as the major crop. In some islands, sugar gave way to other crops but the plantation system remained. Since 1946, this system has been radically modified and most governments have been trying to establish new patterns of land holding and development.

At the present time, banana production constitutes the major agricultural economic activity in the Windward Islands. Sugar continues to dominate the economy of St. Kitts-Nevis, while in Antigua efforts are still being made to generate and stabilize new agricultural activity following the virtual breakdown of the plantation system.

Other significant agricultural exports from the area include tropical fruits, cocoa, nutmeg and other spices from Grenada; arrowroot and some root crops from St. Vincent and the Grenadines; copra from St. Lucia and citrus from Dominica.

In the early 1950's tourism emerged as a new important economic opportunity in the region and now dominates the Antiguan economy. Agriculture, however, continues to be the mainstay of the economies of the other countries.

The Small Farmer in the Project Area

The primary long-range objective of the project is to assist participating countries in the implementation of agricultural diversification programs designed to increase domestic food production by small farmers who, in the sub-region, are the principal domestic food producers. This identification of the small farmers as the primary target group of the CARDATS Project was given further emphasis in the particularization of the "immediate" objectives.

Small farmers in the project area traditionally have been part-time producers. Their main farming activities (usually for export) were either as estate labour or on small self-run units. The growing of food was usually supplementary and at least partially for subsistence. With the decline of plantation systems, non-farming jobs have replaced estate work in many instances causing further alienation from the land and making it more difficult to maintain traditional levels of local food production.

The concept of a "cash" crop which returns cash to the producer within some acceptable and well-defined time frame, is absolute in the mind of the West Indian small farmer. Moreover, he has traditionally seen this cash earned principally through overseas sales and therefore conceives of significant agricultural production only in relation to obviously readily accessible export markets.

The crops grown for local consumption by small farmers have mainly been the so-called ground provisions. These are primarily "root" crops like yams, cassava, sweet potatoes and aroids, but sometimes the term is extended to include non-roots like plantains and other cookable bananas. These provisions have long been regarded as low value commodities, prone to seasonal gluts and having little export potential. By themselves, they are not thought to bring returns to the farmers commensurate with his

expectations. This view is changing somewhat in the light of increasing demands for this kind of commodity in some regional markets like Trinidad, Barbados, and extra-regional outlets in the United States and the United Kingdom. Still, access to many of these markets continues to be difficult because of inadequate transportation facilities, and farmers generally have remained reluctant to expand their acreages under these crops.

Some vegetable have always been grown in the countries which constitute the CARDATS project area. But for the most part this kind of production has been handled by a relatively small number of specialist vegetable growers and/or by backyard gardeners. Generally, local vegetable production has remained small and inadequate even in terms of local demand. Within recent times, the large-scale production of single vegetable commodities has been attempted in some countries (notably in St. Vincent) with variable success. Also, there has been obvious growth in the number of specialist vegetable growers throughout the sub-region.

From the beginning it was recognised that development of the small farmer himself was critical to the success of the entire program. It was necessary therefore to bring into direct focus all of the farmer's existing activities, his attitudes, and his expectations. One needed to approach the farming business from the vantage point of the small farmer himself and to devise systems of production which could, with appropriate effort, be rewarding in *his* terms.

The strategy adopted emphasized the timely provision and overall coordination of an unbroken chain of services, skills, materials and markets as required for special production. And so, farmers must be trained, production inputs supplied, and markets found. Some one or other of the elements essential for successful production is to be found, of course, in each of the countries participating in the project. What is vital, however, is the timely delivery to the producers of *all* of the services and materials involved in the process.

The CARDATS Program—Phase I & 2

In its program for upgrading the production skills and capabilities of small farmers, CARDATS worked in the first instance with relatively small groups of farmers located in target areas selected in the main by the governments of the respective countries.

The numbers of farmers in target areas receiving services directly from CARDATS are shown in Tables 1 and 2. These are categorized as follows:

1. **Primary**—farmers receiving direct assistance from CARDATS beginning with the preparation of farm plans through production to marketing; and
2. **Secondary**—farmers receiving direct assistance from CARDATS through production to marketing, but not in the preparation of farm plans.

The numbers of farmers coming directly under the influence of the CARDATS program were smaller than was envisaged when the project was planned. Furthermore, although the majority of the farmers were consistently associated with the project throughout its first phase, there were some whose involvement was of shorter duration. Some of these new farmers came as a replacement for dropouts (notably in Grenada), while others were recruited as part of expansion processes in certain target areas.

The CARDATS project was designed to demonstrate that small farmers can be efficient food producers if the inputs, techniques and services normally afforded other growers are available to them. In order to do this it was necessary to work with relatively small, manageable groups of farmers. By opting for this approach, it was possible to give each farmer the attention required for the successful adoption of new skills in farm planning, pro-

duction and marketing. Access to loans for viable projects could be arranged along with proper supervision. Adequate records of all the farming activities could be kept, thereby monitoring, not only the effectiveness (or otherwise) of the technical and other directions given by the project, but also the farmers' responses to them.

The obvious, and not surprising, result of all these efforts is that small groups of farmers in each country of the production areas have developed new (or renewed) interest in farming. These people have improved their skills, and their awareness of farming as a business is growing. In the target areas, and gradually extending beyond, new confidence is being generated in the relationship between farmer and extension agent. The fitness of small scale farming as a means of providing reasonable rates of return from investments in food production ventures is generally being recognised. Of some significance also, is the growing in-

terest with which some government ministers and other senior officials are regarding the CARDATS operations in their countries and the requests they make for the expansion of these operations.

It is agreed that the CARDATS programs should be expanded to achieve greater and more noticeable impact on the agricultural economies of the countries involved. They must reach larger groups of farmers. The first phase of the project, with its modest target areas and confidence building processes, has now been succeeded by a second phase which is presently exploiting all the accumulated experiences, skills, and services to be found in the region so that there will be meaningful small farmer development.

To be effective, projects executed by external agencies which are designed to service a large number of small farmers in the OECS member states, must be integrated as closely as possible into the general work programs of local Ministries of Agriculture. The synchronism of CARDATS productive activities with planned patterns of national and regional production, will undoubtedly favour the fuller utilization of production resources held at all levels and facilitate the contained development of desirable programs.

TABLE 1. Primary Farmers.

PRIMARY FARMERS				
PHASE I		PHASE II		
Country	Number	Total Farm Acreage	Number	Total Farm Acreage
Antigua	18	82	63	221
Dominica	76	64	25	125
*Grenada	36	36	73	50
Montserrat	32	184	130	520
St. Kitts/Nevis	25	11	56	51
St. Lucia	11	25	10	4
St. Vincent	15	65	32	170
Totals	223	547	399	1416

*Remarks
Grenada (Phase II)
In addition two (2) registered cooperative societies with a total membership of twenty two (22) and total farm acreage of 38 acres.

Farmer Training

In a significant way the relatively small numbers of farmers dealt with by CARDATS in each island was in accord with the nature of the project itself. It facilitated the farmer training processes.

The small food crop growers with whom CARDATS came into contact in Phase I and II can be classified into the following major groups:

1. Group I—commercially oriented growers with secure land tenancies and interest in the production of food crops (mainly vegetables) for sale;
2. Group II—subsistence farmers with more or less secure land tenancies interested in growing some cash crops and other crops for domestic consumption; and
3. Group III—rural persons, many of them agricultural workers, interested in farming but with little or no farming experience and frequently with little access to farm land and agricultural credit.

Some farmers in each category were found in all project coun-

TABLE 2. Secondary Farmers.

SECONDARY FARMERS				
PHASE I		PHASE II		
Country	Number	Total Farm Acreage	Number	Total Farm Acreage
Antigua	36	125	113	438
Dominica	9	22	26	77
Grenada	120	-	7	12
Montserrat	33	80	200	-
St. Kitts/Nevis	32	42	8	2
St. Lucia	-	-	6	-
St. Vincent	62	260	100	-
Totals	292	-	460	-

TABLE 3. Project Farmers (1984).

Farmer	Farmers		Farming Years	Total Cultivable Acreage Under Irrigation	Family Participation
	Age	School Years			
1	60	6	35	1.45	None
2	53	0	40	3.35	Children
3	60	0	45	2.10	Children
4	37	5	17	1.90	Wife & Children
5	56	8	33	1.80	Wife & Children
6	53	8	25	1.90	Wife & Children
7	76	0	60	2.90	Children
8	65	2	40	2.70	Children
9	26	8	6	2.60	None
10	77	12	30	2.90	Children
11	27	8	7	2.30	None
12	83	0	60	3.00	None
13	42	6	20	1.00	Children

tries, but many of them encountered in Antigua, Montserrat and St. Vincent belonged to Group I; those in St. Lucia and St. Kitts to Group II and those in Grenada to Groups II and III.

Different methods of approach were obviously required in dealing with the development needs of the various groups. The people in Group III needed daily instructions in the simplest gardening techniques, on-the-job guidance and encouragement in the fundamentals of farming. They also needed assistance in stabilising land tenancy situations and developing new mechanisms for marketing new farm produce.

The farmers in Group II were generally older folks, well rooted in the traditional methods of producing ground provisions. Since most of these subsistence farmers were located on sloping land susceptible to erosion, a major requirement was to improve the production of these traditional crops while, at the same time, upgrading the level of soil conservation methods. It was also evident that new, more profitable crops could be introduced on farms with suitable soil and water conditions. This was particularly apparent in St. Lucia's target area, where a nearby stream and available irrigation equipment made intensive vegetable production feasible. Here again, patient and persistent on-the-job instructions in improved production techniques had to be provided on a daily basis, and new marketing channels developed.

Perhaps the most readily approachable farmers were those in Group I. Here were growers already familiar with the cash economy and in possession of some skills and techniques in vegetable as well as ground provision production. What was required for this group was an upgrading of those skills, the strengthening of mechanisms for the supply of production inputs, and the development of suitable marketing arrangements.

Due to the variations in skill and experience among the three groups, the CARDATS program involved farmer training ac-

tivities ranging from the most elementary farming practices through to some of the most sophisticated techniques used in commercial vegetable production. Most of this work was attempted through direct on-farm demonstration and group training, and some work was feasible only with the limited members of farms. Obviously, one hoped for spin-off and spread effects from these efforts. There is evidence that such effects did in fact occur, leading to some improvements in farming methods among non-project farmers. Undoubtedly, however, more comprehensive training programs are being adopted in Phase II and larger numbers of farmers are being addressed.

Credit

The role of credit in small farmer production has been a matter of major importance throughout the life of the project. Indeed, the inclusion of a revolving credit fund in the project's structure has always been considered to be an essential feature of CARDATS and testifies to a belief in the fundamental nature of credit in small farmer development.

Credit is required, of course, for the business of farming. It should be noted here that the granting of loans for agricultural purposes to small farmers in the sub-region is not a new phenomenon. Governments throughout the area have had schemes from time to time for lending small sums to farmers, especially those involved in land settlement programs. Results of these schemes have sometimes seemed to fall short of expectations. Poor appraisals of projects along with untimely disbursements and the lack of supervision contribute to poor repayments. Recognizing that many of these schemes have been counter-productive, CARDATS Credit Program aimed at proper appraisals of projects, rectifying the timeliness of loan disbursements and providing the required short term funds. In addition, close supervi-

sion of the entire credit systems was attempted.

The differential between countries is remarkable and reflects some measure of differences in farming conditions and farmer attitudes encountered in the various countries. Two distinct attitudes towards the use of credit were discernible in project farmers. There were those farmers whose approach to credit was almost ultra-conservative. Their borrowing was mostly for the purchase of inputs, and their repayments were prompt. The farmers in St. Lucia, St. Kitts-Nevis and Antigua belong to this group. On the other hand, there were farmers who seemingly had previously been exposed to unsuccessful and poorly organized credit schemes. They adopted a 'cavalier' approach to borrowing, sought as much money as possible for the payment of labour, and were extremely sluggish in repayment. These farmers were mostly found in Montserrat.

In the course of its first phase, the project area experienced a number of natural calamities and disasters which affected the CARDATS farmers and their ability to service their loans. These were particularly severe in Dominica, St. Vincent, St. Lucia and, to a lesser extent, Montserrat, where hurricanes, frequent floodings, and in the case of St. Vincent, volcanic eruptions, destroyed crops and farming material, resulting in substantial financial losses.

Despite these difficulties, the use of credit in the first and second phase of the CARDATS project contributed in no small way to the rejuvenation of foodcrop farming in some countries and the modest introduction of new vegetable production in others. The expectation and confidence which accessibility to credit engendered was responsible for a new wave of interest in, and enthusiasm for, farming.

Some notice should be taken of the fact that CARDATS was able to ensure access to funds from national credit institutions for many of its farmers. Most of these farmers did not normally qualify for finance since they lacked the necessary collateral. Loans were finally granted on the assurance of the project management that they would be comprehensively supervised. It is clear that the future development of small farmers in the sub-region will depend, in large measure, on the more extensive use of supervised credit.

Marketing and Farm Planning

Reliable information regarding the marketability of his/her product is an essential element in the forward planning done by successful commercial farmers. For the food crop farmer in the OECS member countries, this element is frequently missing.

In assisting project farmers with their farm planning and crop scheduling CARDATS naturally focussed on all the relative technical and economic factors involved in production, but it was evident that the primary concern for most of the farmers throughout the area was with the potential saleability of their produce and the prices they were likely to receive.

The dependence of Caribbean agriculture on export markets is well known. It is also axiomatic that the bulk of any significant increase in food production in the OECS member states must be exported. Whatever may be the ultimate results from programs aimed at including greater consumption of locally produced food, it is clear that in the foreseeable future much of any substantial output in these islands will have to be sold on regional or extra-regional export markets.

CARDATS in its first phase was concerned primarily with assisting participating countries in upgrading their "perishable produce" marketing capabilities. Assistance was given in developing marketing structures and strategies for national marketing boards and in identifying (mostly regional) marketing outlets for the said type of goods produced. In Phase II, the project's planning and marketing activities are broadened to include pilot programs which are geared towards import replacement to meet na-

tional markets and to demonstrate post-harvest handling and marketing/distribution of small farmers' produce. CARDATS also is assisting in the development of marketing intelligence systems linking project area countries with the major regional and extra-regional markets interested in buying their produce.

Production

In its bid to demonstrate the profitability of small farming, CARDATS encouraged the cultivation of mixed vegetables wherever conditions were suitable. These products attract high prices in the region, provided they can be marketed in places of high demand. Many of the project's vegetable growers are farming successfully and it is evident that this kind of production can be profitably expanded to fill regional markets.

It is also equally clear that not all small farmers successfully grow vegetables; the farming conditions simply are not always suitable. On hillsides and under dry, rainfed conditions the crops grown were mainly aroids and other roots, plantains, pigeon peas and corn. In its related programs CARDATS sought to upgrade yields, advising on improved varieties, better fertilizer practices, and more effective cultural and post-harvest handling techniques. CARDATS also assisted in supplying inputs when these were needed. The demand for these provisions has been growing and it is believed that CARDATS, by assisting in the development of reasonable access to new markets as well as in the creation of a more business-like approach to this kind of extensive cropping, could contribute significantly to increased food production in the sub-region.

CARDATS has also been concerned with the need for greater crop diversification in all of the participating countries. Already, greater attention is being given to the cultivation by small farmers of some of the more specialised cash crops like peanuts and pineapples, and also to the establishment of fruit trees on sloping farm land, mainly as protective measure against soil erosion but also to contribute towards satisfying the growing demand for tropical fruits.

Livestock rearing by small farmers in the CARDATS project area is often a random undertaking. The farmers who own them keep the animals for security and to achieve other definite goals, but the methods of rearing livestock is casual. In the sub-region, the farmers' animal rearing activities appear as separate and distinct from those concerned with crop production. Most of the project farmers own livestock. Cattle are the preferred species, but sheep and goats are commonly found in all target areas. Frequently, the animals are maintained some distance from the farming area on non-occupied or abandoned farm land, and receive minimal care and attention. However, the poor husbandry can be improved and integrated into profitable and progressive farming systems.

CARDATS efforts in the field of livestock improvement to date have not been very effective. The development of mixed farming systems involving the sensible integration of crop and animal husbandry production activities was conceived as a means of maximising the use of the farmer's total resources and enhancing his overall performances.

Farm Equipment and Machinery Services

Next to satisfactory marketing arrangements, access to tractor services, especially for land preparation, is regarded by many small farmers as an essential requirement for successful production. In most countries however, these services are either inadequate or non-existent. Quite apart from the severe and chronic shortage of farm machinery, is the almost total inadequacy of the skills and local supplies of spare parts needed to maintain even such equipment that may already be available.

The unavailability of satisfactory facilities for servicing farm machinery in many of the countries is, at least partially, a func-

tion of the low viability of such activity. This, in turn, reflects the low acreage in arable cropping in the Windward and Leeward Islands. Government-run farm machinery pools and workshops have been established in all of the countries to encourage the expansion of this kind of farming through mechanization, but results so far have been disappointing. In some countries the highly subsidized government services offered to farmers have been slow, unreliable and frequently non-functional. Indeed they may well be counterproductive since, because they are subsidized, they serve as disincentives to private entrepreneurs interested in investing in this important aspect of the farming business.

Efforts are being made by CARDATS to assist in upgrading the skills and services provided by support personnel such as tractor mechanics and operators, especially those located in rural districts. Training is being accomplished by means of on-the-job instructions, field demonstrations, attachments, workshops, group discussions and formal lecture courses. Encouragement will also be given to suitable individuals and/or groups who may be interested in investing in the farm machinery business with a view to offering custom service to farmers.

Concern about the appropriateness of the technology available to small food crop growers in the project area has been growing in recent years. This has been especially so in farm mechanisation, where capital and variable costs have escalated to the point where only highly efficient farming operations can economically justify the use of gasoline powered tractors and other machinery. Considerations are now being given to the use of less expensive and more appropriate methods of plowing small plots on rocky hillsides, and distributing scarce volumes of irrigation water.

Other Production Inputs

The confidence and interest which the developing farmer must have in order to produce successfully can be badly shaken when his best efforts to secure essential inputs like seeds and agricultural chemicals are partially or totally frustrated.

In Phase I, CARDATS moved production inputs into its target areas as these were needed, thereby ensuring timeliness of availability and usage. On a number of occasions, inputs were purchased in bulk to reduce costs and to predetermine the regularity of supply to farmers. All these efforts were ad-hoc responses to breakdown in the local supply systems. In its second phase, the project is upgrading the level of supply intelligence available to supply institutions and is promoting the establishment of improved supply systems.

However, notwithstanding any role it might play in the upgrading of traditional agricultural service institutions, CARDATS recognizes the fact that the resolution, resourcefulness and self-reliance of the farmers themselves could be the most meaningful determinants of the quality of the services they receive. It is believed that by organizing themselves into groups (associations and cooperatives), farmers can develop these attributes and enhance their self-reliance in farming operations. CARDATS is assisting in this process of organization to develop and establish common services in land preparation, acquisition of farming inputs, marketing of farm produce and the general pursuit of better farming conditions.

Black Bay Project — St. Lucia Comments on Farming System

Location

The Black Bay Project, comprising some 40 acres, is located between 61°W Longitude and 13°50' N Latitude on the southeastern section of the island of St. Lucia. It lies in proximity to Laborie and Vieux Fort, two major towns in the south of the island.

History

The project was originally conceived in the early seventies by the British Development Division (BDD) and the Department of Agriculture in St. Lucia.

The objective was to initiate an irrigated vegetable production scheme for small farmlets in which inputs and services were provided to the participants while their produce was sold and receipts handed over after deductions were made for the inputs and services provided on credit.

The government provided a project manager, but it was expected that after receiving cooperative education, the farmers would form a cooperative society and assume responsibility for the management of the project.

According to the original Project Document (1974) a grant was made available by BDD for the purchase and/or construction of a building with facilities, tractors/tillage and irrigation equipment along with working capital from the Agricultural Association.

The scheme finally started in 1974, and although there was some measure of success, it completely collapsed in 1977.

The major reasons for the project's failure were:

1. a misunderstanding between management and farmers about the objective of the scheme and responsibilities of all parties concerned;
2. selection of a project area which flooded easily during the rainy season, causing considerable damage to crops; and
3. lack of proper planning, coordination/delivery of services, inputs and the marketing of farmers' produce.

CARDATS Support

When CARDATS assumed responsibility for the project in 1978, no cooperative society was formed, no cropping activities were taking place, and some equipment and machinery were missing or in need of repairs. The working capital also expired while the project manager was still being provided by the government. In fact, the whole area had reverted to grassland and was being utilized for livestock grazing.

CARDATS support/approach included:

1. Farm planning was implemented. Production was programmed so that only peanuts and sweet potatoes would be grown between July-December on the land, this coinciding with the period of flooding which normally would last for 1-3 days. On the other hand, in the January - June period, farmers put emphasis on those vegetables which could be sold in reasonable quantities, and which at the same time gave a good return, e.g., cabbages, onions, tomatoes, carrots, and cucumbers.
2. Farmers were guided, advised, and trained in the technical aspects of production.
3. Assistance was given in the timely provision and overall coordination of services (e.g., irrigation, tractor, etc.) and material inputs needed by the project.
4. Supervised agricultural credit was promoted and utilized along with proper record keeping.
5. Marketing outlets for farm produce were identified in relation to determined farm plans.

With this unbroken chain of services, skills and materials, along with the markets, the farmers were being trained to be able to operate on a self-sustaining basis. CARDATS also assisted in the coordination and training of personnel within the institutions supporting small farmer production and development.

CARDATS' support to the project over the last six years has achieved:

1. *Changes in cropping activities*—With the planning of a cropping pattern (taking into consideration market, gross margin, flood hazard, irrigation, soil type and rotational constraints), farmers were willing to grow mixed vegetables, sweet potatoes, peanuts, etc., as compared to

the other traditional crops, e.g. cassava.

2. *Proper implementation of efficient small farm production systems*—CARDATS was also able to meaningfully improve farmers skills in both livestock and crop production along with marketing.
3. *Effective usage of supervised agricultural credit (short term)*—This was supplemented by improved technical and supply services and geared towards increased productivity of small farmers.
4. *Proper preparation of project farmers to organize themselves into a formal group*— Among the activities that have been executed by the group are the selection of new or replacement farmers for the project and the operation of the irrigation equipment.
5. *Increased production and productivity of farming units and incomes of the small farmers within the Black Bay Project*—This would go a long way towards the achievement of higher levels of rural welfare, improved nutritional standards and increased opportunities in rural communities. During 1984, two farmers, aged 27 and 26 years respectively, joined the project. The latter has already purchased a

water pump for use on his farm. Other farmers, having provided themselves with working capital for their farms, have been building/renovating dwelling houses and investing in livestock. Also the trend over the years has been towards full time participation on the farm of children over eighteen years of age. In some cases the children are managing the farms.

6. *Improved management of livestock*—In 1974 the rearing of livestock was a random undertaking. Now, with the increased numbers, farmers are practising good husbandry and there has been pasture improvement. The number of animals has increased significantly between 1978 and 1984: cattle from 40 to 115 head, sheep 10 to 33 and pigs 2 to 8.

This type of investment, along with the other activities within the project over the recent years, clearly indicated that apart from increased farm incomes, the type of farming system evolving is one that would integrate crop and livestock production. With such a system supported by CARDATS approach, project farmers would continue to realize increasing farm incomes concomitant with improved standards of living.

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