



A Model for Sustainable Agriculture & Rural Development (SARD)

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Defining Sustainable Human Development

Up until 1990, the level of development of a country and its people was measured using the economic indicators of Gross Domestic Product (GDP) and Gross National Product (GNP). Unfortunately, as pointed out by social scientists, these measures of development ignore important dimensions such as social capital and habitat.

In 1990, the United Nations Development Programme (UNDP) produced its first Human Development Report (HDR) which introduced the Human Development Index (HDI), a more realistic measure of economic progress. In subsequent reports, these concepts were refined to include other social and trade criteria and means of measurement. In 1994, the UNDP described Sustainable Human Development (SHD) as:

“... development that not only generates economic growth but distributes its benefits equitably; that regenerates the environment rather than destroying it; that empowers people rather than marginalizing them. It is development that gives priority to the poor, enlarging their choices and opportunities and providing for their participation in decisions that affect their lives. It is development that is pro-people, pro-nature, pro-jobs and pro-women” (UNDP Human Development Report, 1994, p. iii).

This definition recognizes the importance of transparency, participatory decision-making and the inter-relationships of the social, economic, and environmental dimensions of development.

THE SARD MODEL

Social, Economic and Environmental Dimensions

Sustainable Human Development (SHD) is a laudable goal which can be readily accepted as the general purpose of any project oriented towards Sustainable Agricultural and Rural Development (SARD). It encompasses the concepts of equity and improved quality of life which can often be identified in the definition of a project's goal or purpose. As suggested by Figure 1-a, SHD is the starting point for the building of a model for Sustainable Agricultural and Rural Development (SARD).



Figure 1-a: The basic goal of Sustainable Agricultural and Rural Development (SARD)

Since SHD encompasses the economic, social and environmental aspects of development, it can be assumed that efforts at SARD will also involve these three dimensions (Figure 1-b).

Whereas numerous models of SARD distinguish these three dimensions as points of an equilateral triangle, they can be better represented as part of a concentric ring within the

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ring of Sustainable Human Development (Figures 1.b). This is supported by the fact that SHD can only be achieved by the integration of these three dimensions. Any SARD oriented project must have social, economic and environmental components. Economic activities which generate good returns but destroy natural resources or do not develop competent human resources would be unsustainable. One dimension cannot be totally separated from the other two. All three dimensions are intricately inter-connected and all are relevant in any SARD project.

The public sector linkages between the social, economic and environmental dimensions take the form of people, politics, policies, legislation, institutions and the services provided by the latter. These linkages are shown graphically with a third ring on the periphery of Figure 1-c. The location on the outside of the model is indicative of the macro-environment which influences all attempts at SHD, normally directed from the top-down, and sometimes divorced from reality. The ineffectiveness of many agricultural sector policies, public sector institutions, support services and projects suggests the need for improved linkages between public and private sector institutions and between decision makers working at the macro and micro levels.

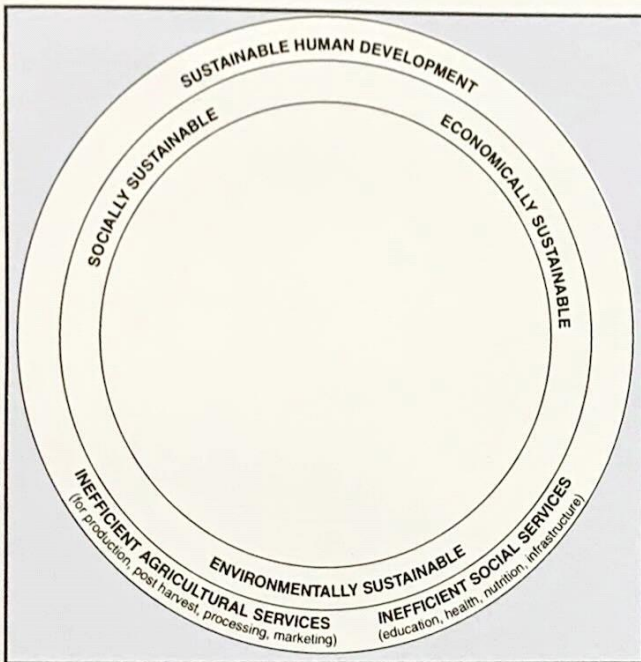


Figure 1-b: The three basic dimensions of Sustainable Human Development

Levels of financial resources, quality of human resources, institutional strengths and weaknesses, and efficiency of bureaucracies, are some of the determinants of the quantity and quality of social and agricultural services reaching rural communities. When the quality of services is high and job opportunities exist, rural communities develop; when they are not, rural people migrate to the cities, looking for better conditions.

There is growing recognition that in most developing countries the quantum and quality of public sector support services are inadequate to meet the needs for Sustainable Human Development. With the expected continuing decline of grant aid, it can be anticipated that the amount of resources for public sector services will continue to shrink. This will necessitate two things: (a) an increasing delivery of support services through the private sector and (b) a greater partnership between the public and private sectors and with intended beneficiaries, for providing more efficient services.

A dilemma for many institutions is determining which services to transfer and how this process is to be carried out. Services in such areas as information generation and analysis, planning, quarantine service and management of public infrastructure will most likely remain, to a high degree, in the domain of the public sector. Services which readily permit cost recovery (nurseries, input supplies, extension and veterinary services, credit, etc.) are likely to be taken up by private sector entrepreneurs and NGOs. However, the provider of the service is less important than maintaining a high quality and efficient delivery of the service (Figure 1-c).

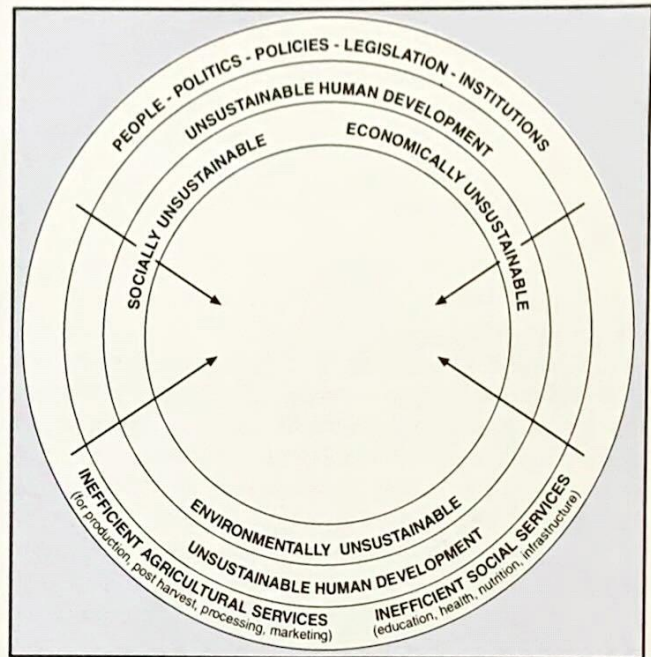


Figure 1-c: Public Sector Institutional Support for Sustainable Agricultural and Rural Development

Over the past half-century, numerous experiences in agricultural and rural development have identified specific social, economic and environmental criteria as crucial elements in the design of sustainable activities. Increasingly, attempts to integrate these three dimensions are utilizing strategies and methodologies which involve rural people in field research, project design and decision making, at all levels. In this process, human resource limitations are often identified as a primary constraint to development. The search

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Meeting the Challenges of the 21st Century – Financing the Agribusiness of the Future

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Introduction

In Trinidad and Tobago primary agriculture contributes approximately 3.0 percent to total output of the economy. Agribusiness, which, as we know, is all-inclusive, contributes approximately 7.0 percent. Specifically, agro-processing (Food, Drink and Tobacco sub-sector of the Manufacturing sector) by itself contributes some 3.6 percent. For comparison purposes one estimate for the USA shows that agribusiness (the food and fibre system) contributes 17.0 percent of GNP (Feibelman, 1995).

Agribusiness today in Trinidad and Tobago comprises a range of enterprises varying from single-unit micro – enterprises to larger integrated operations such as poultry production. It includes primary production, processing, distribution (domestic and foreign) and input supplies and services. The Government is still the major single player in the form of Caroni Ltd. the sole sugar producer.

The sector here as in many other countries has suffered from a host of problems. These include (i) a macro-economic policy framework geared to industrialisation behind high tariff walls (ii) a mineral based economy which tends to work against the rest of the tradeable goods sector of the economy including agriculture and (iii) a mixture of institutional and structural problems.

Certain activities in the sector are still subsidised and there continues to be tariff protection on selected primary agricultural products with the Common External Tariff (C.E.T.) at 25.0 percent. The agribusiness sector employs approximately 45,000 persons or some 10.0 percent of the total employed labour force. Interestingly this share has not varied too much since the opening up of the economy in the early nineties and suggests some offsetting adjustments within the sector.

Financing Agribusiness: The Present Realities

The financing of agribusiness is characterised by a range of problems. Problems that confront lenders include (i) inadequate attention by borrowers to the keeping of accounts (ii) poor overall

management of enterprises (iii) slim and often negative margins and (iv) exceedingly high and varied risks. Major sources of risks include weather, disease and policy making. In a commercial environment the net effect of high risks regardless of origin is to raise lending rates to the sector. Indeed risks can be so high as to prevent any lending regardless of the rate.

Main sources of financing remain the Agricultural Development Bank (ADB) and the commercial banks. Reflecting their funding profile, the former focuses on the longer end of the market and the latter concentrates on the short to medium end. Commercial bank loans outstanding to the agribusiness sector (public and private) in 1997 (as distinct from the agricultural sector) amounted to approximately \$550.0 million or 5.5 percent of the commercial banks' total loans and advances portfolio. The portfolio of the ADB was approximately \$102.0 million in 1996. The commercial bank prime lending rate has averaged 15.0 percent over the last three years while the average rate at the ADB is some 14.0 percent.

The question still remains as to whether finance (cost or availability) is a major constraint to agricultural growth. My own view is that it is not. By and large the financial system has met the demands placed on it by the borrowers. There is no doubt that lower lending rates would generate additional economic activity across all sectors. However, as is now appreciated, the agribusiness sector is affected by the conduct of monetary policy as it is by the general macro-economic framework. At this time in Trinidad and Tobago, macro-economic management is about balancing faster growth with balance of payments sustainability. This has translated into higher lending rates that all sectors, including agribusiness have to face.

For those who might argue for an expansion of lending to agriculture we need to remind ourselves that the banking system cannot produce services for which there is no effective demand or only marginal demand. It has to function in the existing market environment

with all the penalties for making bad loans and rewards for making good ones. It is these penalties and rewards that guide all business decisions. Indeed any business that ignores these signals does so at its own peril and that of its shareholders. In the case of a bank it does so at the peril of its depositors also.

More Recent Trends in Agriculture

Trinidad and Tobago is not only a signatory to the GATT Agreement and consequently to the WTO rules for agriculture but also a signatory to the CARICOM Agreement and therefore tied to the Common External Tariff (CET). These changes over the last few years have meant first a movement from quotas to tariffs and then to tariff reduction. Agribusiness activities have been facing the challenges of liberalisation for several years now. If measured by contribution to GDP the sector as a whole has not contracted as a result of liberalisation, limited as it has been up to now. While there have been some falling off in outstanding bank loans to the private agribusiness sector since 1993 this has not been significant and in any case the value of lending has risen since 1996.

The Agribusiness of the Future

Agribusiness will be affected and shaped by all the changes which are expected to affect world economies including trade agreements, innovations, technological changes, climatic changes and overall policies of governments. These changes will in turn affect what is produced and where, and how production is organised. They will also influence what is consumed and at what price.

Let us examine some of the views expressed on the likely impact of these changes. In the case of the U.S.A. one finds a great deal of optimism expressed by a former United States Secretary of State for Agriculture, when he says " ..in another decade we'll observe a level of sophistication in American farmers that is beyond what

Meeting the Challenges of the 21st Century cont'd

any of us even contemplate today" (Yeutter, 1995). He points to the computerization of sprinkler systems and the learning by farmers about forward contracts, futures and options markets. In the case of Canada, one analyst (Harris, 1997) finds that "Canada's agricultural sector is responding well to a world with fewer subsidies. Our farmers today are high-tech managers and competitive exporters -with the help of bankers who specialize in the field."

These contentions are of course related to developed countries. But for developing countries such as Trinidad and Tobago, what can we say? One view is that "developing countries will in the future become larger producers, consumers, exporters and importers of food products ..." (Yeutter, 1995). While without a doubt there are and will continue to be agribusiness successes, I am not so sure that we are ready to make such claims for the majority of our farmers or agribusiness ventures in general. The reality is that we have quite a lot to do to modernise agribusiness especially primary agriculture.

What seems certain is that the future of agribusiness is in the direction of greater competitiveness. In this context while the highest tariff rate under the Common External Tariff was supposed to fall to 20.0 percent by January 1, 1998 this has been delayed to July, 1998 when it is supposed to be reviewed. Whether or not it is reduced then, what is certain is that tariff rates would come down in the medium to long run, as this country and the region join larger trading blocs such as the Free Trade Area of the Americas (FTAA) which is scheduled to come into being by the year 2005.

All things considered it seems that the future of agribusiness in Trinidad and Tobago lies more in the sub-sector of agroprocessing rather than in traditional primary agriculture. Not only does this assertion seem to be a natural progression in the course of economic development but it also takes cognisance of the constraint of arable land coupled with the dominant mineral base of this economy.

Indeed, the potential for agro-processing and the supply of agri-services

is greatly enhanced when considered from a regional standpoint. There might very well be some complementarity between abundant natural gas in Trinidad and Tobago and raw material supplies from the larger Caricom territories such as Belize, Guyana and Jamaica or indeed from other parts of the world. I submit that this be more fully explored as we seek to establish Caricom's Single Market and Economy.

Issues for Future Agribusiness Financing

In the final analysis the future of agribusiness financing depends importantly as it always has been on whether or not the agribusiness of the future would be profitable. Specifically, it depends on the rate of return to agribusiness relative to that on other businesses. To the extent that the new agriculture would be more business oriented then it ought to be better able to stand on its own, to service debt and consequently to compete effectively for financial capital.

Viable agribusiness enterprises are likely to be larger than they are today, either on their own or as part of an integrated company. To the extent that we are contemplating larger and more profitable agribusiness firms then financial institutions would have to develop more specialist skills in respect of agribusiness financing. While we are not sure that we see agricultural lending "going up exponentially" as does one researcher (Andelman, 1997) in respect of the U.S.A., we expect that there would be some growth.

As banks and businesses in general become more regional, profitable agribusiness is likely to feature as a likely candidate in the attempts by financial institutions at diversification of loan portfolios. They are likely to pay more attention to the possibilities, which the sector might have to offer.

7. Conclusions

Agribusiness in Trinidad and Tobago encompasses a wide range of activities some more profitable than others. The sector, especially crop and livestock production is faced with a range of problems some of which I have

highlighted above. Because of the many risks which the sector faces the cost of finance to the sector is not always as low as it can be.

Some risks can no doubt be addressed by a greater appreciation of the vagaries of the various activities. In this there is no question that lenders need to better understand some of these risks. Other risks however can only be addressed by investment in better irrigation and infrastructure, crop and livestock insurance, wide ranging technological support and larger enterprises.

While the future of agribusiness will be determined by the incentives and disincentives that trade agreements are going to bring, regionalization of agribusiness activities seems to hold the greatest potential. This is not only because of the larger size of entities that are likely to result but also due to the potential for pooling of the comparative strengths of individual countries. Bureaucratic and insular impediments to this however must be reduced.

It must also be accepted that the sector has always and will always compete with other sectors for finance, labour, land and other resources. The sector must therefore reconfigure itself to make greater use of market signals in order to match the profitability of other sectors of the economy if it is to survive in the new environment. ♦

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The Civilian Conservation Corps - Agricultural Development Programme

Marlene Antoine, IICA Trinidad and Tobago and Michael Celestine,
The Civilian Conservation Corps - Agricultural Development Programme

Introduction

"...I will plant until I die"

Visits to any of the project sites involved in the agricultural programme of the Civilian Conservation Corps (CCC) will reveal the familiar orange clothed trainees bending over hoes, watering, weeding or mulching among a variety of crops including pumpkin, melogene, pimento, ochre, bodi, sorrel or patchoi. Like any of the other programmes offered by the CCC, these agricultural trainees will spend eight hours a day for a period of four months undergoing practical and theoretical training in agronomy and livestock. An average of 24 trainees are allocated to any one of the agricultural project sites.

Objectives

The CCC is a programme which is administered by the Trinidad and Tobago Defense Force and was designed in 1993 to undertake re-afforestation throughout the country. The stated goals and objectives were to:

- Create temporary employment for young adults;
- Combat the risk of an increase in socially undesirable practices among youth by promoting attitudinal change and opportunities for permanent employment; and
- Effectively pursue conservation activities.

Programme of Activities

The trainees are paid a stipend of \$30 a day, on a fortnightly basis. The eligibility criteria are based on an age limit between 18 - 25 years, educational achievements, unemployment and the occupational status of the household. Preference is given to applicants who are disadvantaged or challenged in some way.

The programme is organized into 8 geographical regions spread throughout the twin island state. Each cycle includes an induction training component of 1 month's duration, followed by the four month skills training. The trainees can select from an array of subjects including: plumbing, welding, masonry, pottery, garment construction, sign language and food preservation. The agricultural component was formally inaugurated to the curriculum in March, 1997. The programme therefore seeks to address the problem of limited participation by youth in the agricultural and rural development process through the provision of technical training and job attachments.

Trainees' Perspective

Responses to interviews among randomly chosen trainees and Team Commanders were particularly candid; but the consensus was that the programme is beneficial in terms of the skills acquired and the prospects of generating self employment opportunities on completion.

Dexter Charles, Team Leader associated with the

Manzanilla project for a period of four years, stated that he did not like agriculture before but now he will plant until he dies. He contemplates that he does not understand why he is no longer attracted to the other skills based training programmes like welding and plumbing. Based on the training he has received and his experiences with the programme, he is now totally committed to agriculture.

Camille Joseph noted that at her brother urging she decided to join the programme. At the time, she felt that there were no other options available. Prior to joining, she sold in the market but now feels empowered to produce her own goods rather than merely buy goods for re-sale.

Another trainee bluntly noted that her decision to join was based on the stipend which the trainees receive. She added that "...every little bit helps and I have a baby to mind".

Among the constraints identified by the trainees were:

- scarcity of labour and equipment on the projects to undertake land clearing - a typical project site ranges from 5 - 25 acres of land under secondary forests;
- the unavailability of land to trainees on leaving the programme; and
- unavailability of an after programme support system.

IICA/CCC Collaboration

Within the past year, IICA has sponsored the visit of two officers to the Dominican Republic to observe the systems of operation of NGO's and other youth agencies similar to CCC with the aim of duplicating successful experiences. Among the observations made were:

- Accessibility to training for farmers and youth groups is provided by a network of support agencies and includes technical and business management training;
- technical support in the area of monitoring and technical back stopping is provided by a network of governmental and non-governmental agencies;
- agricultural and agriculture-related groups from organisations, associations and federations which come together under one umbrella to form an effective lobby, as well as, access to external funding and technical assistance; and
- funding to youth and community groups is based on the philosophy of 'no handouts' and the belief that non obligatory funding negatively affects the productivity of the recipient groups. Accordingly, all funding are in the form of low interest bearing loans.

Some of the recommendation put forward towards increasing the success rate among youth and community projects in Trinidad and Tobago were:

- there must be a clearly demonstrated commitment among the beneficiaries prior to the offer of financial assistance;

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Technology Transfer from Central America to Jamaica: A Case of Goat Agro-Forestry Production System (GAPS) in Two Parishes

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Introduction:

Developing strong linkages between Latin America and the Caribbean Regions has been an aspiration of both these sub-regions. The Inter-American Institute for Cooperation on Agriculture (IICA) has valuable experience of working through the PROCIs network, a mechanism of exchange of technologies and research results, within the Andean, Southern Cone and the Central American sub-region's and countries.

This paper reports on a farmer-farmer exchange visit between goat farmers of Jamaica and Costa Rica as a model for rapidly exchanging technologies between the regions.

Why transfer Goat Agro-forestry Production System (GAPS) from Costa Rica to Jamaica?

The economic importance of goat production, consumption and importation in Jamaica cannot be overemphasized. The current national production needs to be tripled to satisfy existing demand. The premium price and the unsatisfied demand indicates an urgent need for developing an economically viable goat production system in Jamaica that is also socially and environmentally acceptable.

Goat production in watershed areas with its potential has always been controversial. However, given its social, economic and environmental importance for Jamaica the Ministry of Agriculture (MoA) has identified goat production as one of its priority areas.

The problems of goat production in the Rio Cobre watershed area were determined through participatory diagnostic techniques. The results revealed that a large number of goats are killed by stray dogs or stolen just because the goats have no specific place to be stabled. Goat production is a problem among neighbours, and frequently there are legal cases involving community members. The main production problems are health related problems and are linked to inappropriate stabling conditions. The farmers seemed to have no problem in feeding since they identified almost 20 plant species that can be fed to the goats. The consensus was that the protection of the goats from the "dog killing" and avoiding neighbour conflicts was among the priorities followed by the health and breed improvement efforts.

The objective of the overseas visit of farmers and professionals to Costa Rica was to take a first hand look at the goat management for milk and cheese production in order to adapt these technologies to Jamaican conditions.

The Programme and the Participants.

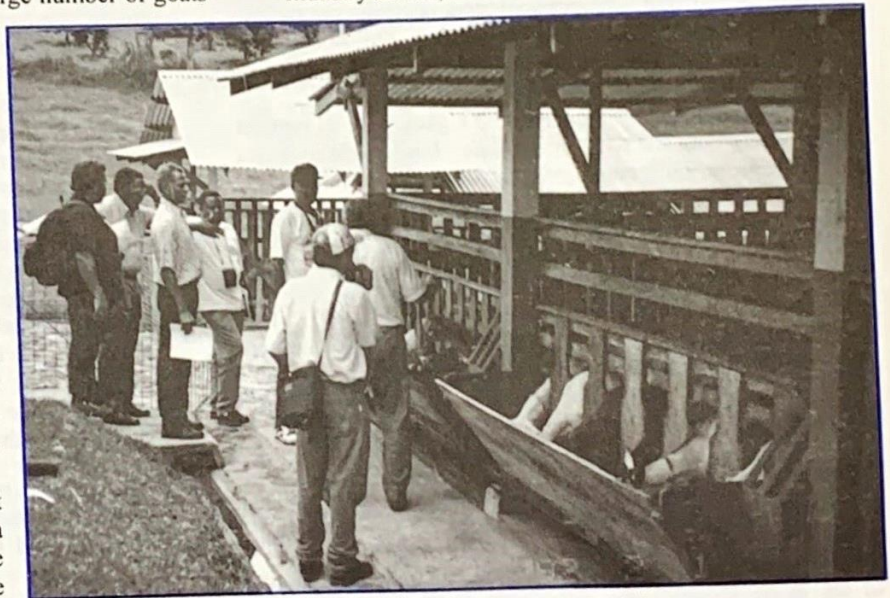
Fourteen participants (five private farmers of which one was a small farmer; four professional from private companies and three from public institutions, one private consultant in livestock and one from a commercial bank) were selected to visit Costa Rica, in order to observe the goat milk and cheese production systems and the functioning of relevant farmers' Associations.

The visit to Costa Rica covered a wide range of activities which included observing and practical, first hand experiences on aspects such as "rustic" goat pen technology, agro-forestry system, waste management, production of milk and processing for cheese, marketing and interacting with associations of goat producers.

Impact Assessment of the GAPS Technologies Transferred

Following the visit of the farmers to Costa Rica a continuous assessment of the impact of the technology transfer and adaptation process was conducted during 1997 and 1998 for three cases, as follows:

1. Commercial farmer: as a substitute for a banana plantation, Mr. Anthony Nathan of Dingwells Farm in St. Mary.
2. Small farmer in Rio-Cobre area, St Catherine, Mr. Franklin Brown.
3. Coffee Pulp Processing Technology with Coffee Industry Board, Linstead Plant, St. Catherine.



Jamaican Farmers Visit a Goat Milking Farm in Costa Rica

Technology Transfer from Central America to Jamaica cont'd

Case 1: Commercial Farmer.

The farmer chose to try the goat production system within the context of an alternative to banana production. He adapted the GAPS technology from Costa Rica especially the rustic goat pen; the pasture plot introducing plant species that are valuable for the development of fodder oriented agro-forestry system; and the introduction of California Red Earth Worm for waste management. He was assisted by an Agricultural Health specialist and an IICA-CASS volunteer from Guatemala who assisted for five months. The farmer modified the technology to conditions on his farm.

The real cost of introduction of the technology did not cost more than J\$3,500.00, since most of the materials for the construction were locally available. The pens constructed were able to house four to six goats.

Case 2: Mr. Franklin Brown

Mr. Franklin Brown of Jubilee Town has built his goat pen with his own family labour inputs and the materials that are locally available. His efforts have multiplied to a group of eight farmers that participated in the training of GAPS. The group has adopted a method of building a goat pen per week with a Jamaican System of "Day for Day". To date, there have been six such pens in four communities. It is the understanding that the participating farmers with their goat pens built, serve as a model for the community members. The role of the IICA-RADA has been one of training and the goat houses are built with no subsidies from none of the institutions, except providing required nails, for the construction.

Mr. Brown's farm has a small agro-forestry unit and has adopted the earth worm technology to manage his farm's waste, and derive economic benefits from converting the animal and household waste into manure. This farmer plans to utilise the earth worms as is the case shown in the Costa Rican Model for feeding of chickens. He has played a major role in the demonstration of pen construction to other farmers.

Case 3: Coffee Industry Board (CIB).

The coffee pulp is a major pollutant throughout the Island. The Central American experience is to process the pulp by earth worm technology. This not only solves the environmental pollution but adds value to the process in that the manure is of a higher quality.

The CIB and IICA have installed the earth worm technology at the Linstead coffee processing plant. The CIB has built a semi rustic structure to process its pulp. The initial results are remarkable. The organic manure now can be sold to earn an income or can be used as a fertilizer substitute. The CIB is satisfied with the chemical analysis of the organic manure produced and plans are underway to adopt this technology in other plants on the island. This technology offers tremendous opportunities for reducing the environmental pollution resulting from coffee processing.

Costs of the GAPS Technology Transfer

The total cost of sponsoring the participants to study the technology in Costa Rica was approximately US\$ 6,000. This cost was borne by IICA. The cost to RADA was limited to

transportation of the farmers to the Villages during the training sessions. The farmers constructed pens using material that is available free of charge and employed family labour and the Jamaican System of a "day for a day". The planting material for the establishment of the Agro-Forestry systems was also available free of charge and there were no direct cost for labour in its establishment. CIB also reported negligible costs for its adoption of the technology for managing the waste of the coffee processing.

Planned short term actions in the Rio-Cobre Project area

Adaptation process of the GAPS technology in St. Catherine: The GAPS technology consists of at least five fundamental areas of transfer: the rustic goat pen, animal health practices, goat improvement and the marketing of meat at later stages of milk and the cheese production. It is the intention of IICA and RADA to support these areas in the short term with the help of R&DD, JAS and other institutions that could strengthen the GAPS in St. Catherine.

Multiplier effects of GAPS-farmers interest and motivation in Rio-cobre watershed: IICA and RADA are holding sessions with Local Management Committees to prepare micro-projects leading to small commercial units in the Parish. Assistance is received from IICA's Head quarters and the Regional Center to advance the work in this area. The participation of other institutions such as JAS will be most welcome.

Formation of Association for GAPS: In line with the previous activity the formation of goat producers for a number of common goals such as training, procuring inputs, services including marketing are considered fundamental in this process. The farmers have demanded the formation of such an association during all the training sessions conducted to date.

Host a seminar with the exchange participants and the farmers who have been adopting the GAPS: This is planned to review the gains in adoption after one year of the visit to Costa Rica. This activity will analyze the potential and the future actions for promoting the adoption and adaptation of the technology and determine mechanisms that must be implemented to expand milk and cheese production for possible export.

Conclusions:

The GAPS should be considered within the context of overall "Window of Sustainability" initiative and the integrated watershed management of Rio-Cobre. The micro-project ideas of small farmers that are in progress (waste management practices) should provide an integral approach to the sustainable development of the watershed. The fact that farmers have selectively adopted varying aspects of the technology to suit their particular conditions and are spreading the technology to other farmers, suggests that the technology is useful and the farmer to farmer exchange is a rapid way to transfer technology. ♦

The St. Stanislaus Farm, Guyana: A lesson in Sustainable Dairy Production for the Caribbean

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Introduction

Over the past three or so decades increasing development attention has been given to local production of food for the human populations of the Caribbean. This has coincided with the attainment of independent status by many of the former colonies of European nations. Prior to that time agricultural production for local consumption was given lower emphasis and was not well supported by the authorities. This lack of support can be compared with the emphasis on growing food in the years of war, the 1940's and immediately after, a period when food supplies were not easily obtainable from overseas.

In the 1960's the bigger and/or more wealthy territories – Barbados, Guyana, Jamaica and Trinidad and Tobago, undertook research, development and other programmes aimed at increasing agricultural production for local use. An area of emphasis was the supply of animal protein needs through a variety of domesticated species, poultry, pigs and small and large ruminants. There were substantial levels of imports of mainly Holstein-Friesian dairy cattle from North America. This was expected to lead to an almost "instant" dairy industry that would continue to develop on a sustainable basis.

The following were the features of the system of dairy production promoted and practised.

- (i) Production of milk was to be "mono-cultural", i. e. the only farm activity.
- (ii) Animals were to be rotationally grazed in fenced blocks of planted pasture grass.
- (iii) Fairly liberal concentrate feeding was recommended and these complete feeds were initially imported, and later, manufactured by local feed mills from imported ingredients.
- (iv) Multiplication of animals through reproductive efficiency and calf and heifer replacement rearing was expected.

Over the decades and with the benefit of history and hindsight it has come to be recognised that the early assumptions were not all correct.

- Prior to undertaking the "new" development dairy production was closely linked to, if not integrated with other agricultural (crop) production. The "new" system did not continue or emphasise this.
- Introduced species of grasses with their high demands for nutrients and management have not been a success. Traditional barbed-wire fence costs have increased along with the increased cost of other inputs for maintaining forage production.
- Imported feed ingredient prices have moved inexorably upwards and there have been increases in the cost of local agricultural by-products.
- Animal numbers have not increased due to low reproductive efficiency and poor calf and heifer replacement rearing.

The St. Stanislaus Dairy Farm

The St. Stanislaus College Farm, in the suburbs of Georgetown, Guyana has been one of the institutions engaged in the development and guiding of farmers into using production systems that are more appropriate and sustainable. Such adjustments are seen as needed for development of a Caribbean dairy industry. The Farm is on the wet coastal plains on heavy poorly drained soils. Its work is briefly described and discussed below. The College was established in 1975 to provide practical training for students in agriculture and generate an income from its commercial operation. It is administered by a Farm Committee

In 1983 IICA became involved in the College. In keeping with the Government's policy to increase milk production a Dairy Production Demonstration Unit was established at the Farm in 1984. Collaboration between the IICA, the National Dairy Development Programme (NDDP) and the Caribbean Agricultural Research and Development Institute (CARDI) has resulted in improvement and increased farm milk production and nationally. In recent years promotion efforts has increased at spreading aspects of the particular technology developed to the other parts of the Caribbean through several mechanisms. These have included:

- (a) continued co-operation with other institutions;
- (b) visits to St. Stanislaus College Farm by selected Caribbean farmers for training and exposure;
- (c) visits of the Farm staff to other territories to assist in training and demonstration; and,
- (d) visits by IICA and other technical persons to further support training and development activities.

The Farm is widely used by farmers as well as students from secondary schools, universities and agricultural training institutions for functional commercial dairy training in their programmes. Farm training also targets special groups such as personnel from agricultural credit and financial institutions, agricultural extension organisations and entrepreneurs involved in supplying inputs for livestock development.

The Dairy Farm

Of its 6.8 hectares (ha), 3.5 ha or 8.7 acres (ac) are used for rotational grazing of the sub-herds of milking cows, dry cows and heifers during the day. Afternoon grazing for milking cows and the day-time grazing of calves is done on another 1.6 ha (4.0 acres). The pasture is cultivated with Antelope grass, *Echinochloa pyramidalis*. The rest of the area is occupied by buildings, trenches, dams and a fish pond and 0.1 ha (0.3 acres) of grass is used as a Cut-and-Carry System for a Sheep Production Unit. In 1983 the Dairy Herd consisted of three (3) cows, two (2) heifers and one (1) bull calf. By December 1993 the numbers were twenty (20) cows, two (2) heifers, nine (9) heifer-calves, one (1) breeding bull and one (1) bull-calf. Understanding how this was achieved and, more important, the productivity levels attained should cause

The St. Stanislaus Farm, Guyana cont'd

consideration of the suitability of the technology to farming in the region.

The Elements of Technology of the Farm

The emphasis has been on proper feeding practices and good animal management using simple, well thought-out, relatively inexpensive infrastructure and record-keeping.

(a) Feeding Practices and Technology

- Feeding based on production of fresh quality grass, high in protein and low fibre, for which the wet and heavy soil conditions are suitable;
- A 25 – 29 day rotational grazing cycle is maintained and pen manure is applied after each grazing;
- Forage is conserved in silos for use in the dry or the very wet season when availability of pasture and/or its quality is reduced;
- Locally available agricultural by-products are used to supplement forage (e.g. wheat middling);
- Solar-powered electric fence controls grazing within the larger pasture blocks that are fenced with barbed wire on "live" posts, *Gliricidia sepium*. The leaves of the latter are also used as feed.

(b) Animal Management Practices and Production Infrastructure

- Machine milking in a Milk Parlour is done for more hygienic and uniform milking twice per day without the calf being present.
- The milk is stored in a separate Milk Room.
- Artificial Calf Rearing in Calf Pens with bucket feeding to weaning at 8 weeks is done.
- There is a Health and Fertility Testing Programme.
- Individual animal and the herd performances are monitored through a Record Keeping System.

Farm Performances and Discussion

Table 1 shows changes in individual and overall herd performances in the decade of 1985 to 1993.

Table 1: Summarised farm production, 1985 and 1993, St. Stanislaus College.

Parameters	1985	1993
Total Milk Production (litres)	24,331	47,908
Av. Lactation Length (Days)	256	286
Avg. Milk/Cow/Lactation (l.)	2,044	2,633
Av. Milk/Cow/Day (l.)	7.3	9.1
Av. No. Cows Milked/Day	9	15
Milk Production/ha (l.)	5,688	9,394
Stocking Rate (AU*/Ha)*	3.8	6.5
Calving Interval (Days)	367	384
Open Days	101	82
Av. No. of Services/Conception	1.1	1.5
Total Animal Units (AU)	16.3	33.4

* Animal Unit (A.U.) = 400 kg (880 lb) animal
Source: SUPPORTING THE DEVELOPMENT OF LIVESTOCK PRODUCTION IN GUYANA - IICA PROJECT

The table shows the level of improvement in all the important animal and herd production areas.

- Average milk per cow per day is over 9.0 litres (2 gal).
- With a lactation length of 286 days this translates to over 2,600 litres of milk per lactation.
- Milk production per hectare per year has been almost doubled to over 9,000 litres through rotational grazing of the improved, fertilised pastures.
- The stocking rate of over 6.0 AU per hectare is much better than the traditional rate of less than 2.5.
- A high stocking rate is achievable through efficient heifer rearing either for sale or to enter the herd.
- The improvement in individual animal and total herd performance is due to a health care programme, keen observation and a good recording system and the records are used in farm decision-making.

The Use of the Demonstrated Benefits

The Model Dairy has shown the economic benefit of using the simple, appropriate dairy technology for improvement in production, reproduction and productivity. This is important at this time when farmers and technical leaders are still heavily influenced by the concept of high individual cow performance, as against seeking to maximise overall farm productivity. Farmers who have been shown the figures in Table 1 instinctively regard the milk per cow per day as being too low. They have to be invited and guided to examine the other parameters, with explanations of their meaning supplied. This is often an eye-opener.

Caribbean farmers are beginning to use the components of the St. Stanislaus Model. This trend is expected to increase as a result of the exposure to the model which is supported by IICA's assistance in training and institutional strengthening of dairy farmers organisations of the Caribbean. The components include Antelope and other improved grass pasture, rotational grazing with or without a solar-electric fencing, improved milking procedures and herd management systems. It is not that all aspects are new to farmers. What may be new is that the factors have been brought together in a "complete" and more convincing manner and that the farmers can be exposed to and "live" in the experience.

The idea of reducing the level of inputs purchased off-farm and maximising on-farm production of feed/forages is catching on among the farmers. Antelope grass is not a new introduction to Trinidad, being available since the early 1970's. Ideas on production systems have evolved since that time, however. The success of making this "new" forage species available to farmers as recently done in Trinidad and Tobago is apparent. There is one farmer in South Trinidad who has established three (3) hectares which is in use and who has shared planting material with over a dozen other farmers. This is a direct result of visiting/ training at St. Stanislaus. This multiplication effect is contributing to making individual farm production more farm-input based and, as a result, more sustainable especially in terms of intensive forage, feed and manure use. This is a necessity for the survival and prosperity of dairy farmers. ❖

A Model for Sustainable Agriculture & Rural Development cont'd

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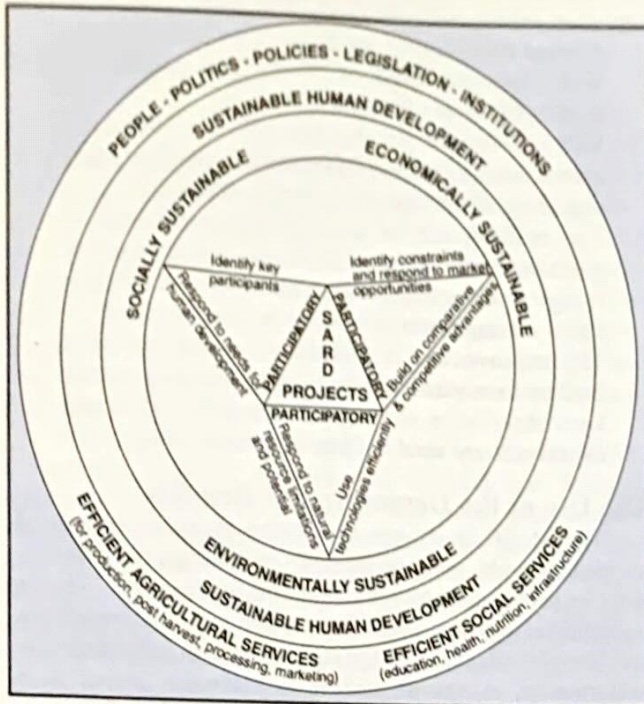


Figure 1-d: Characteristics of projects which contribute to Sustainable Agricultural and Rural Development

for economic and environmental sustainability has increased awareness to the importance of market opportunities, competitive production advantages, appropriate technologies and efficient management of natural resources.

Figure 1-d highlights six important characteristics for sustainable development, symbolically represented on a two dimensional pyramid with the three sides folded out. This analogy is appropriate since triangle based structures are strong and symbolize stability, and the integration of the social, economic and environmental dimensions increases the chances that projects oriented towards sustainable agricultural and rural development will succeed.

The building of the SARD model is completed in Figure 2 where arrows have been added, showing a two way coordination and communication between the macro and micro environments. In this final form it becomes a graphic presentation of a model for the design of projects to facilitate Sustainable Agricultural and Rural Development, using a holistic, integrated, participatory, inter-institutional and interdisciplinary approach.

APPLICATION OF THE THREE DIMENSIONS TO SARD PROJECTS

Projects focusing on SARD must integrate the three basic dimensions discussed above. In this way there is a greater chance that people, economics and natural resources will be brought into harmony. When this happens, the projects contribute to a win-win-win situation where all participants benefit. Consequently, people are more likely to agree on decisions and work together effectively towards a common goal.

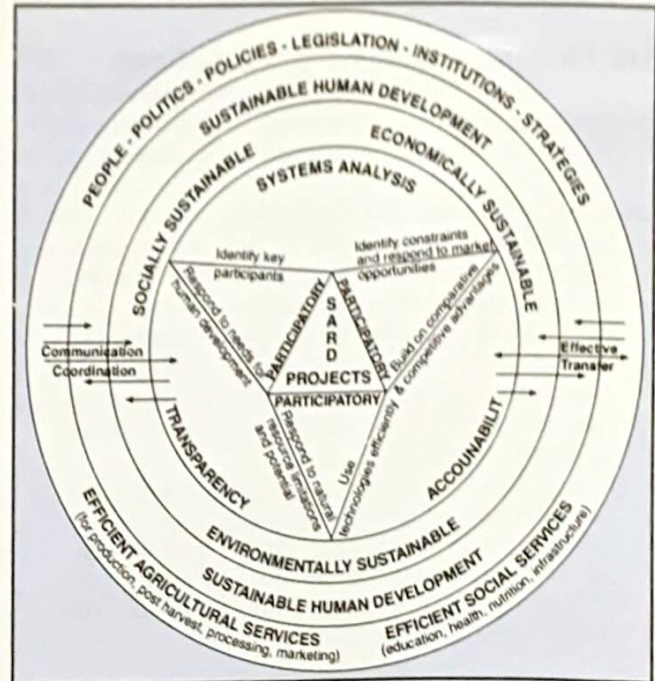


Figure 2: Model for the design of projects to facilitate Sustainable Agricultural and Rural Development

Socially sustainable

Being socially sustainable implies actions which have been determined in a participatory manner, respond to the needs of the target group, and are executed transparently with political and institutional support.

Members of the community, farmers, agro-processors, political leaders, technical persons, service providers and other key potential participants in the project must participate in the design, formulation, implementation and evaluation phases. If not, there is a high risk of having some people working against, rather than for, the project.

One of the most common reported causes for project failure is the non-participation of the intended beneficiaries and/or the intended executors, e.g. farmers and extension officers, during the design and formulation phases. When this happens, key players are less likely to wholeheartedly support the project, thereby contributing towards failure.

Of particular importance in this sub-component is the identification of those players who are necessary to make the relevant systems and sub-systems work efficiently. This includes institutions as well as persons. The identification of the key players should be undertaken during the diagnostic phase, while looking in-depth at the existing systems and the organizational structures which make them work. Once the key players have been identified, their respective strengths and weaknesses can be analyzed and actions to respond to their needs for human development can be formulated (Figure 1-d).

Economically sustainable

Being economically sustainable implies being competitive in the marketplace and having the ability to adjust to

A Model for Sustainable Agriculture & Rural Development cont'd

changing conditions. Such a situation creates and maintains jobs and income while using appropriate technologies.

The single most common cause given for the failure of productive type projects is unknown, uncertain, or highly risky markets. In efforts at agricultural development there is often a strong bias towards increasing production and productivity while overlooking market opportunities and uncertainties. History shows that when farmers respond to government incentives to expand production, when market conditions are ignored, the end result is often gluts, lower prices and reduced returns. While this often leads to consumer benefits over the short term, the farmers usually find themselves in an unsustainable situation.

There is no doubt that the design of economically sustainable production and marketing activities requires an in-depth understanding of the respective systems. A product systems diagnosis must identify production and marketing constraints, opportunities and comparative and competitive advantages (Figure 1-d) for a particular product in a specific geographical area.

A product systems diagnosis should not only identify the constraints and opportunities at all points within the production and marketing sub-systems but it should also identify and characterize the respective key participants who could impact, positively or negatively, on the efficient functioning of the system(s). This information is crucial for determining the needs for human and institutional development.

Environmentally sustainable

Sustainable development is environmentally friendly to air, water, land, flora and fauna resources. With the exception of large scale projects funded by international banks and donor agencies, most projects are implemented without carrying out an environmental impact study. Consequently, the direct or indirect negative impact on the environment, from diverse projects, may go undetected until natural resources have been destroyed.

Although many projects may not have an environmental component, an analysis of the potential impact of the project on the environment and natural resources should nevertheless be undertaken. If a potentially negative impact is identified, mitigating measures should be included.

The environmental impact analysis must identify the natural resource limitations and potential and ensure that appropriate technologies are introduced and used efficiently (Figure 1-d). ♦

Women Drivers



Small scale rural women producers bear the brunt of production and marketing activities

Women do more work than men in the field and on the farm, yet mechanisation tends to favour men. A recent study was undertaken by FARMESA (Farm-level Applied Research Methods in East and Southern Africa) and FAO-AGSE on the potential for improving production technology farm women in Africa. Covering Burkina Faso, Senegal, Uganda, Zambia and Zimbabwe, the study focused on the appropriateness of hand tools and animal traction. Its main conclusions included:

- The prime constraint is the limited resources and credit available to women - a direct consequence of their low socioeconomic status in society
- Weeding is women's hardest job and a major constraint to increased production; here lies the greatest opportunity for improvements
- There is a serious lack of information flow between importers/producers of tools (women) farmers
- Women farmers have only limited access to training especially in animal traction technologies

It is often men's attitude towards women which has to change first before the workload of African women farmers can be seriously reduced (Quote of Zambian research team member: "If a man comes home and finds his wife sitting and resting he will say, Why aren't you doing something?")

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The Editor-in-Chief welcomes articles, news updates, book reviews and comments for publication in the Economic Policy and Sustainable Rural Development Newsletter.

The Civilian Conservation Corps - Agricultural Development Programme cont'd

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- there is the need for 'monitoring and documentation' as specific functions of project development, undertaken by specially assigned staff; and
- there is a need for a system of collaboration between the private and public sectors to increase the availability of land to youth. A possible scenario being one in which private farms sub-divide and allocate land to selected groups of young persons while the governmental or developmental agency, in turn, assists in the development of the parcels in the areas of soil conservation, irrigation and other developmental activities.
- The state provides land to youth groups

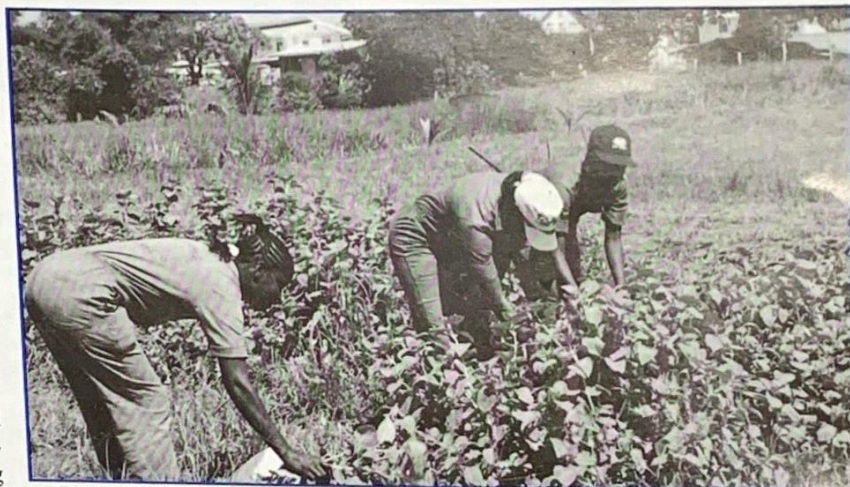
More recently, IICA sponsored one graduate trainee to attend the Youth Summit in Barbados organized by UNFPA. The delegate presented a report which encompassed the recommendations of interest groups and youth organizations on their respective programme of activities and the possibilities for assisting youths. The delegate also noted that she gained useful information on various schemes coordinated by CARICOM and heightened awareness on a wide range of issues facing youth

In keeping with the view that the combined and complementary efforts of CCC and IICA can provide an effective contribution to the promotion of youth in agriculture, the two agencies have agreed in principle to coordinate services to trainees, graduates and staff. In the short-run, CCC and IICA have identified the promotion of business management training and an 'after programme' support system, as two areas for collaboration.

Future Projections

The CCC's Agricultural Officer has noted that the Programme has the potential of attracting 300 young farmers to the labour force on an annual basis. He shares some of the concerns

of the trainees, in particular the need for more equipment and adequately trained support staff to assist in the co-ordination of the projects in the different regions. However, he notes that an 'after training programme' will be introduced in the near future whereby graduates will be allowed to cultivate portions of the sites presently being used for the 'hands on' training. Additionally, a number of strategic alliances are being forged with the University of the West Indies, Faculty of Agriculture and Natural Science which will see CCC collaborating on field trials within a action/research mode. Similar plan are to be explored with NIHERST and the ongoing collaboration with the IICA will be strengthened. ♦



CCC Trainees Tending to their Spice Crop

The Quarterly Newsletter of the Caribbean Regional Centre (CaRC) is published to provide information and encourage discussion relevant to the promotion and development of the programmes, Policy Trade & Investment and Sustainable Rural Development, administered by the CaRC.

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