GROUP INSURANCE AND REGIONAL ECONOMIC GROWTH AMONG CARIBBEAN COUNTRIES

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Introduction

It is quite significant that this Conference has as its theme – *Maximizing Regional Self-sufficiency in Food in the Commonwealth Caribbean.*[1] Its importance is evident from the concerns being expressed throughout the world in developed and 'late-developing' [4] countries regarding the problems of providing food and basic nutrients to meet the needs of a growing population. In the Caribbean there are evidences of the awareness of the problems as witnessed, for example, by the following statement from Professor Owen Jefferson. He states:

> "... *Quite apart from the small size of the market, the situation tends to be aggravated by the lop-sided distribution of income which is characteristic of the typical Caribbean economy. An unequal distribution of income tends to bias the composition of demand not only towards imports in general but towards those kinds of imports which are most difficult to replace by domestic production. Furthermore, the slow rate of growth of the agricultural sector which accounts for upwards of 30 per cent of the work force in most of the economies has meant that the purchasing power of a very small proportion of income can be devoted to the purchase of industrial products."* [3]

Simultaneously, increases in the population throughout the region continue to offset increases in food production, hence, hopes of a narrowing of the gap in the near future is highly uncertain unless new techniques and some level of innovation [6] can be introduced to bring new producers and previously idle land into production. There is an understanding also that opportunities in the non-agricultural sector will not be sufficient to absorb those who desire to leave agriculture, hence, growth in the agricultural sector is essential if the other sectors are to have growth. Agriculture thus becomes the meeting point for two imperatives of development – growing more and better food and finding new job opportunities.

The constraints to production are many and varied. The variability of the weather, the lack of good quality seeds and the inability to secure sufficient fertiliser are all factors that affect the level of agricultural production. Countries in the Caribbean are further constrained by the possibilities of hurricanes, droughts and other natural conditions over which there is no control.

The impact of such disequilibrium situations, when correlated with an increasing but dependent population, imposes an even greater strain on the resources of the countries as they seek to meet a growing demand for

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[1] For the benefit of this paper, the Caribbean is considered as the present and former Commonwealth Countries. In my opinion the ideas presented are applicable for the entire region, however.

food through imports.

While agricultural policy throughout the region has been expressed in terms of increasing agricultural production there is little evidence, inspite of Caricom, to suggest that there is a regional policy geared towards the coordination of agriculture into a National Plan for economic development. The seriousness of this lack of direction cannot be overlooked when all around the world pressures are being exerted to restrain food production.

The concerns for increased food production is recognised in a summary of a statement offered before a Committee hearing in the U.S. House of Representatives in 1974. Five factors were offered as making the food situation an urgent matter with global concerns. They are:

1. drought and other climatic variations have reduced world-wide production;
2. rocketing oil prices have made the purchase of agriculture fuel more difficult;
3. shortages of fertilizers and pesticides have made it more difficult to obtain high yields;
4. population growth has increased the number of people to be fed; and
5. affluence has increased consumption demand of the food available.

In one way or the other all of these relate to Caribbean countries. The masses of the population are becoming disenchanted with policies which have failed to provide them basic food and nutritional needs.

Objective

The objective of this paper therefore is to focus attention on one factor, a tool, which could well serve as a catalyst to production, an invigorator of agricultural production and a more balanced distribution of income and higher levels of nutrition intake throughout the region. This tool is Crop Insurance.

Nature and Objectives of Crop Insurance

Crop insurance may be defined as a technique which provides farmers some minimum protection against the uncertainties of crop production in return for a small premium [10]. It is a means whereby the farmer can stabilize his income from year to year while reducing the extent of variability in income resulting from crop losses. Like other forms of insurance, crop insurance spreads losses among many persons, over many areas and over many years.

In addition to the micro-economic benefits, there are also macro-economic implications of such a programme. The fact is, if a large number of farmers in a community or a region is insured then, the insurance can become an important component in stabilizing the income of that community or region, including not only the farmers' income, but also all others who are involved in economic transactions with them. The reality of the situation is that a calamity will be faced by all the inhabitants of that community or region, hence, if a large indemnity payment is provided for crop losses due to some catastrophic situation this serves as a substitute for funds generally received from the sales of crop. These funds circulate in the community or region and sustains other business activities and job survival, thus stabilizing the income of others in that community or region [5].

P.K. Ray, in his book on Agricultural Insurance makes the following points: [9]

"A contractual right to assistance in the event of crop failure furhter enables farmers to improve their credit in general and more particularly by using the insurance policy as collateral for loans or extensions of credit. At the same time, bankers and others including co-operative credit institutions that extend such credit are provided with an opportunity for making larger and better loans since their borrowers are expected to have more stable incomes and can offer more tangible security for such loans. Furthermore, people in the rural communities and trade centres, also find an opportunity of improving the stability of their incomes due to a stabilization of farmers' incomes on which they depend so much. The community also gains in so far as the insurance gives farmers a greater confidence in venturing upon the adoption of new and improved farming practices and in making greater investments in agriculture for improving crop yields and increasing agricultural production. Again, if the insurance could be integrated with food and other commodity reserves, it might go a long way to normalize the availability of supplies and to stabilize prices of the insured agricultural commodities. Finally, the government's obligation, wherever undertaken, to provide relief in case of crop disaster is reduced to the extent farmers themselves pay for the insurance."

A potential wide linkage exists in the spreading of benefits from this programme.

The Theoretical Underpinning of a Crop Insurance Programme

No attempt will be made to engage in a major discussion on the theory of insurance here. However, any appreciation of the merits of a crop insurance programme requires some basic understanding of the theoretical concepts of insurance. As Hazell notes: *"Agricultural production, particularly in the developing countries, is generally a risky process, and considerable evidence exists to suggest that farmers behave in risk averse ways"* [1]. He goes on to lament the fact that risk considerations are rarely incorporated into regional or sector planning models: *"Better farmers are assumed to behave in a profit maximizing way"* [1].

Fundamental to such discussion is the realization that insurance is a device which can be used to reduce the level of risk and uncertainty faced by farmers by spreading any losses over many persons, a wide area and a number of years.

Definitions

The terms *risk* and *uncertainty* are often used synonymously but in fact they have different technical meanings. Risk involves a quantitative measurement of an outcome such as a gain or loss in a manner such that the mathematical probability (or odds) of the outcome can be predicted. Because of its measurability, losses resulting from risk can be estimated in advance, and can be insured against. Uncertainty on the other hand is immeasurable and is always present when knowledge

of the future is less than perfect. It refers to anticipation of the future and is unique in the mind of each individual farmer [2].

Probably, the distinct difference between the two categories, risk and uncertainty is that in the former, the distribution of the outcome in a group of occurrences is known (either through calculation a *priori*, or from statistics of past experience), while in the latter uncertainty, this is not true. In one case the distinction was made as follows:

> "*Using the definition that risk is a measurable uncertainty a future event that is an uncertainty to an individual can be a risk to a group of similar individuals. The individual cannot measure uncertainty, because he can in no way estimate how much resources to lay aside each year to protect himself against the contingency. On the other hand, there is some size group of similar individuals, with similar circumstances, such that it is possible to find some annual rate of deposit which would be sure within a given range of probability to accumulate sufficient funds to pay for any losses within the group during the year*" [7].

The Nature of Crop Insurance

Any production decision or for that matter, any kind of an investment decision implies a prediction of future events - either explictly or implicitly - for the farmer. The forecast of annual returns is a specific factor or point estimate, generally referred to as the most likely or best estimate. For example, one might forecast that the return on one acre of bananas is $500 a year for five years. The question arises as to how good is such an estimate. Are we certain, uncertain or somewhat in between? The level of uncertainty present can be defined and measured in respect to the forecasters *probability distribution* and the probability estimates associated with each possible outcome. The probability distribution could consist of a few potential outcomes or a number of outcomes.

In forecasting yield, and indirectly incomes, we could make an optimistic estimate, a pessimistic estimate, and a most likely estimate; or alternatively, we could make high, low and a best guess estimate. If the weather conditions are good and there are no hurricanes, diseases, etc. we would expect our optimistic estimate to be realized; the pessimistic estimate would hold if poor weather conditions prevail - hurricane etc. occur, and our best guess estimate would occur if these exogenous factors stay at normal level.

These assumptions can be further expanded to include an assessment of the farmer's acceptance of, or aversion to risks. The typical farmer could be classified as either (a) a risk averter or (b) a risk lover.

It is generally accepted that there exists some level of risks in the farmer's decision to engage in agricultural production. Given this assumption it follows that agricultural producers who are risk averters would seek to minimize such risks through programmes or devices which allow for greater certainty or uniformity in returns from production over the long run if not in the short run. Such a device could be Crop Insurance.

Maximization of Expected Monetary Return: Decision Criteria

The farmer's decision to use or not to use crop insurance is one based on both economic and non-economic consideration. The decision criterion used for situations involving risk is to maximize the expected value of the events. The expected value is defined as the overall sum of the probability of each event times the income contribution of that event:

$$\text{Maximum: } E(X) = \sum_{t=1}^{n} P_i(X) \, X_i; \quad i = 1 \ldots n$$

where $P_i(X)$ = probability to event X_i;

$\Sigma P(X) = 1$

The expected return under conditions in which consideration is given to the use of a crop insurance programme can be hypothesized (see Table 1).

Table 1. Expected Returns

Changes in Exogenous Factors	Returns ($)
Exceptional crop weather conditions	3,000
Normal weather conditions	2,000
Unusually poor weather conditions	500

The anticipation of variations in the expected returns based on changes in exogenous factors is an improvement over the earlier best (guess) estimate of $500 per acre for bananas since here we have introduced information we did not have before, but there are still missing links. We must now consider how likely is it that we will have any one of the three exogenous factors above occurring. The probability concept can now be used to compare the riskiness of alternative investment prospects under the probability of various conditions.

Estimates of the probability of various weather conditions affecting farmers' incomes can now be made. Assuming the odds are 2 in 10 (.2) that there will be poor weather, 5 in 10 (.5) that there will be normal weather and 3 in 10 (.3) that exceptional crop weather will occur the expected monetary value, over time can be calculated to be $1,800 (see Table 2).

Table 2. Payoff Matrix

Changes in Exogenous Factors	Probability	Annual Dollar	$P(X_i)$
Exceptional crop weather	0.3	3,000	900
Normal weather conditions	0.5	2,000	1,000
Unusually poor weather	0.2	-500	-100
Expected Value			$1,800

The expected value criterion can be extended to the situation where two or more alternative investment opportunities exist. Assuming one farmer (A) purchases crop insurance at a cost of $100 this in effect reduces his annual dollar returns under various weather conditions by $100 with the insurance providing a minimum return of $1,500 (see Table 2). The second farmer (B) does not insure against crop failure and therefore under conditions of unusually poor weather his annual earnings is negative, representing some level of dissaving.

The expected value under these two alternatives A and B is $2,100 and $1,800, respectively. Using maximization of expected value as a decision criteria alternative A is clearly superior to alternative B. In other words, it paid farmer A to insure his crop against failure.

Table 3. Calculations of Expected Values for Two Producers

Changes in Exogenous Factors	Probability of these changes occurring	Outcome if this state occurs ($)	$P(X_i)$ ($)
Producer A (with insurance):			
Insurance cost = $100 per year			
Exceptional crop weather	0.3	2,900	870
Normal weather	0.5	1,960	950
Unusually poor weather	0.2	1,400	280
Expected Value			2,100
Producer B (without insurance):			
Exceptional crop weather	0.3	3,000	900
Normal weather	0.5	2,000	1,000
Unusually poor weather	0.2	-500	-100
Expected Value			1,800

A Proposal and Rationale for a Crop Insurance Programme among Caribbean Countries

This proposal is being made under the general assumption that some form of crop insurance coverage is possible and desirable in the region.[1] The principal advantage of establishing a Caribbean crop and livestock insurance programme rather than just local programmes is the broader geographical distribution of risks which it would allow. This is a clear case where distance[2] would contribute to economies of scale for the participating

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[1] Already, there is a well organised programme of insurance for bananas, coconuts and livestock in Jamaica. There are reports that other Caribbean territories have insurance on specific crops e.g. Dominica - bananas. Other countries in the hemisphere with some form of a programme are Brazil and Mexico.

[2] Among the larger countries, Jamaica in the center lies almost 800 miles from Belize in the west and more than 1,000 miles from Trinidad & Tobago in the east. Guyana on the other hand is more than 1,350 miles of the Bahaman Islands, etc.

countries. This is particularly important in the case of crops since their dependence on the weather, while likely to effect large areas of an island will not necessarily simultaneously affect crops in widely scattered countries in the region.

While it is not the author's intention to spell out in full detail all of the intricacies involved in establishing a programme in this paper, it is being contended that some form of a crop and livestock coverage is possible under the establishment of rather *rigid* conditions.

There is enough evidence around the world[1] to sustain this belief. The success of the programme would rest on the structure, support and co-operation of those involved. The programme's primary objective should be: (a) the reduction of uncertainty, (b) increases in food and livestock production, and (c) increases in the number of farm producers and a stabilizing of their incomes.

The programme visualised here is one which requires the setting up of national crop or livestock insurance programmes in all participating countries followed by the creating of a regional insurance agency which would provide reinsurance.[2] This regional body could be a completely autonomous body created for this purpose or, it could be a part of some existing regional body as the Common Market Secretariat or the Caribbean Development Bank.

The first step in introducing the programme is to recognise its merits in the fight to increase aggregate production by Caribbean farmers and in stabilizing agricultural incomes and credit throughout the region. In addition, it carries out the function of strengthening the financial stability and productive capacity of farmers and hence their credit worthiness for borrowing funds needed for farm improvement.

The point is made that the farmer who is forced to have crop insurance to obtain credit beneftis only by getting a loan since his credit costs him more (interest plus cost of insurance). This reasoning is not necessarily valid however, since the farmer receives all the benefits that other farmers get from crop insurance in addition to help in getting a loan or other form of credit. If he had borrowed for seeds, fertilizer, sprays etc. and his crop is lost, any indemnity though paid to the creditor,

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[1] Among the countries which have instituted some form of a crop insurance programme are: Brazil, Canada, Iran, Israel, Jamaica, Japan, Lesotho, Mauritius, Mexico, Puerto Rico, South Africa, Sri Lanka, Sweden and the United States of America.

[2] Reinsurance has been described by Ray as "*a device by which an insuring agency shares the risks assumed by it with one or more other similar agencies or with agencies which specialize in reinsurance. The first is called a direct-writing agency or company, and the second the re-insurer. Usually a contract or 'treaty relation' is entered between the two, defining the specific circumstances under which reinsurance is to apply, the respective shares or obligations in case of losses and indemnities to be paid, and the allocation of premiums received by the direct-writing agency.*"

helps to repay him for the loss in his production costs since he would recover these from the insurance company. The result is that his debts are paid and he remains a good credit risk for the next cropping season.

The recommendation in terms of a programme is for a crop insurance scheme based on crop yields and covering only the most important agricultural commodities produced by the farmers. To be actuarily manageable, the programme should include as many of the Caribbean countries and involve large numbers of farmers. Countries such as Canada, Japan and the United States of America with its broad geographical base are in a position to carry on alone.

This is not true of individual Caribbean countries. To offset this, it is proposed that these countries be grouped under a regional umbrella, the Caribbean Crop Reinsurance Agency (CCRA). This agency would first seek to harmonize the conditions of existing or planned national insurance programmes within certain guidelines after which it would provide some level of reinsurance for the countries.

Because of the presence of some differences in emphasis of crops, currencies and problems of management, a direct regional insurance agency would not be feasible. A programme of reinsurance instead, involving a wider sharing of risks over both time and space should prove more beneficial and less costly since contracts would be established between the proposed regional agency and the local or national company as the original insurer.

Conceivably the programme would operate like this. A farmer who is a member of a national insurance company (e.g. National Crop Insurance Company of Guyana) has his rice crop insured for an equivalent of $1,500. In the event of a loss the national company pays to the farmer his full loss value (up to $1,500) but it sends a bill to the reinsurance agency for a portion of the aggregate losses of all farmers as defined in the contract. Thus in one policy the farmer gets all the protection he wants, the burden of coverage is lessened for the local agency and CCRA is able to achieve its objectives of encouraging production and providing stability in the country involved without the demands on it being frequent and for small individual losses.

Understandably, there are many problems to be faced in such a programme. In looking at the merits or demerits of this programme there should be clear guidelines as to the responsibilities and obligations of each insurer. For example, in addition to agreeing to assume (for a fee) a part of the excess losses of the Guyana Insurance Agency (GIA) CCRA should (a) credit GIA with the share of indemnity due them; (b) see to a uniform code of practice on the part of each participating country; and (c) provide expert advice and assistance as needed. The national insurance agencies on the other hand should (a) agree to send to CCRA a portion of the premiums collected; (b) keep CCRA informed of its operations; and (c) follow the general directions and guidance of CCRA.

Again, while the proposed agency would be operating primarily as providing reinsurance for the national companies rather than as a provider of direct insurance, its influence would be substantial on the local level in terms of the nature and extent of coverage. In the

absence of a direct model[1] it would draw upon the experience of a number of the more successful crop insurance programmes in countries such as the United States of America, Japan and Canada to the extent that their experiences can be transposed.

Steps in Establishing Programmes on Local Level

The Caribbean countries and small farmers in particular can benefit from this kind of a programme in spite of the many difficulties in its path.

Work on a programme begins by attempting to find the answers to a great many questions. Among these are:

(a) would insurance on the commodity meet a real need?
(b) how many people are involved?
(c) how frequently do these risks occur?
(d) what does it cost to produce the commodity?
(e) are reliable acreage and yield records available?
(f) is there much variation in acreage and yields from year to year?

Once most of the above and other questions have been considered, the decision to institute the programme might be made, in which case the following steps become necessary.

First on the local level, a contract for insurance is developed which includes the terms and conditions for the insurance. It includes such items as the insured crop, causes of loss insured against, requirements for reporting acreage and interest, quality protection provided, when insurance begins and ends, what constitutes an insurance unit, conditions under which the contract terminates, requirements for reporting damage or loss, method of determining loss, and numerous other insuring provisions.

Once the contract is developed all that remains to be done is the determination of the amount of insurance protection and establishment of the cost of the premium. The programme can then be promoted and sold to all eligible farmers.

On the regional level a separate document is drawn up by the re-insurance agency. In this document, the national company agrees to cede and the reinsurer agrees to accept by way of insurance on a quota share basis a percentage of each and every risk written by the national company covering the specified losses (e.g. squalls, drought, hail, flood, fire, insects, etc.) over some specified period. The contract would also spell out in detail such things as rates of premium, extent of liability, exceptions, and all other details considered essential for its own protection.

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[1] France and Puerto Rico are examples of countries in which crop reinsurance schemes have been instituted. In 1957, the U.S. Federal Crop Insurance Act was amended to permit U.S. FCIC to provide reinsurance for crop or plantation insurance in Puerto Rico when such reinsurance is not available from private sources at reasonable cost.

Some Implications of the Programme

Among the problems to be resolved is how to measure the loss. In addition there is the matter of the guarantee. Should the guarantee be determined by the farmer's ability to produce or by the amount of money and time spent in growing the crop? This point deserves consideration in the instituting of a programme since it is important in determining the amount of insurance guarantees among individual farmers, farming areas, etc. Who should have the urgent guarantee - the farmer who invests the most or the one who can produce the most, must be resolved.

What price to use in arriving at the indemnity payment is also of primary interest since it will determine the actual monetary return. If the price is set before fixing the premium then that precludes using market prices. If there is a government price, then this also would have to be set before determining the premium. Ideally therefore, the price should be close to the market price during the insured year.

Financing the Insurance Programme

There are a great deal of difficulties envisioned in working out a satisfactory approach to the financing of the programme. There are many who would suggest that the programme would be costly and not profitable. Crop insurance programmes in the countries envisioned are not designed to make profits - at least not in the context of development. For one thing, the programme can only be initiated in countries with adequate agricultural, economic, institutional and philosophical infra-structure. It is encumbent on the government of the countries involved, the credit institutions, farmers organizations, etc. to cooperate in making this insurance available to small-holder producers. How much capital is actually needed to get this programme in operation will have to be worked out. What can be said is that the costs will vary with the size of the programme, the extent of coverage and the number of countries participating.

Actual financing on the local level would be through: (a) premium received, (b) government subsidies, and (c) surpluses or reserves brought forward. The amounts of (a) and (b) will depend on actuarial considerations. At the regional level the reinsurance agency might be initiated with the assistance of a loan by a consortium of international or regional institutions including locally-operated life insurance and banking institutions to establish a cash reserve. In addition, an agreed portion of all premiums collected should be ceded to the reinsurance agency. Roy makes the point that if the organization is set up as an experimental or pilot scheme, the need for capital may at first be relatively small but will grow if the experiments are successful and the volume of insurance is increased. The programme should be structured in such a way that lends itself to flexibility and expansion.

In instituting programmes such as this, there is need for an appreciation of the overall contribution which it could make to the typical Caribbean country in search of a means of encouraging agricultural production among its small holders. Bernard Oury in his paper on Weather and Economic Development points out: *"While agriculture is a risky enterprise, human ingenuity has not failed to devise ways and means to reduce risks or to mitigate their results... The first device that comes to mind is to avoid agricultural risks so far as possible by concentrating*

*agriculture in places that have a favourable climate. But in most
countries the scope for such concentration is severely limited and,
with a growing population, is progressively further narrowed"* 8 .

We probably cannot control the climatic conditions but we can
provide a means to weather its storms. We can bring together regional
and multi-national aid funds for the purpose of insuring or reinsuring
crop yields. We can see to it that through such efforts the poorest
farmer, rich in willingness to produce but short on consistent credit
availability, will have a chance.

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