Managing Hazards, Reducing Risks and Increasing Investments in Agriculture - Some Perspectives

SPECIAL PAPER

Critical anlaysis of policy issues for repositioning agriculture in the Caribbean.

CTA IICA

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This Special paper titled '*Managing Hazards, Reducing Risk and Increasing Investment in Agriculture – Some Perspectives*' seeks to widen understanding and promote a new mindset with respect to three issues critical to the agriculture development process.

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Special Paper

Managing Hazards, Reducing Risks and Increasing Investment in Agriculture:

For Your Information

Getting Agriculture Moving

Governments of the Caribbean region have decided that continued low productivity and modest results from agriculture are no longer acceptable. The Heads of Governments of the Caribbean have agreed that the sector can no longer survive in a "business as usual" mode. They have called for a fundamentally different approach for the *repositioning of agriculture*.

Four decades ago, Mosher (1966) argued that this repositioning, or as he put it *'getting agriculture moving'* boils down to a simple concept: – that agricultural production and marketing decisions are made independently by several different individual entrepreneurs. Within the Caribbean Community, these decisions are being made daily and simultaneously, by thousands of agri-entrepreneurs within the context of the risks of their operating environments. This decision making framework is built around the following elements:

- Price data (interest, exchange and wage rates, and input, transport and energy costs);
- Technical information (technologies, etc);
- Production process (commodity selected by entrepreneur based on expected economic gains);
- Agro-ecological data (weather, land fertility, pest risks, etc);
- Output composition (goods for either households or processing);
- Local policies/rules (agriculture, health, environmental policy, others, eg., e.g. larceny);
- Market data (location, demand, prices, standards, access regulations, promotion, others);
- Output market (final or intermediate goods, local, regional or extra-regional).

Generally, decision-making pertaining to agriculture production is influenced by the incentives to work rather than by the nature of the work itself (Timmer, 1998). In this context, Timmer (1998) astutely contrasts the desire to achieve increased agricultural output through a change in agricultural production decisions with that of attaining a higher output from a steel or cement plant when he noted:

> *"...a dozen or so individuals could take direct action which could lead to a 10 percent increase in steel output in a year or so, and their decisions would be decisive. Nowhere can a similar small group of individuals decide to raise food production by 10 percent. A small group of planners, or the president and the cabinet, can decide that they* ***want*** *food production to rise by 10 percent… but they cannot increase food production by themselves. They must also convince the millions of farmers in their country to want to increase food production by 10 percent and make it in their self interest to do so."*

Translating that argument to the Region's goal of agricultural repositioning implies that a comprehensive appreciation of the environment within which the agri-entrepreneur makes his or her decisions is a necessary prerequisite in the design of any intervention aimed at stimulating and expanding agricultural output. Stated simply, **the agri-entrepreneurs must perceive it to be in their interest and or be strongly convinced and encouraged through government policy, to increase their output**. Governments of developing countries intervene through national plans and other interventions, to impact on the production, marketing and consumption of agricultural products and inputs (Stephens and Jabara, 1988). Macroeconomic policies heavily influence prices - wage rates, interest rates, land rental rates, foreign exchange rates and the rural-urban terms of trade. These in turn influence the production and investment decisions of producers (Timmer, 1998 b) and the pace and extent to which agriculture grows and is transformed.

Understanding agriculture's situation is a first step in knowing where and how it needs to be positioned

Attention is again being focused on revitalizing agriculture in the Caribbean to strengthen its contribution to national and regional development in the Caribbean, including providing a level of food security. Against this backdrop, an understanding of the process of agricultural growth can be had using Michael Porter's description of the three sequential stages of the economic development process: namely the initial 'Factor-Driven' Stage, followed by the 'Investment-Driven' stage, then the, 'Innovation-Driven' stage.

Porter describes the Factor Driven stage as having a reliance on basic factor conditions such as low-cost labor and access to natural resources as the dominant sources of competitive advantage and exports. Activity is geared towards the production of commodities or relatively simple products, with firms engaged in price-based competition and assimilation of technology through imports, foreign direct investment and imitation. Factor-Driven economies are highly sensitive to world economic cycles, commodity price trends and exchange rate fluctuations.

The FAO SOFA (2002) noted that economists and historians indicate five different perspectives on the agricultural growth process. Of these five, the 'Resource Perspective' is in keeping with Porter's Factor-Driven stage of development. This perspective suggests that with abundant land and water, resources need not decline as population grows since more land can be brought under cultivation. However, as land and water boundaries are closed, the ratio of population to resources will rise and bring about a reduction in per capita production. This model provides the idea that population growth or population density may stimulate investments in institutional and technological change.

There is consensus that the key to transforming agriculture out of a Factor-Driven/Resource Perspective stage of development is productivity growth. Agricultural growth entails achieving increased productivity per unit of resources used to produce agricultural goods. High and sustained levels of productivity growth are a prerequisite to fuel the transformation to Investment Driven growth. Porter noted that heavy investment in efficient infrastructure, business-friendly government administration and strong investment incentives and access to capital are essential to allow for such productivity growth. Porter notes that in Investment-Driven growth, economic activity is concentrated on manufacturing and outsourced service exports of products and services that are more sophisticated, with greater presence along the value chain. While there is continued reliance on imported technologies accessed through licensing, joint ventures, foreign direct investment and imitation, countries have developed the capacity to improve on foreign technologies.

The four other perspectives of the agricultural growth process described by FAO SOFA (2002) generally fall within Porter's Investment Driven stage. These include investments in the following areas which are all elements for sustained productivity growth:

- Institutional Change Perspective- addresses inefficiencies associated with transaction costs and imperfect markets. Investments in infrastructure and institutions (credit institutions and legal systems) are important for agricultural economies to reduce transport, transactions and other costs as well.
- Human Capital Perspective- emphasizes that farm management and production skills (farmer human capital) can be improved through investment in training (schooling) programs, experience and agricultural extension programs.
- Best Practice Perspective- focuses on the fact that at any given time, farmers may not yet have tested and adopted existing technology that would reduce costs and produce growth because of failures in the information and

demonstration systems available to them. Investments in agricultural extension systems will then produce growth in food production per capita by bringing farmers closer to best practice technology use.

- Adaptive Invention Perspective- emphasizes that agricultural technology is location-specific to a considerable degree. Biological processes are sensitive to soil, climate and even economic conditions. Natural "Darwinian" evolutionary change produced a rich diversity of species, resulting in natural differences in plant and animal life in each ecological niche. Farmers only partially overcame this niche phenomenon when they selected the landraces (farmers' varieties) that today constitute the genetic resource stock utilized by modern plant (and animal) breeders as they search for varietal (and breed) improvements. Modern plant breeders must also respect soil and climate factors and tailor varietal improvements to regions or niches. This means that technology that is valuable in one location may not be valuable in another. It also means that targeted invention (plant breeding) programs can produce growth in per capita food production.

The institutional change, human capital, best practice and adaptive invention perspectives all depart from the resources perspective by introducing dynamics that enable producers to produce more with the same amount of factor resources. That is, they introduce productivity change. Each of these perspectives is associated with the development of what is referred to as technological capital (TC). This represents a country's capacity to implement, adapt and develop productivity-enhancing technology. The latter perspective is particularly critical for transforming agriculture from a factor to an investment driven stage. As previously alluded to, the agriculture production process does not function as a factory under controlled conditions. Hence, with particular emphasis on the role of technologies, and given that such technologies are created in developed countries for highly industrialized, energy-dependent agricultural production models, much consideration should be given to foreign direct investment that act as vehicles for technology transfer. Indeed, it is because of this operating reality, that innovation in agriculture at all levels, (from input supply- to production processes- to product and human capital development), has to become the driver and sustenance of productivity growth in agriculture.

Bonnen (1998) argued that increases in agricultural productivity are not solely the result of technological improvements but can also be attributed to changes in institutional innovation and improvements in human capital. He concluded that without ongoing sustained institutional development and human capital growth, a developing country would fail at achieving a highly productive and industrialised agriculture. Bonnen (1998) observed that the prevailing

institutional structures within the USA, including the legal system, served to reduce many of the risks and costs of commerce thereby contributing to increased productivity within agriculture. He concluded that sustained national policy and institution building together with an approach that coordinates investment in research and technology, physical and human capital, and an adaptive response to their use, is a pre-requisite to achieving goal of increased productivity.

Governments of the Caribbean region have decided that continued low productivity and modest results from agriculture are no longer acceptable. The Heads of Governments of the Caribbean region have agreed that a new strategy must be developed, built on national and regional consultations, so as to find sound solutions and responses to constraints and challenges facing the sector. In January 2005, at a meeting of the region's Ministers of Agriculture of the Alliance, President Bharrat Jagdeo of Guyana as the lead Head for Agriculture within the Conference of Heads of Governments of CARICOM presented the report on the outcome of the Consultative process. The results of the Consultative process will jump start a much wider and more involved process of agricultural repositioning in the region, towards an agricultural sector which by 2015 would have:

- made substantial progress towards contributing significantly to national and regional development and to economic, social and environmental sustainability;
- operated under a transparent regulatory framework at national and regional levels, that promotes and facilitates investment and attracts (direct and indirect) inflows of capital;
- transformed, significantly, its processes and products and stimulated the innovative entrepreneurial capacity of Caribbean agricultural and rural communities; and
- enabled the region (as a whole) to achieve an acceptable level of food security that is not easily disrupted by natural hazards and/or man-made disasters.

The Consultative process identified ten Key Binding Constraints to repositioning. These have become the basis for articulating and implementing the 'Jagdeo Initiative' which seeks to develop practical regional interventions to alleviate same.

1. Limited financing and inadequate levels of new investments;
2. Outdated and inefficient agricultural health and food safety (AHFS) systems;
3. Inadequate research and development;

4. Fragmented and disorganized private sector;
5. Weak land and water distribution and management systems;
6. Deficient and uncoordinated risk management measures;
7. Inadequate transportation systems, particularly for perishables;
8. Weak and non-integrated information and intelligence systems;
9. Weak linkages and participation of producers in growth market segments
10. Lack of skilled and quality human resources;

The perspectives that follow explore the implications for the Caribbean Community of three critical issues relating to '*agricultural repositioning*', or '*getting agriculture moving*'. These critical issues relate to two of these constraints, namely, "*Deficient and Uncoordinated Risk Management Measures*' and '*Limited Financing and New Investments*'.

In summary, the perspective on '***Natural Hazards and Disaster Management in Agriculture'*** recognizes explicitly, that geography and small size expose the Caribbean Region to a broad range of natural hazards. It contends that disaster management and sustainable agriculture development are inextricably inter-twined.

> Empirical evidence over the 1970 to 1999 period indicated that more than 70% of natural hazards that resulted in disasters were of meteorological origin; the remaining 30% resulting from geological phenomena. The large economic and human cost associated with these natural events is mainly the result of extreme vulnerability. This vulnerability stems from the pattern of socioeconomic development in the region as well as inadequate risk management policies. The experiences of these natural events proved conclusively that there is urgent need for mitigation measures as a means of reducing human suffering, infrastructural damage or financial loss. Further, preliminary evidence on climate change suggests a strong likelihood that the incidence of more severe natural events will increase in the region.
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> Natural hazards have been a reality for Caribbean populations for a long time, but their frequency and intensity have increased in recent years. Hurricanes, floods and droughts and to a lesser extent earthquakes and volcanoes, have resulted in deaths, homelessness, the destruction of property and the disruption of food supplies and communication and other essential services. The year 2004 was unprecedented in terms of extreme effects of natural hazards in the region, and indeed throughout the world. In the Caribbean, for the agriculture sector, natural hazards of greatest significance

have been floods, hurricanes, landslides, drought, invasive species, and volcanic eruption.

With the advent of increasingly sophisticated information technology, greater emphasis is being placed on prevention. The region can no longer continue to rely upon costly reconstruction processes and post-disaster international assistance. Improvement of risk management is essential to guarantee the protection and future progress of agricultural, economic and social development in the region. Applying this philosophy to the reduction of agricultural risks from natural hazards this paper proposes the adoption of a Hazard Analysis and Critical Mitigation Point (HACMP) system that consolidates national and regional agency initiatives and embraces gender-sensitive procedures into the hazard analysis, vulnerability and mitigation measures.

The perspective on '***A Multi-Commodity Agricultural Insurance for Risk Reduction***' also recognizes explicitly, that natural hazards present a major and often, unmitigated risk in agriculture in the Caribbean. Further, it acknowledges that while insurance is an important risk mitigation instrument, its availability as a disaster risk management strategy in the Caribbean is limited to a few crops.

The development of agricultural insurance markets in the Caribbean will be a critical aspect of the suite of measures available for the reduction and management of risk in agriculture. To date, the history of insurance in agriculture in the Caribbean is limited to bananas in the Windward Islands, administered through WINCROP-Windward Islands Crop Insurance and coffee, banana and coconut all under separate coverage in Jamaica. Traditional disaster risk management strategies, including use of savings, accessing loans, diversification and the provision of relief by Governments have not proven to be adequate in preventing serious economic loss and allowing speedy recovery. The stimulation of agricultural production in the Caribbean will require a more structured approach to the management and reduction of risk, through mechanisms such as, crop insurance, particularly multi-crop insurance.

The perspective on 'A Multi-Commodity Agricultural Insurance for Risk Reduction' discusses the critical lessons from experiences and issues to be considered in any efforts to establish multi-commodity crop insurance in the Caribbean. Limited finances and lack of global experience are seen as major constrains to regional governments efforts at pioneering the establishment of crop insurance schemes. There is substantial scope for leadership of the

private sector, in pioneering and managing crop insurance schemes, with support from the public sector. Among the key factors for consideration in establishing a model multi-commodity insurance scheme, include sound open market criteria, such as, comprehensive assessment of the demand, clear identification of the key perils, informed decisions on the crops to be covered, appropriate rating of premiums, involvement of the private sector and a supporting role of governments. Further, economic viability and sustainability issues suggest that consideration must also be given to the establishment of a scheme that is regional in scope and coverage.

Effective risk mitigation is one of the critical pre-requisites for improving business confidence and stimulating investment in agriculture in the Caribbean. The perspective on '***Catalyzing and Expanding Investments in Agriculture and Rural Areas***' recognizes explicitly, that reducing the perceived and real risks of the agri-entrepreneurs must factor clearly among public sector and donor objectives if investment targets in agriculture are to be realized.

The perspective concludes that in the absence of risk mitigation financial instruments, such as, insurance markets, farmers have few options to manage systemic risks affecting physical production (droughts, floods, pests, etc.) or profitability, hence impacting negatively on the level of investments or the capacity to realize high returns from same.

The need to build domestic and national capital for stimulating and sustaining growth is a prerequisite for development. This is particularly significant in light of the dramatic evolution in the environment for investment in agriculture and rural development. In the past twenty years, agricultural investments were geared towards increasing production and world food supplies. In today's emerging environment, investments in agriculture seek to increase competitiveness and profitability along the commodity chain from farmer to consumer, enhance sustainability of the environment and natural resource base and empower rural people to manage change.

International competitiveness and social and environmental sustainability are the overarching goals for agriculture as the region moves closer to the reality of a Single Economy under the CSME. The Region must therefore embark on deliberate and concerted activities to develop a modern, efficient and holistic agribusiness system, if it is to improve its ability to participate in the growth segments of the regional and international agri-food/markets and reduce its dependence on extra-regional food imports. Such dependence

is also in terms of donor assistance. While it is widely agreed that donor assistance is often times a catalyst for agricultural growth and rural development, no developing country should perpetuate a reliance on donor assistance for development, particularly in agriculture.

Investment in the agricultural and rural sectors is critical to the process of creating an enabling economic and business environment for competitive and sustainable agricultural and rural development. It is argued that agri-entrepreneurs are motivated to invest in agriculture by the perceived opportunities of economic returns. While the prospect of promoting economic returns is also a goal, the realization of increased social welfare also ranks in importance for investment by governments and agencies. The application of some of the issues pertaining to investment intended to catalyze productivity in the sector is illustrated with reference to the Chilean experience. The perspective concludes with the identification of a few possible projects for consideration for government/agency or tripartite investment in Caribbean countries.

The Jagdeo Initiative makes a clear link between the limited and declining investment and financing for agriculture in the region and the general lack of risk management mechanisms. It makes a strong call to develop an integrated and coordinated regional approach to risk management, including innovative agricultural insurance instruments, as risk mitigation facilities. Given the premise that agricultural production and marketing decisions are made independently by several different individual producers – the agri-entrepreneurs – then it is advised that that consideration of options in these specific areas must benefit from inputs from the agri-entrepreneurs themselves.

DOCUMENTO ESPECIAL

Construir la Resistencia, Reducir los Riesgos y Aumentar las Inversiones en Agricultura- Algunas Perspectivas

Dar un impulse a la agricultura

Para Su Información

Los Gobiernos de la región del Caribe han decidido que la continuación de la baja productividad y los resultados modestos de la agricultura ya no son aceptables. Los Jefes de Gobierno acordaron que el sector no puede sobrevivir si se sigue pensando que "todo sigue igual". Han pedido que se adopte un enfoque fundamentalmente distinto para el reposicionamiento de la agricultura.

Hace cuatro décadas, Mosher (1966) sostuvo que este reposicionamiento, o según él, el impulso a la agricultura no es más que un concepto sencillo: - ***que las decisiones relativas a la producción y la comercialización de la agricultura son tomadas de manera independiente por muchos empresarios distintos***. Dentro de la Comunidad Caribeña, las decisiones al respecto se toman a diario y simultáneamente por miles de empresarios agrarios en el contexto de los sucesos internacionales nuevos y cambiantes y las condiciones ambientales. El marco de la toma de decisiones se fundamenta en los siguientes elementos:

- Datos relativos a los precios (intereses, divisas, tasas salariales, insumos, transporte, costos energéticos, etc.);
- Información técnica, (tecnologías, etc.);
- Proceso de producción (bienes elegidos por los empresarios basado en ganancias económicas esperadas);
- Datos agroecológicos (clima, fertilidad del suelo, riesgos de plagas, etc.);
- Composición de la producción (bienes para hogares o para el tratamiento);
- Políticas/reglas locales (agricultura, salud, política ambiental, otras, p.ej. el robo)
- Datos sobre el mercado (ubicación, demanda, precios, normas, reglamentos de acceso, promoción, entre otros);
- Mercado de producción (bienes finales o intermedios, locales, regionales o extra-regionales).

De manera general, la toma de decisiones con respecto a la producción agropecuaria es influida más por los incentivos para trabajar que por el trabajo en sí mismo (Timmer 1998). En este contexto, Timmer (1998) compara perspicazmente el deseo de lograr un aumento de la producción agropecuaria a

través de la modificación de las decisiones relativas a la producción agropecuaria con el de lograr una mayor producción en una planta siderúrgica o de cemento. Afirmó:

> *"…una docena de individuos pueden tomar acción directa, lo que puede conducir a de aumento del 10% en la producción de acero en un año más o menos, y sus decisiones serían decisivas. No es posible en ningún lugar que un pequeño grupo de este tipo decida aumentar la producción de alimentos en un 10%. Un pequeño grupo de planificadores, o el presidente con el gabinete pueden decidir aumentar la producción de alimentos en un 10%, pero no pueden aumentar la producción de alimentos por si solos. También deben convencer a los millones de agricultores de su país para que sean motivados a aumentar la producción de alimentos en un 10 por ciento, haciendo que dicho aumento sea en su propio interés."*

Traducir ese argumento al objetivo regional de reposicionar la agricultura implica que una comprensión exhaustiva del entorno en el cual el empresario agrario toma sus decisiones es un requerimiento necesario al diseño de toda intervención destinada a estimular y ampliar la producción agropecuaria. En otras palabras, **los empresarios agrarios deben considerar que esto está en su interés y/o tener la convicción fuerte y el estímulo a través de las políticas gubernamentales, para aumentar su producción**.

Los Gobiernos de los países en vías de desarrollo intervienen por medio de los planes nacionales e intervenciones de otra índole para impactar la producción, comercialización y consumo de productos e insumos agropecuarios (Stephens y Jabara 1988). Las políticas macroeconómicas influyen fuertemente precios – salarios, tasas de interés, alquileres de terreno, tipos de cambio y los términos de intercambio rural-urbano. A la vez, éstos influyen en las decisiones de los productores con respecto a la producción y las inversiones (Timmer 1998 b) así como el ritmo a que la agricultura crece y se transforma y la medida en que lo hace.

Comprender la situación de la agricultura es un primer paso para saber dónde y en qué manera debe posicionarse

Una vez más se está concentrando la atención en la revitalización de la agricultura en el Caribe, con el propósito de fortalecer su contribución al desarrollo nacional y regional en la región, incluyendo el proveer un nivel de seguridad adecuado. Contra el trasfondo, un mejor entendimiento del proceso de crecimiento agropecuario puede tenerse usando la descripción de Michael Porter las tres etapas del proceso de desarrollo económico; a saber la Etapa inicial "Impulsada por los Factores", seguida por la etapa "Impulsada por la

Inversión", y después, la etapa "Impulsada por la Innovación".

Según Porter, la etapa Impulsada por los Factores depende de las condiciones básicas de los factores, tales como la mano de obra barata y el acceso a los recursos naturales, fuentes dominantes de la ventaja competitiva y las exportaciones. La actividad es orientada hacia la producción de mercancías o de productos relativamente sencillos, las empresas estando dedicadas a la competencia basada en precios y la asimilación de la tecnología a través de las importaciones, la inversión extranjera directa y la imitación. Las economías Impulsadas por los Factores son altamente susceptibles a los ciclos económicos mundiales, las tendencias en los precios de las mercancías y fluctuaciones del tipo de cambio. En el Estado de los Alimentos y la Agricultura de la Organización de Alimentos y Agricultura (FAO SOFA) (2002) se observó que los economistas y los historiadores indican cinco perspectivas distintas sobre el proceso de crecimiento. De los cinco, la "Perspectiva de los Recursos" es acorde con la etapa del desarrollo Impulsado por los Factores de Porter. Esta perspectiva sugiere que con una abundancia de tierra y agua, los recursos no tienen que disminuir a medida que crezca la población, porque es posible cultivar más tierra. Sin embargo, a medida que se cierren las fronteras terrestres y marítimas, la proporción de la población a los recursos se incrementará, y traerá una reducción de la producción per capita. Este modelo plantea la idea de que el crecimiento de la población o la densidad de ésta puede estimular las inversiones en transformaciones institucionales y tecnológicas.

Existe un consenso de que la clave para transformar el sector agropecuario de la etapa Impulsada por los Factores/ Perspectiva de los Recursos es el crecimiento de la productividad. El crecimiento agropecuario consiste en lograr mayor productividad por unidad de recursos utilizados para producir productos agropecuarios. Niveles de productividad altos y sostenidos son necesarios para que se realice la transformación hacia un crecimiento Impulsado por la Inversión. Porter afirmó que importantes inversiones en una infraestructura eficiente, la administración pública propicia a los negocios, y fuertes incentivos para la inversión y el acceso a los capitales son fundamentales para permitir dicho crecimiento de la productividad. En el crecimiento, Impulsado por la Inversión, la actividad económica se concentra en la manufactura y la exportación de productos y servicios más sofisticados con mayor presencia en la cadena de valor. Aunque se mantiene la dependencia de tecnologías importadas la las cuales se gana acceso por medio de licencias, empresas mixtas, inversión extranjera directa y la imitación, los países han desarrollado la capacidad de mejorar las tecnologías extranjeras.

Las cuatro otras perspectivas del proceso de crecimiento agropecuario delineadas por FAO SOFA (2002) generalmente son acordes con la etapa Impulsada por la Inversión de Porter. Incluyen las siguientes inversiones, necesarias para mantener el crecimiento de la productividad:

- La Perspectiva de la Transformación Institucional responde a las ineficiencias asociadas a los costos de transacción y los mercados imperfectos. Las inversiones en la infraestructura y las instituciones (instituciones crediticias y sistemas legales) son importantes para que las economías agopecuarias reduzcan los costos de transporte, transacciones y otros.
- La Perspectiva del Capital Humano hace hincapié en que las capacidades de administración de explotaciones y de producción agropecuaria (capital humano – agricultor) pueden ser mejoradas por medio de la inversión en programas de entrenamiento (escolarización), experiencia y programas de masificación agropecuaria.
- La Perspectiva de las Mejores Prácticas se concentra en el hecho de que en cualquier momento dado, es posible que los agricultores no hayan probado ni adoptado la tecnología existente capaz de reducir los costos y producir crecimiento debido a fallas de los sistemas de información y demostración disponibles. Inversiones en sistemas de masificación agropecuaria producirán crecimiento de la producción de alimentos per capita, haciendo que los agricultores se acerquen más al uso de la tecnología de las mejores prácticas.
- La Perspectiva de la Invención Adaptiva enfatiza que en gran medida la tecnología agropecuaria es propia de la ubicación. Los procesos son susceptibles a las condiciones del suelo, del clima y aun de la economía. La transformación natural evolucionaria "Darwiniense" produjo una rica diversidad de especies, dando lugar a diferencias de la flora y la fauna en cada nicho ecológico. Al haber seleccionado las razas terrestres (variedades de los agricultores) que hoy constituyen los recursos genéticos utilizados por los criadores y cultivadores en la búsqueda de mejores variedades y razas, los agricultores apenas lograron superar este fenómeno relacionado a los nichos. Los cultivadores modernos también deben respetar los factores relacionados al suelo y al clima, y adaptan las mejoras de las variedades a las regiones o a los nichos, lo que significa que la tecnología que tiene valor en un lugar tal vez no lo teng en otro. Además, significa que los programas de invención bien dirigidas (cultivo de plantas) pueden producir crecimiento en la producción de alimentos per capita.

Las perspectivas respecto de la transformación institucional, el capital humano, las mejoras prácticas y la invención adaptiva todos se apartan de la perspectiva relacionada a los recursos al incorporar una dinámica que permite que los productores aumenten su producción a partir de la misma cantidad de recursos. Es decir, que presentan cambios de productividad. Cada una de estas perspectivas se asocia al desarrollo de lo que se denomina el capital tecnológico (CT), que representa la capacidad de un país para implementar, adaptar y desarrollar tecnología que mejore la productividad. Esta perspectiva es particularmente crítica para transformar la agricultura de la etapa vinculada a los factores a la etapa impulsada por la inversión. Como se ha aludido arriba, el proceso de producción agropecuaria no funciona como una fábrica bajo condiciones controladas. Por ello, dando un énfasis particular al papel de las tecnologías, y dado que dichas tecnologías son creadas en países desarrollos para los fines de modelos de producción agropecuaria que dependen de la energía, se debe tomar muy en consideración la inversión extranjera directa que sirven como vehículos para la transferencia de la tecnología. En efecto, es debido a esta realidad operativa que en la agricultura, la innovación a todos los niveles desde los insumos, la oferta hasta los procesos de producción y el desarrollo de productos y capital humano debe convertirse en el motor y el sostén del crecimiento de la productividad en la agricultura.

Bonnen (1998) sostuvo que los aumentos de la productividad agropecuaria no son solamente el resultado de las mejoras tecnológicas, sino atribuibles a variaciones de la innovación institucional y mejoras del capital humano. Concluyó que sin mantener el desarrollo institucional continuo o crecimiento del capital humano, un país en vías de desarrollo no lograría tener un sector agropecuario altamente productivo e industrializado. Bonnen (1998) observó que las estructuras institucionales existentes, incluyendo el sistema jurídico, servían para reducir muchos de los riesgos y costos vinculados al comercio, contribuyendo al incremento de la productividad del sector agropecuario. Concluyó que la construcción sostenida de las políticas nacionales y las instituciones, en conjunto con un enfoque según el cual se coordine la inversión en investigación y tecnología, capital físico y humano y una respuesta adaptiva a su uso son un requisito necesario para lograr los objetivos de mayor productividad.

Los Gobiernos de la región del Caribe han decidido que la continuación de la baja productividad y los resultados modestos de la agricultura ya no son aceptables. Los Jefes de Gobierno de la región del Caribe acordaron que es necesario desarrollar una estrategia nueva a partir de consultas a nivel nacional y regional para encontrar soluciones y respuestas sólidas a las limitaciones a las

cuales se enfrentan en el sector. En enero de 2005, durante una reunión de los Ministros de Agricultura de la Alianza regional, el Presidente de la República de Guyana, Bharat Jagdeo, en su calidad de Jefe de Gobierno con responsabilidad en material de la Agricultura en el seno de la CARICOM, presentó el informe sobre el resultado del proceso de Consulta. Los resultados del proceso de Consulta den un ímpetu a un proceso más extenso y complejo de reposicionamiento de la agricultura en la región de contra con un sector agropecuario que, para el año 2015:

- Haya avanzado de manera importante hacia una contribución significativa al desarrollo nacional y regional y a la sostenibilidad social y ambiental,
- Disponga de un marco regulatorio tanto a nivel nacional como regional que promueva y facilite la inversión y atraiga la entrada de capitales (directos e indirectos);
- Haya transformado de manera importante sus procesos y productos y estimulado la capacidad empresarial innovadora de las comunidades agropecuarias y rurales del Caribe; y
- Permita que la región en su totalidad logre un nivel aceptable de seguridad de los alimentos que no sea fácilmente afectada por catástrofes naturales o generados por el hombre.

Los Ministros de Agricultura, en coordinación con otras organizaciones internacionales están abordando la tarea de encontrar soluciones prácticas y respuestas a las limitaciones y desafíos que afectan la agricultura. En el proceso de Consulta se identificaron las diez limitaciones claves y más vinculantes:

1. La falta de recursos financieros y los niveles de nuevas inversiones poco adecuados;
2. Sistemas de transporte poco adecuados, particularmente con respecto a las mercancías perecedoras;
3. Insuficiencia de la investigación y desarrollo;
4. Un sector privado fragmentado y desorganizado;
5. Debilidad de los sistemas de distribución y gestión de tierras y agua;
6. Deficiencia y la falta de coordinación con respecto a las medidas de gestión de los riesgos;
7. Sistemas de seguridad sanitaria y de los alimentos en el sector agropecuario anticuados y poco eficientes;
8. Debilidad y la falta de integración de los sistemas de información e inteligencia;
9. Debilidad de las vinculaciones y de la participación de los productores en los segmentos del mercado en crecimiento.
10. Falta de recursos humanos capacitados y de buena calidad;

Las siguientes perspectivas analizan las implicaciones para el Caribe de tres asuntos críticos relacionados al '*reposicionamiento agropecuario*', o '*para dar un impulso a la agricultura*'. Estos asuntos críticos son relacionados a dos de estas limitaciones, a saber la "*Deficiencia y la falta de coordinación con respecto a las medidas de gestión de los riesgos*" y la "*Falta de Recursos Financieros y Nuevas Inversiones*"

Para resumir, la perspectiva de la ***'Gestión de los Peligros Naturales y las Catástrofes en la Agricultura'*** reconoce explícitamente que las características geográficas y las dimensiones de los países del Caribe, la región está expuesta a una serie de peligros naturales. Sostiene la gestión de las catástrofes naturales y el desarrollo agropecuario sostenible son inextricablemente entretejidos.

La evidencia empírica durante el período 1970 a 1999 indicó que más de un 70% de peligros naturales que resultaron en catástrofes fueron de origen meteorológico, y un 30% fueron el resultado de fenómenos geológicos. Esta vulnerabilidad es el resultado del patrón de desarrollo en la región, así como políticas de manejo de riesgos poco adecuadas. Las experiencias vinculadas a estos eventos demuestran decisivamente que urge tomar medidas de mitigación como una manera de reducir el sufrimiento humano, los daños infraestructurales o pérdidas financieras. Además, la evidencia preliminar respecto del cambio climático parece indicar que aumentará la probabilidad de que ocurran más eventos producidos por los fenómenos naturales severos.

Los peligros naturales son una realidad entre las poblaciones caribeñas desde hace mucho tiempo, pero su frecuencia e intensidad han aumentado en años recientes. Los huracanes, las inundaciones y las sequías, y en menor grado los seísmos y los volcanes han provocado muertes, la pérdida de viviendas y la destrucción de la propiedad, afectando el suministro de alimentos, las comunicaciones y otros servicios fundamentales. El año 2004 fue sin precedentes en términos de los efectos extremos de los peligros naturales en la región, y aun en el resto del mundo. En el Caribe, con respecto al sector agrícola, los peligros naturales más significativos son las inundaciones, los huracanes, los deslizamientos de tierra, sequías, especies invasivas y erupciones volcánicas.

Con la llegada de la tecnología informática cada vez más sofisticada, se hace hincapié más en la prevención. La región ya no puede seguir dependiendo de los procesos costosos de reconstrucción y de asistencia internacional post desastre. Es imprescindible mejorar la gestión de los riesgos para garantizar

la protección y el progreso del desarrollo agropecuario, económico y social en la región en el futuro. Aplicando esta filosofía a la reducción de los riesgos que enfrenta el sector agropecuario en los peligros naturales, esta ponencia propone la adopción de un Sistema de Análisis de Peligros y Punto de Mitigación Crítica que consolide las iniciativas de las agencias nacionales y regionales e incorpore procedimientos con una perspectiva de género en las medidas de análisis de peligros, vulnerabilidad y mitigación.

La perspectiva sobre ***"la Reducción de los Riesgos Para Múltiples Productos Agropecuarios"*** también reconoce explícitamente, que las amenazas naturales constituyen una mayor y muy frecuentemente desestimado riesgo para la agricultura en el Caribe. Además, este reconocimiento de que el seguro puede ser un importante instrumento de mitigación de riesgos se presenta en la estrategia de desarrollo de pocos cultivos en la región.

El seguro agrícola está emergiendo de nuevo como un tema de interés para los agricultores, gobiernos y formadores de políticas, compañías aseguradoras e instituciones financieras para el desarrollo. En general, los seguros constituyen una forma de reducir o gestionar los riesgos cuando existe incertidumbre sobre los posibles resultados de producción. En particular, el seguro de cultivos, orientado a cubrir pérdidas derivadas de eventos adversos de origen climático o similares, que están más allá del control de los productores, está emergiendo como un proceso dinámico y un área de negocios en crecimiento. Esto está siendo impulsado por un aumento de la comercialización de productos agrícolas, la viabilidad de nuevos tipos de seguros, el desarrollo de la política de comercio internacional y la necesidad de los bancos de tener garantías sobre los préstamos que brindan a los productores. Parte de este crecimiento está ocurriendo en los países en desarrollo.

El desarrollo de los mercados de seguros agrarios en el caribe será un aspecto crítico del conjunto de medidas disponibles para la reducción y gestión de los riesgos en la agricultura. Hasta hoy, la historia de los seguros agrarios en el Caribe se limita a algunos cultivos a saber: el banano en las Islas de Barlovento, a través de WINCROP – (Seguros para los Cultivos en las Islas de Barlovento) y el café, el banano y el coco, cada uno con cobertura separada en Jamaica. Las estrategias tradicionales para el manejo de los riesgos, incluyendo el uso de los ahorros, el acceso a créditos, la diversificación y el suministro de medidas de alivio por los gobiernos no son adecuadas para prevenir las pérdidas económicas importantes y permitir la recuperación rápida. La estimulación de la producción agropecuaria en el

Caribe requiere un enfoque más estructurado a la gestión y la reducción de los riesgos, por medio de mecanismos tales como los seguros de cultivos, y en particular, los seguros para múltiples cultivos.

La perspectiva de seguros para la reducción de los riesgos para múltiples productos agropecuarios discute las lecciones críticas de las experiencias y los asuntos que deben considerarse cuando se pretenda establecer un seguro para múltiples cultivos en el Caribe. La escasez de recursos y la falta de experiencia internacional son consideradas como limitaciones importantes que enfrentan los gobiernos de la región al intentar establecer planes de seguro para los cultivos. Existen muchas posibilidades para que el sector privado lidere el establecimiento y la gestión de los planes de seguro agrario, con el apoyo del sector público. Entre los factores claves que se deben considerar al establecer un plan modelo de seguro para múltiples productos son los criterios firmes de mercado abierto incluyendo una evaluación exhaustiva de la demanda, una identificación clara de los peligros claves, decisiones bien informadas sobre los cultivos que requieren cobertura, la elaboración de tarifas adecuadas para las primas, la participación del sector privado y un papel de apoyo de parte del gobierno. Además, Los asuntos relativos a la viabilidad y la sustentabilidad económica implican que se debe tener en cuenta el establecimiento de un plan de alcance y cobertura regional.

La mitigación efectiva de los riesgos es unos de los requisitos críticos para aumentar la confianza en el ámbito comercial y estimular las inversiones en la actividad avícola en el Caribe. La perspectiva de "***Catalizar y Ampliar las Inversiones en la Agricultura y en las Zzonas Rurales***" reconoce explícitamente que la reducción de los riesgos percibidos y reales de los empresarios deben figurar entre los objetivos del sector público y los donantes, para que las inversiones deseadas se concreticen.

Esta perspectiva reconocimiento que en la ausencia de instrumentos financieros para la mitigación de riesgos, tales como los mercados de seguros, los agricultores disponen de pocas opciones para la gestión de los riesgos sistémicos que afectan la producción (sequías, inundaciones, plagas, etc.) o la rentabilidad, así impactando negativamente el nivel de las inversiones o la capacidad de generar altos retornos de las mismas.

La competitividad internacional y la sostenibilidad social y ambiental son los objetivos globales para el sector mientras que la región avanza hacia la realidad de una Economía Unica (CSME). Por lo tanto la región debe emprender actividades deliberadas y concertadas para desarrollar un

sistema de empresas agrarias moderno, eficiente e integral para así mejorar su capacidad de participar en los segmentos de crecimiento de los mercados de agrialimentos regionales e internacionales, reduciendo su dependencia de las importaciones de alimentos extraregionales. Es de importancia crítica la creación de un entorno económico y empresarial propicio al desarrollo competitivo y sostenible del sector agropecuario y las zonas rurales por medio de las inversiones en dichos sectores.

La necesidad de construir capital interno y nacional para estimular y mantener el crecimiento es un requisito del desarrollo. Esto tiene particular importancia a la luz de la evolución dramática del clima inversionista para la agricultura y el desarrollo rural. Durante los últimos veinte años, las inversiones agrícolas se orientaban hacia el aumento de la producción y el suministro mundial de alimentos. En el nuevo entorno las inversiones en el sector agropecuario intentan aumentar la competitividad y la rentabilidad a lo largo de la cadena de productos entre el agricultor y el consumidor, fomentar la sostenibilidad del medio ambiente y de la base de recursos naturales, y empoderar a la gente rural para que puedan manejar los cambios.

La competitividad internacional y la sostenibilidad social y ambiental son los objetivos globales para el sector mientras que la región avanza hacia la realidad de una Economía Unica (CSME). Por lo tanto la región debe emprender actividades deliberadas y concertadas para desarrollar un sistema de empresas agrarias moderno, eficiente e integral para así mejorar su capacidad de participar en los segmentos de crecimiento de los mercados de agrialimentos regionales e internacionales, reduciendo su dependencia de las importaciones de alimentos extraregionales. Asimismo, dicha dependencia existe con respecto a la asistencia de los donantes. Generalmente, hay consenso en que la asistencia de los donantes puede catalizar el crecimiento del sector agropecuario y el desarrollo rural, pero ningún país en desarrollo debe perpetuar una dependencia de asistencia a favor del desarrollo, especialmente en la agricultura.

La inversión en la agricultura y el sector rural es crítica en el proceso de crear un entorno económico y empresarial propicio al desarrollo competitivo y sostenible del sector agropecuario y las zonas rurales. Se sostiene que los empresarios agrarios son motivados a hacer inversiones en el sector por las oportunidades percibidas para obtener retornos económicos. Aunque la posibilidad de promover los retornos económicos también es un objetivo, la realización de mayor bienestar social es otra consideración importante para

la inversión de parte de los gobiernos y sus agencias. La aplicación de algunos asuntos relativos a la inversión para catalizar la productividad en el sector se ilustra con referencia a la experiencia chilena. La perspectiva se concluye identificando unos proyectos posibles para la consideración de los gobiernos/las agencias o para la inversión tripartita en los países del caribe.

La iniciativa Jagdeo establece claramente el vínculo entre los niveles limitados y disminuyendo de la inversión y el financiamiento de la agricultura en la región, y la falta de mecanismos de gestión de los riesgos en general. Se hizo un llamado fuerte para que se desarrolle un enfoque regional a la gestión de riesgos integral y coordinado que incluya instrumentos de seguros agrarios innovadores. Dada la premisa que las decisiones con respecto a la producción y comercialización en el sector agropecuario son tomadas independientemente por muchos productores individuales – los empresarios del sector- es aconsejable que una consideración de las opciones al respecto debe beneficiarse del aporte de los mismos.

COMMUNICATION SPECIALE

Permettre un redressement, réduire les risques et accroître l'investissement dans le secteur de l'Agriculture – Quelques Perspectives

Faire l'Agriculture bouger

Pour Votre Informacion

Les Gouvernements de la région de la Caraïbe ont donc décidé qu'une productivité modérée mais constante et de modestes résultats du secteur agricole ne sont plus acceptables. Les Chefs de Gouvernement de la CARICOM ont déjà proclamé que le secteur ne peut plus fonctionner « comme si de rien n'était ». Ils ont fait appel à une approche fondamentalement différente pour le *repositionnement de l'agriculture*.

Il y a de cela quatre décennies, Mosher (1966) a soutenu que le repositionnement ou comme il l'entend « parvenir à faire l'agriculture bouger » se traduit par un simple concept: – la production agricole et les décisions relatives à la au marketing sont prises indépendamment par plusieurs entrepreneurs individuels. Dans la communauté de la Caraïbe, ces décisions sont prises quotidiennement et de manière simultanée, par des milliers d'agri entrepreneurs avec en toile de fond les risques de leur cadre d'opérations. Ce cadre de prise de décisions est établi autour des éléments suivants :

- Des données liées aux prix (intérêts, change, salaires, intrants, transport, coûts énergétiques, etc);
- L'information technique (technologies, etc);
- Le processus de production (produit choisi par l'exploitant à partir des gains économiques escomptés);
- Les données agro écologiques (le temps, la fertilité des terres, les risques relatifs aux pestes, etc);
- La composition des produits (produits pour les foyers ou pour la production);
- Les politiques/règlementations locales (agriculture, santé, politiques en matière d'environnement, autres par exemple le vol);
- Les informations relatives aux marchés (lieu, demande, prix, normes, réglementation de l'accès, promotion, parmi tant d'autres);
- Marchés de produits (produits finis ou intermédiaires, locaux, régionaux ou extra-régionaux).

Généralement, le processus de prise de décisions en matière de production agricole est influencé par les encouragements au travail plutôt que par la nature du travail lui-même (Timmer, 1998). Dans ce contexte, Timmer (1998) a habilement établi un contraste entre le désir d'augmenter la production agricole à travers un changement dans la production agricole et une augmentation de la production d'une usine d'acier ou de ciment en remarquant:

> *"...une douzaine d'individus pourrait avoir une action directe, ce qui donnerait lieu à une augmentation de la production d'acier en un an ou plus, et leurs décisions seraient critiques. Il n'existe nulle part un tel groupe d'individus pouvant décider d'augmenter la production alimentaire de 10%. Un petit groupe de personnes chargé de la planification ou le président et le comité exécutif peuvent décider une augmentation de 10 pour cent de la production alimentaire… mais ils ne peuvent aucunement augmenter la production d'eux-mêmes. Ces personnes doivent également convaincre des millions d'exploitants dans leurs pays de vouloir une augmentation de 10 pour cent de la production alimentaire et prendre sur eux pour ce faire."*

Aligner cet argument sur l'objectif régional en matière de repositionnement de l'agriculture implique qu'une connaissance globale de l'environnement dans lequel l'entrepreneur agricole prend ses décisions, représente une nécessité requise en compte dans la conception de toute intervention visant à stimuler et développer la production agricole. En termes simples, **les –agro-entrepreneurs doivent comprendre que ceci est dans leur intérêt et/ou être fermement convaincus et encouragés, à travers des politiques gouvernementales, à augmenter leur production.**

Les Gouvernements de pays développés interviennent par le biais de plans nationaux et autres interventions, en vue d'influencer la production, le marketing et la consommation de produits et d'intrants agricoles (Stephens et Jabara, 1988). Les politiques macroéconomiques influencent de manière décisive prix – les taux de salaires, les taux de location de terrains, les taux de change et les termes de commerce ruraux/urbains. Ceux-ci, à leur tour influencent la production et les décisions de producteurs (Timmer, 1998 b) ainsi que l'allure et jusqu'à quel point l'agriculture croît et fait l'objet de transformations.

Comprendre où se trouve l'Agriculture est la première étape pour savoir où et comment la positionner

L'accent est encore une fois mis sur la revitalisation de l'agriculture dans la Caraïbe. Il s'agit de renforcer sa contribution au développement national et régional dans la Caraïbe, y compris garantir un niveau satisfaisant de sécurité. Avec en toile de fond le, une compréhension du processus de croissance agricole s'inspirera de la

description par Michael Porter des trios étapes séquentielles du processus de développement économique, notamment l'étape initiale « motivée par les facteurs » suivie de l'étape « motivée par l'investissement », puis l'étape « motivée par l'innovation ».

Porter décrit l'étape motivée par les facteurs comme une étape dépendante des conditions de bases relatives aux facteurs tels la main d'œuvre bon marché et l'accès aux ressources naturelles étant les principales sources liées à l'avantage en matière de concurrence et d'exportations. Les activités visent à produire des marchandises ou des produits simples connexes avec des entreprises engagées dans la concurrence motivée par les prix et l'assimilation de technologies à travers les importations, l'investissement direct étranger et l'imitation. Les économies basées sur les facteurs sont très sensibles aux cycles économiques mondiaux, aux tendances des prix des produits et aux fluctuations des taux de change. L'Organisation pour l'alimentation et l'agriculture/Etat de l'alimentation et de l'agriculture (The Food and Agriculture Organization State of Food and Agriculture (FAO SOFA)) (2002) a remarqué que les économistes et les historiens indiquent cinq perspectives différentes sur le processus de croissance de l'agriculture. De ces cinq perspectives, la 'Perspective ressource' est conforme à l'étape de développement basée sur les facteurs mentionnée par Porter. Cette perspective suggère qu'avec des terres et de l'eau en abondance, les ressources ne devraient pas décliner alors que la population augmente puisque plus de terres peuvent être acquises pour la culture. Cependant, alors que les limites des terres et de l'eau sont fixées, la proportion de la population quant aux ressources augmentera et entraînera une baisse de la production par habitant. Ce modèle offre une idée selon laquelle la croissance de la croissance ou la densité de la population pourrait stimuler les investissements dans des changements institutionnels et technologiques.

Il existe un consensus anonyme selon lequel la clé de la transformation du secteur agricole à partir de l'étape de développement : Perspective motivées par les facteurs/ressources est la croissance liée à la productivité. La croissance agricole exige l'obtention d'une meilleure productivité par unité de ressources utilisée pour générer des produits agricoles. Des niveaux de croissance de productivité élevés et constants sont une exigence requise dans la transformation vers une croissance poussée par l'investissement. Porter a remarqué que les investissements dans l'infrastructure efficace, l'administration gouvernementale favorable au commerce, des encouragements à l'investissement convaincants et un accès au capital représentent les éléments essentiels permettant une telle croissance de la productivité. Porter avance que dans le cas de la croissance poussée par l'investissement, l'activité économique se concentre sur la

production et les exportations de services et de produits de l'extérieur, qui sont plus sophistiqués, avec une présence plus marquée dans la chaîne de valeur. Alors que l'on continue à se fier aux technologies importées, accessibles par le biais d'une autorisation, aux associations temporaires, à l'investissement étranger direct et à l'imitation, les pays ont développé leur capacité d'amélioration des technologies étrangères.

Les quatre autres perspectives liées au processus de croissance du secteur de l'agriculture décrites par la FAO SOFA (2002) correspondent en termes généraux à l'étape basée sur l'investissement mentionnée par Porter. Celles-ci comprennent des investissements dans les domaines suivants, qui sont tous des éléments propices à une croissance durable de la productivité :

- La perspective relative au changement institutionnel qui traite des inefficacités liées aux coûts de transaction et aux marchés imparfaits. Les investissements dans l'infrastructure et les institutions (institutions liées au crédit et aux systèmes juridiques) sont d'importance pour les économies basées sur l'agriculture et permettent de réduire les coûts relatifs au transport, aux transactions et autres.
- La perspective liée au capital humain souligne que les aptitudes relatives à la production sur les exploitations (capital humain : exploitants) peuvent être optimisées à travers des investissements dans des programmes de formation (études) et de développement du secteur agricole.
- La perspective de la meilleure pratique met l'accent sur le fait que, à tout moment, les exploitants pourraient ne pas avoir essayé et adopté des technologies existantes qui pourraient réduire les coûts de production, à cause d'un manque d'information et de démonstration des systèmes disponibles. Les investissements dans les systèmes de développement du secteur agricole vont alors permettre une croissance de la production alimentaire par habitant en rendant les exploitants plus aptes à utiliser la meilleure pratique en matière de technologie.
- La perspective liée à l'invention adaptive souligne que la technologie agricole est déterminée en grande partie par la localisation. Les processus biologiques sont sensibles aux sols, au climat et mêmes aux conditions économiques. Le changement évolutionnaire naturel "darwinien" a permis une grande diversité d'espèces donnant lieu aux différences naturelles dans la vie animale et végétale de chaque groupe écologique. Les exploitants n'ont pu que partiellement surmonter ce phénomène de niche lors de la sélection des variétés de produits qui constituent de nos jours le stock de ressources génétiques utilisé par les

> producteurs modernes de plantes (et d'animaux) dans leur quête d'amélioration des variétés et des espèces. Les producteurs modernes doivent, au même titre, respecter le sol et les conditions climatiques en vue de concevoir des améliorations sur-mesure conformément aux régions et aux niches. Ceci signifie qu'une technologie qui est utile à un endroit pourrait ne pas l'être pour un autre site. En d'autres termes, l'invention spécifique (culture végétale) peut donner lieu à une croissance de la production par habitant.

Le changement institutionnel, le capital humain, la meilleure pratique et les perspectives relatives à l'invention adaptive reposent tous sur la perspective de ressources en introduisant des dynamiques qui permettent aux exploitants de produire de plus grandes quantités avec la même quantité de ressources liées aux facteurs. Autrement dit, ces éléments introduisent un changement au niveau de la productivité. Chacune de ces perspectives est liée au développement de ce qui est appelé le capital technologique (CT), qui représente la capacité d'un pays à mettre en œuvre, adapter et développer une technologie visant à améliorer la productivité. Cette dernière perspective est particulièrement critique pour le passage de l'agriculture à l'étape basée sur les facteurs à celle basée sur l'investissement. Comme mentionné auparavant, le processus de production agricole ne fonctionne pas comme une usine dans des conditions contrôlées. Par conséquent, avec un accent mis sur le rôle des technologies et étant donné que ces technologies sont inventées dans des pays développé pour des modèles de production agricole hautement industrialisée et dépendante de l'énergie, il conviendrait de considérer l'investissement direct étranger qui fonctionne comme des véhicules de transfert technologique. En effet, c'est à cause de cette réalité que l'innovation en matière d'agriculture, à tous les niveaux, de l'approvisionnement des intrants aux processus de production, en passant par le développement du capital humain et des produits, doit devenir le moteur et l'agent de durabilité de la croissance de la productivité dans le domaine de l'agriculture.

D'après Bonnen (1998), les augmentations de la productivité ne résultent pas uniquement d'améliorations technologiques mais également aux changements liés à l'innovation institutionnelle et aux développements des ressources humaines. Il a conclu que sans développement institutionnel durable et des ressources humaines, de manière constante, un pays ne peut obtenir un secteur agricole hautement productif et industrialisé. D'après Bonnen (1998) les structures institutionnelles courantes aux USA, y compris le système juridique, ont permis de réduire une grande partie des risques et des coûts du commerce, contribuant ainsi à accroître la productivité dans le secteur agricole. Il a conclu

que des politiques nationales durables, un développement institutionnel et une approche qui coordonne les investissements dans la recherche et la technologie, le développement du capital physique et humain, ainsi qu'une réponse adaptive pour leur utilisation, constituent une exigence requise pour l'obtention d'une plus grande productivité.

Les Gouvernements de la région de la Caraïbe ont donc décidé qu'une productivité modérée mais constante et de modestes résultats du secteur agricole ne sont plus acceptables. Les Chefs de Gouvernement se sont entendu pour qu'une nouvelle stratégie soit développée, en vue de trouver des solutions et des réponses concrètes aux contraintes et défis auxquels fait face le secteur agricole. En Janvier 2005, lors d'une réunion des Ministres de l'Agriculture de l'Alliance de la région, le Président du Guyana Bharrat Jagdeo, en sa qualité de Président des responsables de l'Agriculture dans le cadre de la conférence des Chefs de Gouvernement de la CARICOM, a présenté un rapport sur les résultats du processus consultatif. Il est prévu que les résultats du processus de consultation permettront de lancer un processus beaucoup plus large de repositionnement de l'agriculture dans la région. L'intention est d'avoir un secteur agricole qui, d'ici 2015, devrait avoir :

- fait des progrès notables vers un développement national et régional significatif et une durabilité économique, sociale et environnementale ;
- un cadre régulateur transparent aux niveaux national et régional, qui promeut et facilite l'investissement et attire des flux (directs et indirects) de capitaux (directs et indirects) ;
- transformé de manière significative ses processus et produits et a stimulé la capacité innovatrice et d'entreprise des communautés agricoles de la Caraïbe ; et
- permis à la région (dans sa totalité) de parvenir à un niveau acceptable de sécurité alimentaire qui n'est pas perturbé par les catastrophes naturelles et celles causées par l'homme.

Le processus consultatif a identifié les dix contraintes les plus contraignantes liées au repositionnement. C'eux-ci sont devenues la base pour articuler et mettre en application l'initiative de Jagdeo qui cherche à développer des interventions régionales pratiques pour alléger mêmes:

1. Des financements limités et des niveaux insuffisants de nouveaux investissements;
2. Des systèmes de santé agricole et de sécurité alimentaire dépassés (AHFS) pour son sigle en anglais;
3. Une recherche et un développement insuffisants;
4. Un secteur privé fragmenté et désorganisé;

5. Des systèmes de gestion et de distribution de l'eau et des terres peu développés;
6. Des mesures de gestion des risques insuffisantes et non coordonnées;
7. Des systèmes de transports inadéquats, particulièrement pour les denrées périssables;
8. Des systèmes d'intelligence et d'information peu développés et non intégrés;
9. Des liens peu élaborés et une faible participation des producteurs dans la croissance des segments de marché;
10. Une insuffisance de ressources humaines qualifiées et de qualité.

Les perspectives suivantes passent en revue les implications pour la Communauté de la Caraïbe de trois points critiques liés au « repositionnement de l'agriculture » ou « faire bouger l'agriculture ». Ces questions critiques sont liées à deux de ces contraintes, notamment, « *une carence et une déficience en matière de mesures de gestion des risques* » *et* « *un financement et de nouveaux investissements limités* »

En guise de résumé, la perspective sur « L***es Risques Naturels et la Gestion des Catastrophes dans le Secteur de l'Agriculture*** **»** prend explicitement en compte le fait que sa géographie et sa petite taille exposent la Caraïbe à un grand nombre de dangers naturels. Elle comprend que la gestion des catastrophes et le développement d'une agriculture durable sont indéniablement étroitement liés.

> Des preuves empiriques au cours de la période comprise entre 1970 et 1999 pour indiquer que plus de 70% des dangers naturels étaient d'origine météorologique, les 30% restants émanant de phénomènes géologiques. Le coût élevé en matière d'économie et de ressources humaines associé à ces évènements naturels est principalement le fruit d'une extrême vulnérabilité. Une telle vulnérabilité provient d'un modèle de développement socio-économique dans la région et de politiques inadéquates en matière de gestion de risques. Les expériences de ces évènements naturels ont clairement démontré qu'il existe un besoin urgent de mesures de mitigation comme moyen de réduire la souffrance humaine, les dommages et les pertes financières. Par ailleurs, des preuves préliminaires relatives au changement de climat suggèrent une forte probabilité d'une augmentation d'évènements naturels plus sévères dans la région.
>
> Les catastrophes naturelles constituent, depuis longtemps, une réalité pour les peuples de la Caraïbe, mais leur fréquence et intensité se sont

décuplées au cours de ces dernières années. Les cyclones, les inondations et les sécheresses, ainsi que dans une moindre mesure les tremblements de terre et les éruptions volcaniques, ont eu pour résultat des décès, des personnes sans abri, la destruction de propriété et des troubles au niveau de l'approvisionnement en nourriture, de la communication et d'autres services essentiels. L'année 2004 a été unique en son genre en termes d'effets extrêmes des dangers naturels dans la région et dans le monde. Pour le secteur de l'Agriculture, les dangers naturels les plus lourds de conséquences ont été les inondations, les cyclones, les glissements de terrains, les sécheresses, les pestes, le feu, les éruptions volcaniques et les tremblements de terre ou tsunamis. Certains des dommages potentiels peuvent être évités par le bais d'un investissement dans des évaluations des dangers et à travers l'incorporation des plans de développement.

Avec la venue d'une technologie de l'information de plus en plus sophistiquée, un accent particulier est mis sur la prévention. La région ne peut plus continuer à dépendre de processus de construction coûteux et d'une assistance internationale post catastrophe. L'amélioration du système de gestion des risques est essentielle en vue de garantir la protection et les progrès avenirs de l'agriculture, du développement économique et social dans la région. Pour appliquer cette philosophie à la réduction des risques dans le secteur agricole générés par des dangers naturels, cette communication propose d'adopter un système de points pour l'Analyse de dangers et un système de points pour la Mitigation critique qui consoliderait les initiatives d'agences nationales et régionales et est sensibles aux procédures relatives à la sexospécificité dans l'analyse des dangers, de la vulnérabilité et des mesures de mitigation.

La perspective relative à « ***La Réduction des Risques Basée sur l'Assurance Agricole pour Cultures Multiples*** » reconnaît également explicitement que les dangers naturels présentent un grand risque souvent non mitigé pour le secteur de l'Agriculture de la Caraïbe. En outre, elle comprend qu'alors que l'assurance est un instrument important en terme de mitigation des risques, sa disponibilité en tant que stratégie de gestion des risques liés aux catastrophes dans la Caraïbe est limitée à quelques cultures.

Le développement de marchés d'assurance agricole dans la Caraïbe sera un aspect critique dans la détermination de mesures disponibles en matière de réduction et de la gestion des risques dans l'Agriculture. Jusqu'à ce jour, l'histoire de l'assurance dans le secteur agricole de la

Caraïbe est limitée aux cultures telles les bananes dans les Iles sous le vent, gérées par WINCROP-Windward Islands Crop Insurance et le café, la banane et le coco étant autrement couvertes en Jamaïque. Les stratégies traditionnelles de gestion des risques, y compris le recours aux épargnes, l'accès aux prêts, la diversification et l'offre d'une assistance par les gouvernements ne se sont pas avérées être des mesures adéquates dans la prévention d'importantes pertes économiques et n'ont pas semblé permettre un redressement rapide. La stimulation de la production agricole dans la Caraïbe requiert une approche plus structure de la gestion et de la réduction des risques, à travers des mécanismes telle l'assurance pour les cultures et l'assurance pour les cultures multiples.

La perspective sur la « l'Approche de la réduction des risques basée sur l'assurance agricole pour cultures multiples» aborde les leçons critiques tirées des expériences et thèmes à considérer dans tout effort de mise en place d'une assurance pour cultures multiples dans la Caraïbe. Des financements limités et un manque d'expérience générale sont considérés comme des contraintes clés face aux efforts faits par les gouvernements régionaux pour établir des modèles d'assurances pour cultures. Il existe une forte possibilité pour le secteur privé mène en matière d'efforts dans l'articulation et la gestion de modèles d'assurance des cultures, avec un soutien du secteur public. Parmi les facteurs clés à considérer, il faut mentionner des critères de marché solides, tels qu'une évaluation exhaustive de la demande, une claire identification des dangers clés, les décisions sur les cultures à couvrir, un classement approprié des primes, l'implication du secteur privé et le soutien des gouvernements. Par ailleurs, une viabilité économique et des questions de durabilité suggèrent qu'une considération devrait être accordée à l'établissement d'un schéma qui est régional dan sa portée et sa couverture.

Une mitigation efficace des risques est une des exigences requises critiques pour l'amélioration la confiance en matière d'affaires et pour stimuler l'investissement dans le secteur agricole dans la Caraïbe. La perspective relative à l'action de ***« Catalyser et Accroître les Investissements dans lAagriculture et les Zones Rurales »*** reconnaît explicitement que la réduction des risques réels et perçus des agro-entrepreneurs doivent prendre clairement en considération les objectifs du secteur public et des bailleurs de fonds si les investissements ciblés doivent être réalisés.

La perspective comprend qu'en l'absence d'instruments financiers pour la mitigation des risques, tels que les marchés d'assurance, les exploitants n'ont que quelques options en terme de gestion des risques systématiques affectant la production physique (sécheresses, inondations, pestes, etc.) ou la profitabilité, ayant donc un impact néfaste sur le niveau des investissements ou sur la capacité à obtenir des bénéfices élevés émanant de ces investissements.

La perspective conclut que le besoin d'accumuler un capital intérieur et national pour stimuler et assurer la durabilité de la croissance est une exigence requise pour le développement. Ceci revêt une importance particulière à la lumière de l'évolution dramatique des investissements dans le domaine de l'agriculture et du développement rural. Au cours des vingt dernières années, les investissements dans le secteur agricole étaient destinés à augmenter la production et les quantités de nourriture dans le monde. De nos jours, l'environnement et les investissements dans le secteur de l'agriculture cherchent à accroître la compétitivité et la profitabilité dans la chaîne des produits, de l'exploitant au consommateur, avec une plus grande durabilité de l'environnement avec des ressources naturelles et le développement des capacités des peuples ruraux pour mieux gérer les changements.

La compétitivité internationale et la durabilité sociale et environnementale sont des objectifs stratégiques pour l'agriculture, alors que la région se rapproche de la réalité d'une Economie unique dans le cadre de l'EMUC. La région doit donc s'engager dans des activités concertées et délibérées en vue de développer un système moderne, efficace et exhaustif d'agri business si ceci permet d'améliorer sa capacité de participation dans la croissance de segments de marchés de produits agricoles au niveau régional et international et pour réduire sa dépendance d'importations de denrées extra régionales. Une telle dépendance existe également en terme d'assistance provenant des bailleurs de fonds. Alors que beaucoup pensent que l'assistance des bailleurs de fonds est souvent un catalyseur pour la croissance du secteur agricole et du développement rural, aucun pays en voie de développement ne devrait continuer à dépendre de l'assistance de bailleurs de fonds pour son développement, particulièrement dans le secteur agricole.

L'investissement dans les secteurs agricole et rural est critique dans le cadre du processus de création d'un milieu économique propice aux

affaires pour la compétitivité et un développement agricole et rural durable. Il semblerait que les motivations qui poussent les agro-entrepreneurs à investir dans l'agriculture sont des opportunités perçues en matières de bénéfices économiques. Alors que la possibilité de promouvoir les bénéfices économiques représente également un objectif, la réalisation d'une meilleure assistance sociale revêt une importance particulière pour l'investissement fait par les gouvernements et les agences. L'application de certaines questions relatives à l'investissement visant à catalyser la productivité dans le secteur est illustrée avec une référence faite à l'expérience chilienne. En guise de conclusion, la perspective considère l'identification de quelques projets possibles à présenter à la considération des gouvernements/agences ou tout investissement tripartie dans les pays de la Caraïbe.

L'initiative de Jagdeo établit un lien clair entre l'investissement limité et en baisse et le financement pour l'agriculture dans la région, ainsi que le manque général de mécanismes de gestion des risques. Un appel résonnant a été fait pour développer une approche régionale intégrée et coordonnée en matière de gestion des risques, y compris des instruments innovateurs en terme d'assurance agricole, comme instruments de mitigation des risques. Etant donnée la prémisse selon laquelle la production agricole et les décisions liées au marketing sont prises indépendamment par plusieurs producteurs individuels – les agro-entrepreneurs – il est donc conseillé que la prise en considération d'options dans ces domaines spécifiques doivent bénéficier de l'intervention des agro-entrepreneurs eux-mêmes.

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PERSPECTIVES ON:

Natural Hazards and Disaster Management in Agriculture in the Caribbean

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Natural Hazards and Disaster Management in Agriculture in the Caribbean

Natural hazards must not automatically cause disasters

Clarifying the concepts

The policy, institutional and information environment for disaster management in the Caribbean has improved significantly since the establishment of the Caribbean Disaster Emergency Response Agency (CDERA) in 1991. As a result, the term 'natural disaster' is now widely used in the Caribbean to describe the region's vulnerability to natural hazards. A 'hazard' refers to the exposure to danger, risk or vulnerability. The United Nations Environmental Social and Cultural Organisation (UNESCO), defined natural hazards as "*naturally occurring physical phenomena*", or risk elements inherent in the natural environment, which are an inevitable part of life on earth. Natural hazards may be of either: (a) atmospheric or 'weather-related' (hydro-meteorological) origin, such as, hurricanes, floods, droughts; (b) geological origin, such as, earthquake, volcanic eruption, landslides, tsunamis; or (c) environmental origin, such as, wild (forest) fires and invasive species. In many situations, the probability of one or more natural hazards can be predicted, albeit with different advance warning depending on the type of hazard. A full description of the major tropical natural hazards, categorized by origin can be found in 'Natural Disaster Management, 1990-2000' (IDNDR, 1999).

A natural hazard is not a disaster. Hurricanes, volcanoes, earthquakes and flooding are natural hazards not natural disasters. These two phrases **are not synonymous** and should not be used interchangeably. Disasters are also described as temporary events triggered by natural hazards or man-made actions that cause serious disruptions in the functioning of a community or a society due to its incapacity to respond and/or cope using only local resources. The result is widespread human, material, economic and/or environmental loss – the disaster.

In the context of a natural hazard, UNESCO defined disasters as '*the consequences or effects of natural hazards….'*, representing '*…. a serious breakdown in sustainability and disruption of economic and social progress'*. UNESCO emphasized that natural hazards '*..must not automatically cause disaster'*, observing that they may not be "*entirely 'natural', for people are agents of disaster*". This is based on the fact that some human practices and activities may increase the level of exposure to risks and/or may trigger disasters. For example, severe deforestation and unregulated over-construction on hillsides may cause more serious flooding; concentration of populations on flat coastal areas may worsen the effects of flooding and sea

surges; extensive settlements in hazard-prone zones and/or poor building codes and construction may place a significant number of the population in harm's way. Unfortunately, it is usually the poor segments of a society that settle in hazard prone areas and most vulnerable to natural hazards. The effects of natural hazards to man can be reduced through better understanding of exactly what a natural hazard is, the different triggers and vulnerability factors. This is essential in defining and applying preventive and preparedness measures, including land use and building codes, poverty-reduction and management and mitigation measures.

The History of Natural Hazards in the Caribbean

Natural hazards have been a reality for Caribbean populations for a long time, but their frequency and intensity have increased in recent years. Hurricanes, floods and droughts and to a lesser extent earthquakes and volcanoes, have resulted in deaths, homelessness, destruction of property and disruption of food supplies, communication and other essential services. The year 2004 in particular, was unprecedented in terms of extreme effects of natural hazards in the region, and indeed throughout the world. The change in frequency and intensity of natural hazard events has been strongly linked to the impacts of climate change. The scientific community predicts higher and increased probabilities of more frequent and severe hurricanes and floods. Given this, the impact and cost of disasters as a result of hurricanes occurring near or over countries are expected to increase.

Disasters from frequent incidences of natural hazards in the Caribbean have significantly impacted the history and development of the economies, particularly agriculture. Un-mitigated risks of natural hazards rank prominently as a major deterrent to investment in agriculture, particularly in primary production (farming, livestock, fishing etc). There is the general perception that such risks and uncertainties in other economic sectors are more easily managed and mitigated. This is evidenced by the existence of a range of risk mitigation instruments for the industrial and services sectors. Agriculture is an important economic activity and livelihood in most, if not all Caribbean countries. Its continued inability to cope with a range of natural hazards makes agricultural industries extremely vulnerable. During the past two decades, the more common natural hazards to which agriculture in the Caribbean was most vulnerable were floods, hurricanes, drought, landslides, invasive species and to a limited extent, volcanic eruption. These have affected agriculture in different ways, with varying disastrous consequences.

- *Floods,* whether flash, minor or major flooding, are classified by IDNDR (1999)

as a weather-related hazard. They are becoming more prevalent and harmful over time and are listed as among the world's most frequent and damaging forms of disaster. Flooding is often the product of interaction between environmental and social pressures in which the principal motivation for the interaction is the desire to exploit natural resources. Flood hazards may be difficult to minimize in the absence of enforced policies and laws that deal with zoned land use, denudation of hillsides and the de-silting of watercourses. This reinforces UNESCO's assertion that *'people are agents of disaster*".

In the Caribbean, CDERA (2001) reported floods as the most common natural event during 1997-2001, occurring in 90% of member countries. The fact that only 25% of these member countries had any plans in place for preventive measures or to guide disaster management activities for flood hazard largely explains this outcome. Floods have become almost endemic in several Caribbean countries. In Trinidad and Tobago, severe flooding has become almost an annual event since 1989. Jamaica suffered from eight instances of severe flooding since 1990 and in early 2005 and 2006, Guyana suffered extreme losses from widespread severe flooding which cost billions of dollars in losses of agricultural products.

- *Hurricanes*, classified by IDNDR (1999) as a weather-related hazard, are defined as large-scale weather systems developing over tropical or sub-tropical waters, and depending on central sustained wind speed, may be classified as depressions, storms or hurricanes.

Hurricanes, or the threat of same, are a feature of the Caribbean landscape for at least 5 months out of every year. Between 1979 and 2005, at least 10 severe hurricanes wrought substantial damage on more than one occasion in Antigua and Barbuda, the Bahamas, Dominica, Dominican Republic, Haiti, Jamaica, St Kitts and Nevis and more recently, Grenada in the far south in 2004/2005. IICA (2004) reports that in the last 16 years, the cost of hurricane-induced disaster, measured in percentage of gross domestic product (GDP), ranged from a low of 2.39% of GDP from Tropical Storm Allen in Jamaica in 1980, to 96.8% of GDP from Hurricane Ivan in Grenada in 2004.

In virtually all these cases, the countries have been unable to cope in the absence of international assistance. The damage to agriculture has been substantial, in some cases totally devastating leading export crop industries (eg., banana, sugar, nutmeg) and destroying infrastructure. The following Table provides an indication of the cost of such damage to agriutlrue, housing and infrastructure from selected hurricanes between 1980 and 2004.

Selected Hurricanes Damage to Agricultural and other Sectors in some Caribbean Territories,			
Hurricane /Year	Country/Sub-sector	Damage description	Estimated value, US$
Allen (1980)	St. Lucia: Housing, agriculture and industrial sector		$74,626,865 (*EC$200,000,000*)
Gilbert (1988)	Jamaica:, Agriculture	Sugar cane 30,000ac 157,000ac crops destroyed	$30.1 million ($J 1.66 billion)
Hugo (1989)	British Virgin Islands: Farmers and backyard gardeners	Crops, livestock, buildings, roads and dams, fisheries, agricultural station.	$4,496,800
Luis (1995)	Anguilla: Agriculture, livestock, fisheries		$2,979,000
	St. Kitts and Nevis: Agriculture	Wind damage to crops, soil erosion, sugar cane crop and infrastructure loss	$35,000,000
Luis and Marilyn (1995)	Dominica: Crops, livestock, bananas, forestry.	90% banana acreage and 50% tree crop production destroyed.	$11,940,298 *(EC$32,000,000)*
Lili (1996)	Bahamas: Agriculture	Extensive damage to 28 acres of bananas, key limes, mangoes, and coconuts in Exuma and severe damage to banana in Long Island.	No value reported
Debbie (2000)	St. Lucia: Agriculture	Flood, wind and erosion damage to banana and coconut crops	Short and medium term losses to banana industry estimated at $746,268 (*EC$ 2,000,000*) per week
Ivan (2004)	Grenada: Agriculture		$36,194,029
Source: FAO Regional Workshop on Disaster Preparedness and Impact Mitigation in the Agriculture, Forestry and Fisheries Sectors - Technical Report			

- *Drought* is classified by IDNDR (1999) as a weather-related hazard. Drought is defined as the insufficiency of rain for an extended period that causes water shortages, stream-flow reduction and depletion of groundwater and soil moisture. IDNDR noted that agricultural drought in particular, does not

depend only on the amount of rainfall, but also on the correct use of that water.

Agriculture in the Caribbean is still largely rain-fed, rendering it highly vulnerable to disasters from natural hazards and the inefficient use and management of water resources. At the extremes are Antigua and Barbuda and some parts of Guyana which are both vulnerable to drought on an annual basis. The impacts of drought on agricultural production are usually documented in general terms, with information on specific losses ascribed solely to drought less common. This could be explained by the fact that losses from drought occur over an extended period of time with the impact less pronounced, than the damage caused by a hurricane.

- *Landslides* classified by IDNDR (1999) as a Geologic Hazard, are downslope movements of soil, rock or mud, triggered by prolonged or heavy rainfall and earthquakes, among others.

The climate and geology (steep slopes resulting from tectonic and volcanic forces), make Caribbean countries vulnerable to landslides. Only on islands with low relief and limestone bedrock, such as, the Cayman Islands or the Bahamas can landslides be considered irrelevant as a hazard. Damage to structures, especially roads results in major economic loss from landslides. Estimates suggest that the cost of repairing landslide damage to roads throughout the Caribbean averages $15 million per annum. The magnitude of agricultural losses attributable to landslides varies based on the socio-economic status of the location where the landslides occur. Losses in the form of buried cropland and delays that span months to a few years before replanted crops are harvestable lead to substantial loss of livelihoods for many small farmers. Because agriculture is carried out mainly by individual farmers, with per capita incomes ranging from hundreds to a few thousand dollars, losses of this magnitude represent a severe burden to the economies of both individual families and island nations.

- *Invasive species* are defined as non-indigenous species that are capable of establishing a breeding, widely spreading population in the new location without further intervention by humans. Invasive species represent a major factor in the otential extinction of 30% of threatened bird species, and 15% of threatened plant species (United Nations Environment Programme (UNEP)). Overall, approximately two-thirds of species extinctions may involve competition with invasive species.

Traditionally, Caribbean countries have suffered from the debilitating impacts of

'exotic pests and diseases' in agriculture. Such experiences date back to the mid-1980s, with the carambola fruit fly infestation in border regions of Guyana and Suriname. More recent experiences have been the rapid spread of the Pink Hibiscus Mealy Bug, from the initial outbreak in Grenada in 1994, to other Caribbean islands and the arrival of the Giant African Snail from the Martinique and Guadeloupe to St. Lucia, Dominica and Barbados from 2002/03. The lack of national action plans has allowed some invasive species to spread to unprecedented extents, interfering with human livelihoods, causing ecosystem disruption and ultimately impacting on local economies. Often, it is when the event reaches crisis proportions that concerted actions towards policy change and practice are mobilized as a regional response. These experiences and the various responses have done much to enhance understanding of the nature and impacts of invasive species and afford priority to the development of comprehensive national strategies and action plans and technical expertise in emergency and long-term management capacities.

Invasive species are considered to be THE greatest threat to biodiversity in geographically and evolutionarily isolated systems, such as, islands of the Caribbean. Consequently, Caribbean countries have accelerated efforts to modernize their agricultural health and food safety systems and infrastructure in order to comply with their obligations under the World Trade Organization (WTO) Agreement on Sanitary and Phytosanitary (SPS) Measures. The CARICOM Secretariat, the Food and Agriculture Organisation (FAO) and IICA were mandated to develop a new regional response – the Caribbean Agricultural Health and Food Safety Agency (CAHSFA). CAHFSA is intended to be a functioning, self-sustainable, regional Agricultural Health Agency that would embrace animal and plant health activities, systems and infrastructure. CAHFSA could play a lead role in the mechanisms to limit invasive species as they affect terrestrial and aquatic plants and animals.

- *Volcanic eruptions* present a range of different hazards one after the other, or at the same time. These include moderate-sized earthquakes, landslides, fragmented rock and gas 'bombs' (ejected from the crater), pyroclastic flows, ash falls, lava flows and volcanic mudflows or lahars. However, it is not until the rich soils formed on their ejection are occupied by farms and human settlements that they are considered hazardous (IDNDR, 1999).

Although volcanoes are a distinctive agent in the formulation of several Caribbean islands, they have been relatively less significant as a natural hazard within recent times. It is also noteworthy that several of these volcanoes in the Caribbean have been named 'Soufriére'. The St. Vincent and the Grenadines

Soufriére Volcano erupted twice in the last century, in 1902/03 and 1979. The former eruption killed 1,565 people, with extensive damage to agriculture in both events. Kick 'em Jenny, the submarine volcano 8 km north of Grenada has been the most active in the Caribbean in the 20th Century, having erupted 11 times since it was first discovered in 1939. However, the Montserrat Soufriére Hills Volcano has been the most active since 1995.

Volcanic eruptions have continued to ravage Montserrat over the last 10 years, with almost total devastation of ground vegetation in the affected areas. The forest has been severely impacted by acid rain, noxious gasses and the weight and physical impact of heavy ash and projectiles. While the forest will recover over time, most if not all wildlife habitat and biodiversity have been severely impacted. The May 2006 ash fall and associated acid rains disrupted the delicate recovery in agriculture, destroying arable farming, livestock (largely sheep and goats), fruit tress and some ornamentals island wide. A rapid assessment suggested that at least 20 major arable crop farmers and over 50 small and back yard farmers were affected. With an approximate 52% of farmers wholly dependent on farming for livelihoods, the loss of current incomes and delayed recovery add to existing socio-economic pressures. It is expected that when these eruptions subside and finally cease, the nutrients added to the soil will greatly enhance the agricultural potential.

- *Earthquakes* present less of a major hazard in the recent history of the Caribbean. The largest recorded earthquakes have been in Jamaica in 1692 (Port Royal), 1907 (Kingston), 1958 (Montego Bay and Kingston), and 1993 (Kingston), and the Eastern Caribbean in 1843 on all the islands between St. Kitts and Dominica. In that event, 5000 deaths were recorded in Guadeloupe, 30 in Antigua, 6 in Montserrat and 1 in Dominica. CDERA indicated that these historic incidents are instructive in terms of the geological vulnerability of the region. More recent earthquake events have occurred in the Southern Caribbean in 1997, with the effects being felt particularly in Trinidad and Tobago, and in the last four years in Antigua and Barbuda and Dominica.

- *Climate change* is an emerging hazard that is receiving serious attention in the Caribbean. In this area, an important initiative is the Mainstreaming Adaptation to Global Climate Change (MAGCC) Project. The MAGCC will build on the achievements of the Caribbean Programme for Adaptation to Global Climate Change (CPACC) which ended in 2003. MAGCC seeks to mainstream adaptation to climate change in national development planning and private investment decisions. The project will achieve same by working with key sectors (water supply, agriculture and land use planning) to facilitate

the incorporation of climate change monitoring, impact and risk assessment into their ongoing programmes and long-term planning. MAGCC also includes the provision of technical support to build the capacity of participating countries to respond to climate change through five project components, namely:

- Build Capacity to Assess Vulnerability and Risks Associated with Climate Change;
- Build Capacity to Reduce Vulnerability to Climate Change;
- Build capacity to Effectively Assess & Utilize Resources to Reduce Vulnerability to Climate Change;
- Public Education and Outreach; and
- Project Management.

The MACC project offers critical inputs to the regional disaster management environment through its promotion the adoption of the Comprehensive Hazard Assessment and Risk Management (CHARM) approach for national planning. The CHARM strategy begins with the establishment of the context followed by the identification, analysis, evaluation and treatment of the risks (SOPAC, 2002). The success of this strategy is dependent upon participation of and acceptance by all stakeholders, including government planning departments, national disaster management offices, non-governmental organizations, community groups, private sector, donors, and regional partners.

The history of these events and likelihood of future severe events, including those associated with climate change, have opened the window of opportunity to foster greater attention to hazard risk reduction, disaster management and specifically, mitigation measures. CDERA (2001) concluded that, altogether these natural events have diverted considerable sums of government budgets from capital investment and recurrent expenditure into reconstruction. Losses in earnings from visible (agriculture) and invisible (tourism) exports have exacerbated the economic hardships experienced. Some countries, notably, Antigua and Barbuda and Montserrat, St. Kitts and Nevis and Montserrat, have experienced multiple losses in close succession. Each disaster leaves in its wake an overwhelming volume of evidence suggesting that planning and investment can mitigate vulnerability and consequent risk from subsequent events. Mitigation and adaptation strategies must form part of a multi-purpose investment in the future of an economy and society.

Disaster management refers to policies, strategies and activities in preparation for and response to the effects of natural or man-made hazards. Disaster risk reduction is guided by consideration of human vulnerability to natural hazards,

the impact of the development process on human vulnerability and the desire to reduce risk and vulnerability. Taken together, these principles imply that disaster reduction should be an integral component of development process. In the development of disaster management, particularly in the development of early warning systems for crops, diseases and climate, rapid advances in Information Technology (IT) has played a key role. The FAO promotes three such IT-based systems:

- The Global Information and Early Warning System (GIEWS) that monitors food production, stocks, trade and export prices.
- The Emergency Prevention System (EMPRES) for Trans-boundary Animal and Plant Pests and Diseases linked to GIEWS, issues alerts of imminent livestock epidemics.
- The Desert Locust Information Service, an arm of the EMPRES network, offers information about threats of upsurges, using computer technology to track the movement of locusts (CTA, 2005).

Disaster Management and Mitigation in the Caribbean

The experience of the 2004 hurricane season has catalysed efforts to improve disaster preparedness within the region and so reduce the vulnerability of the countries. As most Caribbean countries are small low-lying island systems, they are inherently vulnerable to the effects of natural hazards, particularly hurricane winds and flooding. Indeed, even with the limited severe seismic activity, there is very little evidence of contingency planning for potential impacts of a major land or submarine eruption.

The region's geological vulnerability has been exacerbated by demography and a pattern (quality and pace) of development. Inadequate development planning and execution have resulted in severe flooding, as indicated previously. Poor infrastructure has increased the risks of loss of life and assets. Insufficient education and information flows have minimized the perception of risk and resulted in failure to effect the necessary action at individual, community and/or national levels. Public policy and the levels of investment in mitigation have not been adequate and have impacted negatively on short and long term growth after the disaster. In addition where the economies have not diversified and the distribution system and marketing structures are not well defined, probabilities for serious disruption to economic growth have increased. (IICA 2004)

At the national levels, there have been some improvements in risk management. Many Caribbean countries, especially those within the hurricane belt have invested heavily in strengthening their national emergency organizations. The Organization of Eastern Caribbean States (OECS) member countries are

participating in the World Bank's Emergency Recovery and Disaster Management Loan and Credit Facility, which support investments in capacity building, institutional strengthening, community preparedness, physical investment and contingency funding. Improved national policies for land use planning and building codes have also improved the framework and environment for disaster management. Projects to improve monitoring and forecasting (flood plain mapping, GIS) and public awareness and education by the National Development Organizations or similar national entities where they exist, give effect to these policies.

Similar emphasis is being placed on developing national capacities for disaster management in agriculture in particular. These include compensation for losses, insurance systems for hurricane-induced losses, proactive surveillance of pest and disease incidence and a collaborative early warning systems and Emergency AHFS Preparedness Plans. Much of natural disaster mitigation efforts are undertaken at the farm-level with many of the practical mitigation measures are embodied in Good Agricultural Practices (GAP) and are therefore not viewed as an add-on procedure (Protz, 1999). In some countries, various forms of insurance are also associated with agricultural disaster mitigation and risk reduction (Esters, 1997; Glauber, 2004). However, it is noted that the regional agricultural insurance market is virtually non-existent.

The lessons learnt from the disasters of 2004 afford recognition of the need for cooperation and collaboration among international agencies. The main areas for concerted efforts and strengthening in disaster management cycle include an urgent need, to *inter alia*:

- heighten awareness and understanding among Caribbean nationals of the dangers and potential impact of natural hazards;
- improve national coordination for pre and post disasters to facilitate more effective and timely delivery of the necessary support;
- establish and maintain a high level of transparency in the conduct of relief and other operations during and post disasters;
- define clear communication plans for disaster management that specific lines of responsibility, including the extremely important management of public information. While there are plans in many countries, the communication responsibility and strategy is not well known or tested;
- implement public information campaigns for dealing with disasters and emergencies throughout the year, not just after the disaster;
- dedicate a national frequency for emergency broadcast information and service (IICA, 2004).

For the Caribbean, regional collaboration is the most appropriate and cost effective way to implement and monitor disaster management programmes. In this regard, the establishment of CDERA in 1991 has impacted positively on the policy and institutional environment for disaster management in the Caribbean. CDERA's main function is to make an immediate and coordinated response to any disastrous event affecting any participating state, once the state requests such assistance. Besides its primary function of disaster response, CDERA carries activities in all aspects of the disaster management cycle: defined as prevention-mitigation-preparedness-response-recovery-rebuilding. The partners of CDERA are the regional response organizations, the national disaster organizations, the donor agencies, specialized technical agencies, Non Governmental Organizations, other private sector groups and other response agencies.

CDERA has had some successes in guiding an agenda that promotes international cooperation, information exchange and technical assistance aimed at improving disaster management. In recognition of the need to develop and implement structured and comprehensive programmes, which lead to a reduction of hazard risk and disaster losses, CDERA and CDB developed a Model Hazard Mitigation Policy for the Caribbean in March 2003. It addresses natural and technological hazards and is designed to be used as a guide, together with sector vulnerability assessments and reduction measures, by CDERA participating states and Caribbean Development Bank (CDB) borrowing member countries to develop national hazard mitigation policies (CDERA, 2003). Among the data available are hazard maps to enable agricultural entrepreneurs to assess flood risks in order to inform crop selection and planting decisions.

Within the region the Caribbean Agricultural Meteorology network (CarAgMet) with current membership from Barbados, Grenada, St Lucia and Trinidad and Tobago, *inter alia*, provides information and advice to the agricultural community on meteorological issues affecting agricultural production (CarAgMet, 2006). In all instances, the effectiveness of these systems is influenced by the speed of response of agricultural entrepreneurs themselves, governments and donor agencies.

The CDB has approved capital loans, equity participation and technical assistance grants for Regional projects in areas at risk from climate change and climate variability particularly agriculture, forestry, fishing, tourism, water, health and housing. The CDB has also established a Risk Management Programme in its borrowing member countries and a Disaster Mitigation Facility for the Caribbean (DMFC). The DMFC is supported by funding from the USAID.

The DMFC will strengthen regional capacity for disaster mitigation as a means of vulnerability reduction and will provide technical assistance in support of the implementation of functional disaster mitigation policies and practices.

The involvement of key international agencies in disaster management in the Caribbean is summarized as follows.

- ACS (Association of Caribbean States), executing a project on a Weather Service Production System in the Caribbean Area to Strengthen and improve the role of the National Meteorological Services (NMS) in the Caribbean region providing them new tools specially value-added tailor made products and services for the local public and private sectors. It is expected that with the operation of identical/similar systems in various NMS, the co-operation between NMS supporting each can be stimulated creating new weather products and services for the Caribbean region. The Pilot, already under way in Jamaica and Trinidad and Tobago is being financed by the Government of Finland;
- ECLAC (Economic Commission for Latin America and the Caribbean) provides post-disaster assistance when requested. Assessment methodologies have been developed and have been used to assess the costs of disasters in the Caribbean;
- IDB (Inter American Development Bank) has several lending programmes addressing aspects of coastal vulnerability in Jamaica, the Bahamas, Barbados, Belize and Guyana;
- IICA (Inter-American Institute for Cooperation on Agriculture) has also developed capacity for damage assessment in the aftermath of Hurricanes, such as in Bahamas in 1999 (Hurricane Floyd) and Grenada in 2004 (Hurricane Ivan);
- USAID (United States Agency for International Development)-sponsored Caribbean Disaster Mitigation Project (CDMP) has played a catalytic role in promoting community preparedness, hazard assessments and risk mapping, hazard-resistant building practices, vulnerability audits of lifeline infrastructure; linking property insurance to the quality of construction and comprehensive mitigation planning.

The collective efforts at both the national and regional levels should strengthen the capacity and suite of disaster mitigation measures available to Caribbean countries. However, the expectations from these disaster mitigation initiatives would not be achieved if Caribbean countries continue to under utilise the available disaster loss reduction tools. This was the conclusion of a recent CDERA study (February 2005) conducted in 20 English, French- and Spanish-

speaking Caribbean states. The study revealed that a number of hazard maps were available across the region but few countries were maximizing the use of them. In fact, only in Martinique and Puerto Rico was the use of vulnerability assessments in the planning process legally enforced. Vulnerability assessments and hazard mapping are important as the starting point of any activity for disaster loss reduction. However, the absence of a clearly stated recognition of gender-specific pre and post disaster impacts and capabilities was a glaring omission. This is part of a more systemic lack of appreciation of the gender specific dimension of hazard mitigation.

Notwithstanding national and regional efforts and donor interventions, the Caribbean continues to suffer heavy losses from natural hazards. Primary causes can be found in the rapid development of the tourism sector in highly vulnerable coastal areas, a lack of capacity for sound physical planning and development control and the absence of appropriate building standards. But perhaps the most profound cause is linked to the absence of effective mechanisms for mainstreaming disaster management in development planning. Agricultural development remains the bedrock of economic and social development of the countries of the region. Therefore, despite substantial allocations from agencies to recovery and reconstruction efforts in affected countries, the fragmentation in approach and the lack of adequate attention to sustainable agricultural development has reduced the impact of the efforts.

Natural Hazard and Disaster Management in Agriculture - A Perspective

Traditionally, within Latin America and the Caribbean, integrated development planning and hazard mitigation are usually treated as separate parallel processes. The CDERA/CDB model hazard mitigation policy recognises that effective formulation and implementation of hazard mitigation activities benefits from coordination and collaboration among agencies. Advantages of such coordination include a greater possibility that vulnerability reduction measures will be implemented if they are part of a development package, efficient generation and use of data from joint activities and a lower cost of vulnerability reduction. It also leads to more robust activities due to improved information exchange, inputs into the science and engineering research agenda and the building of resiliency in the most vulnerable segment of the population.

Institutional weakness remains one of the central constraints to disaster management in the Caribbean. Indeed, this has been identified as a key binding constraint to sustainable agricultural development in the Caribbean. This is exacerbated by the limited knowledge and facts on the vulnerability of populations and their assets. Hazard assessment data have not been sufficiently

integrated and transformed into policies and strategies for managing the adverse consequences of natural hazards, in particular high winds and flooding.

While regional organizations and governments through the national entities take actions to strengthen their response capacities, these efforts tend to prepare for and respond to the onset of hazards, rather than to take actions that in the short and longer term that will lead to stabilization, recovery and hazard risk reduction. Risk transfers such as insurance, financial market, privatization of public services and calamity funds are either, undeveloped, unavailable or very discreet. Furthermore, where they do exist, the primary beneficiaries are physical structures and stocks. This tends to exclude agriculture, which is a key sector in the social and economic recovery of most of the countries when a natural disaster occurs. (IICA 2004)

There is a clear and present need for a comprehensive disaster mitigation mechanism within the region, generally, and for agriculture in particular. The escalating economic, environmental and social costs dictate that a concerted, systemic and systematic approach is adopted. In this regard, the food safety concept of the Hazard Analysis and Critical Control Point (HACCP) system seems applicable in conceptualizing a Hazard Analysis and Critical **M**itigation Point (HAC**M**P) system for disaster mitigation. This approach provides a framework to fully integrate the CHARM and HACCP principles into one system, and to further institutionalize the critical point concept within the agricultural sector. It also provides a structured mechanism to inculcate gender-sensitive procedural elements into the hazard analysis, vulnerability assessment and mitigation measures. The well-documented roles of women in the agricultural and rural sectors will be recognized in the determination of critical points.

The seven principles of HACMP are (1) the analysis of the hazard, (2) the identification of critical points, (3) the design and establishment of critical limits for each mitigation point, (4) the design and establishment of monitoring measures for the

A critical point is a step that if controlled, will eliminate a hazard, or reduce it to an acceptable level. The critical point concept has gained currency in relation to food safety with the application of HACCP. It can also be applied to Thermodynamic phase transitions. It is the timely adjustment of phased activities in agriculture by utilizing the appropriate mitigating measure that gives the critical mitigating point its utility. It can be a powerful tool when coupled with proper analysis involving the identification of the hazards that could occur at each phase in the process and the description and implementation of measures to be taken for their control. Beyond that critical point, the same measures will be ineffective, incurring costs that will outweigh the benefits.

respective critical points, (5) establishment of corrective actions, (6) establishment of verification measures and (7) effective record keeping. The design of the programmes should incorporate the seven HACMP principles and every effort should be made to involve the stakeholders in all phases of the activities.

The HACMP framework should be perceived as a policy framework to guide responses and interventions intended to mitigate the impact of natural hazards. HACMP provides a basis for a natural hazard mitigation policy for the agricultural sector with advantages that include focused attention as required and the opportunity to be proactive and tailored to specific stakeholders. It promotes and utilises a systems approach based on sound science and provides a structured mechanism for multi-agency participation, increased efficiency, effectiveness of oversight and linkages with regional disaster mitigating agencies. If properly implemented and managed, HACMP can also lead to a substantial reduction in the cost of post-hazard resumption.

However, for its effective implementation, HACMP will require a 'driver', perhaps a legislative or institutional or agency framework together with political support. There will be need for the adoption of cost containment measures together with effective communication with and participation of stakeholders. In addition, the benefits of HACMP will have to be contrasted with a perception of it being too rigorous. Further, its adoption would require political and policy support from the various levels of the public sector. This could be complemented with supporting programmes of agencies working in the agricultural sector.

One of the most important aspects of a successful hazard mitigation strategy is the participation of the public during the planning process. Such participation must fully and integrally include women in all steps of the HACMP process, taking specific actions that will ensure their full participation in post-disaster mitigation and recovery. Indeed, case studies in developing countries highlight a serious deficiency in the policy response to disaster reduction and sustainable development - that is failure to reflect principles of participation and sustainability in post-disaster efforts (Ayse Yonder *et al,* 2005). This is evident in emergency and short-term disaster response programming that often favours technical responses that emphasise the involvement of outside professionals over the priorities, skills and knowledge of the affected persons. Many standardised programmes ignore the complexity of communities' needs in rebuilding their lives and livelihoods. Even when the importance of local communities' participation is recognised, there is often no clear agreement about what the participation should entail leading to confusion at best and wasted resources at worst.

Yonder *et al* (2005) observed that in addition, relief and recovery efforts fail to adequately consider gender-specific impacts of disasters. Disasters increase women's household and care giving work dramatically yet post disaster efforts often ignore these inequalities. Misconceptions are widespread about the contribution grassroots women can make to post disaster efforts. Women's efforts, once supported, are no less technologically appropriate than those of with males. Reducing the economic vulnerability of women and their families should be seen as a key mitigation measure that reduces potential losses from future disasters.

Yonder *et al* (2005) concluded that lessons learnt from the experiences in other countries suggest that aid agencies must broaden accountability measures to reward efforts that demonstrably reduce social vulnerabilities and foster participatory local development throughout the post disaster relief and recovery stage. The responses should include monitoring mechanisms to ensure that women, being among the most vulnerable and marginalised groups, can access resources, participate publicly in planning and decision making, organise themselves and build capacity to sustain their involvement throughout the recovery exercise. There must be formal, linked mechanisms to ensure women's participation in the overall mitigation process.

Conclusion:

Within the past two decades the Caribbean region has experienced repeated losses from hurricanes and associated wind, rain, storm surge damage, drought, volcanic eruption flooding and landslides. However, approaches to natural disaster management in the Caribbean continue to focus on either avoidance, not taking any action, minimizing the impacts, recovery/rehabilitation, long-term mitigation through good practices and/or compensation for damages and losses. Such losses, including those in agriculture, have exacerbated the economic and social hardships and seriously disrupted the economic growth and development process.

The Caribbean cannot continue to rely on costly reconstruction and post-disaster external assistance. Disaster management and mitigation adaptation strategies must be viewed as a multi-purpose investment in the economic, industry and society's future. The UN/ISDR Climate and Disaster Risk Reduction Inter-Agency Task Force on Disaster Reduction 8th meeting Geneva (5-6/11/20030) concluded that reducing agriculture's vulnerability to natural hazards is critical to its sustained development and that disaster reduction is also equally important for poverty reduction.

Under the Jagdeo Initiative *'Deficient and Uncoordinated Risk Management Measures'* is identified as one of the ten Key Binding Constraints for urgent regional action. Despite renewed preventative efforts, through, mainly strengthened Offices of Disaster Preparedness and Management, there is still no specific reference to the agriculture, forestry and fisheries sectors within National Disaster Management Plans. Strengthening the policy and institutional framework and technical capacity for hazard reduction and disaster management will require an urgent consolidation and strengthening of disaster management policies, strategies, resources and capacities in agriculture.

In comparing the agricultural, community's response to food safety hazards through the introduction of the Hazard Analysis and Critical **C**ontrol Point (HAC**C**P), it is suggested that agriculture adopt similar principles to guide the response to environmental hazards as they relate to natural events. A counterpart system, namely the Hazard Analysis and Critical **M**itigation Point (HAC**M**P) system has been offered as a possible starting point. This system promotes the need for institutionalising the critical point concept within agriculture and offers a structured mechanism to include gender-sensitive procedural elements into all aspects of the system, from hazard identification to mitigation and relief efforts. The perspective outlined above therefore is offered as a basis for developing a structured, auditable system to consolidate the disparate efforts of several regional and national agencies with interest in the natural hazard reduction and disaster management.

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PERSPECTIVES ON:

Multi-Commodity Agricultural Insurance for Risk Reduction

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A Multi-Commodity Agricultural Insurance for Risk Reduction

agriculture is ranked among the three most hazardous occupations

Understanding the Risks in Agriculture

The agric-entrepreneur, particularly the farmer, experiences many stress and risk factors unique to the agricultural livelihood, that influence the decision making process. This makes agriculture a complex business.

Akcaoz and Ozkan (2005) categorised risk in agriculture into three areas, production, marketing and finance. These areas encompass uncertainty pertaining to such as rainfall (in rain fed cultivation situations), price changes, timely availability of labour, availability and functioning of machinery and changes in government policy. The USDA expands the classification into five areas; namely price, production, income, financial and institutional. Price risk is associated with price fluctuations in the global market while production risk pertains to planting, harvesting and yields. Income risks relate to changes in production or prices or swings in various input costs and financial risks are associated with such as farm cash flows, cost of debt and cost of capital. Institutional risk is linked with government policy (USDA, 2006). Akcaoz and Ozkan (2005) reported on a study of South African commercial farmers that identified some risk sources as crop gross income, government policy, livestock gross income, credit access, and government regulations.

For ease of reference, these varying classifications can be grouped as follows:

- *Price and market risk* - associated with price fluctuations in the global market and those arising from trade and travel, e.g. invasive species;
- *Production risk* – related to planting, harvesting and yields (the latter especially in relation to natural disasters, e.g., hurricanes and floods);
- *Income risks* - related to changes in production or prices or swings in various input costs;
- *Financial risks* - associated with cash flows, cost of debt and cost of capital;
- *Institutional risk* - linked to government policy and the regulatory environment;
- *Personal risk* – linked to the improper use of machinery and chemicals, lack of awareness about safe practices and unavailability or inappropriateness of protective equipment. This ranks agriculture alongside mining and construction as the three most hazardous occupations in both developing and developed countries.

Experience suggests that an optimal approach to mitigating risk in agriculture may encompass a strong element of entrepreneurial perspective. It will be prudent for any consideration of risk reduction options to be made within the context of the prevailing macroeconomic, entrepreneurial, agro-ecological, sectoral and market environment. Like the typical financial investor pursuing a diversified portfolio in order to reduce risk, the typical agri-entrepreneur, worldwide, also engages in risk reduction activities through practices, such as, intercropping, irrigation in preference to rain-fed production and crop selectivity. This is supported by the research of Lukanu *et al* (2004) who investigated the cash crop cultivation decisions of farmers in Mozambique. Lukanu *et al* (2004) concluded that the production decisions of those farmers were influenced by factors such as the ability to intercrop with existing food crops, the availability of drought-, pest- and disease-resistant varieties, technical and financial support systems and the availability of a market. Reflection upon these findings and the entrepreneurial decision-making framework (see introductory section) suggest that consideration of risk reduction options should benefit from inputs from the entrepreneurs themselves. Reducing risk in agriculture can be partly achieved by stabilizing the respective variables that influence entrepreneurs' decisions, and/or by establishing mechanisms that cushion the negative impact of unexpected occurrences. One such mechanism is that of insurance.

Mitigating Risk through Insurance

In general, insurance is a way for reducing or managing risks when faced with uncertainty of outcome. The concept relies on the pooling of the risks separately faced by a large number of individuals, who contribute through premiums to a common fund that is used to cover the losses incurred by any individual in the pool. The viability of the insurance scheme is based in part on the level of the premiums and the expectation of a spread in the probability of the losses that each participant may face.

Requirements of a viable insurance scheme include:

- Symmetric information shared between the insurer and the insured on the distribution of probable losses so that the risk can be properly classified. The information needs for agriculture pertain to weather patterns, yields, market trends, farm conditions, farm management capacity, risk attitudes, and capacity to pay for the insurance.
- A large number of similar exposed units since for the actuarial models used to determine coverage, indemnity and premium levels to be accurate, the size of the pool or portfolio should be large and face similar risks.

- The risk should be nearly or perfectly independent across insured individuals and spatially uncorrelated. The degree of correlation in financial losses caused by the risk insured is critical and as such the greater the spatial correlation, the less efficient insurance becomes as a risk transfer mechanism. Where losses are catastrophic, the risk-pooling does not present an advantage for insurance since the contributions of the unaffected are insufficient to cover the damages of the affected.
- An insurance company should be able to calculate both average frequency of the random event to be insured and the average severity of loss. For low-probability risks with potentially catastrophic results, it is usually difficult to fix a rate.
- Actual losses must be determinable and measurable with evidence of a clear and causal linkage between the actual loss and the random event insured.
- Potential losses must be significant and an insurable interest must prevail otherwise there will be no incentive to purchase insurance. In addition, insurance cannot be provided to policyholders who have a vested interest in a loss occurring.
- There must be limited policyholder control over the insured event with the buyer unable to control whether an insured event will occur, otherwise "moral hazards or suspect claims" are likely to prevail.
- Premiums should be economically affordable and attractive to potential buyers; a condition achieved when the premium cost is substantially less than the potential benefit offered by the policy should the insured event occur.

support for insurance development in agriculture is growing . . .

Agricultural Insurance

Agriculture is an inherently a risky business and entrepreneurs, particularly farmers, face a multitude of risks, high among them being production or yield risk. Production risk cannot be eliminated but could be reduced, mitigated and managed using various technologies. Among the financial mechanisms that have been employed to deal with production risks is that of insurance. Other risks affect viability of enterprises but these risks are typically managed through other instruments.

Agricultural insurance is remerging as a topic of interest to farmers, governments and policy makers, insurance companies and developmental finance institutions. The major types of insurance products available in agriculture globally are for yield, catastrophes, price, revenue and income. In addition, index insurance and one for mutual funds are also available.

- *Yield Insurance:* yields are normally insured for known perils that allow the calculation of the probability of bad outcomes occurring, based on historical data. Insurance can be based on individual yields with indemnities being paid if the farm's yield falls below a predetermined individual trigger yield. Alternatively, when based on area yields, the farmer receives payment if the yield falls below the area trigger yield. Area based yield insurance reduces the problems of adverse selection[1] and moral hazard[2]. The availability of yield insurance can lead to a shift in resources to those products for which yield insurance is available.
- *Catastrophic Insurance:* losses incurred because of natural events or epidemic diseases are covered. The systemic nature of this coverage, simultaneously catering to heavy losses from many persons, makes it difficult for companies and unaffordable for farmers because of the high premiums charged. Catastrophic insurance also suffers from the availability of inadequate relevant historical data to calculate a sound premium and crowding out by governments' ad-hoc disaster payments that stifle the development of insurance products.
- *Price Insurance* is feasible for those commodities for which objective price data are available. Loss assessment is usually based on a price that cannot be influenced by the farmer such as 'futures price' and 'spot market price'.
- *Revenue Insurance* is a combination of price and yield insurance that has the potential advantage of being cheaper than either since the probability of a bad outcome is smaller. Revenue insurance can be established on a commodity basis or for a portfolio of commodities. The latter can be cheaper for the farmer, because low revenue from one enterprise is likely to be partly offset by higher revenues from another, if the revenues are not positively correlated. In order to offer revenue insurance, an insurance company must be able to determine the joint probability distribution of price and yield risks and find solutions to overcome moral hazard and adverse selection problems.
- *Income Insurance* is potentially more attractive to farmers than other forms of insurance, because it deals with losses affecting farmers' welfare more directly. However, moral hazards and adverse selection issues make it difficult for an insurance company to calculate the probability distribution of a bad outcome and to fix a sound premium.

[1] Adverse selection occurs if those more at risk buy more risks than others.
[2] This refers to an individual's change in behaviour, to increase likelihood of benefiting, after having taken out an insurance policy

- *Index Insurance* allows for a weather or climatic measurement to be used as the trigger for indemnity payments. In this case a coupon that specifies a monetary sum becomes payable on proof that the reference weather event, of defined severity, has occurred. The value of the coupon may be standard or varied in proportion to the severity of the event. Such a product is suitable where weather perils may affect a wide area such as with drought or hurricane.
- *Mutual Funds* are a special case of insurance where the participants, having previously contributed, own the funds to be used to reimburse a loss. A member's loss is fully or partially compensated from money already in the fund. A mutual funds scheme offers the advantage that farmers, knowing each other, will be able to exercise social control, reducing problems of moral hazard or adverse selection.

Agricultural insurance is an especially difficult product to deliver because, despite the possibilities of reinsurance, it is hard to calculate farm premiums in order to develop sufficient reserves for low probability but high loss events. (Asian Development Bank, 2003). In addition natural risk in agriculture is a different but not an intractable problem when approached on a limited-peril basis by an insurer structured along quite different lines to the typical government program (Roberts and Dick, 1991). This suggests that it is possible to contain costs, both for underwriting and for administration, and still provide a useful risk-transfer mechanism that farmers will voluntarily purchase.

Roberts and Dick (1991) observed that there was a growing volume of business based upon more flexible limited-peril insurance arrangements between agricultural industries wishing to transfer some of the major production risks and insurers willing to accept the risk for an adequate premium and safeguard. However, it is conceptualised that market niche for insurance is more in the commercial agricultural sector, where substantial investments have been made.

Specific-risk commercial agricultural insurance is currently developing slowly in the commercial sectors of many developing countries and in many cases in the absence of public sector participation. This phenomenon is mainly as a consequence of the increasing scale and commercialization agricultural in developed and developing countries. It reflects insurers having followed old clients or producers, risking large sums of capital on uncertainties of weather, requesting the insurance industry to develop risk-transfer mechanisms tailored to their specific needs (Roberts and Dick, 1991). With this trend, agriculture

seems gradually becoming on par with other industries with the felt need for risk-transfer mechanisms that will at least provide protection against certain natural catastrophic risks, and help ease the fluctuations in the usual unstable cash flows of agricultural enterprises. The high premiums paid make such business attractive to insurers with the added incentive that many perils are controllable by management, leaving a limited number to be covered by insurance.

Support for insurance development in agriculture is growing with the new thinking of re-insurers who are more willing to participate in agricultural risk. The scale of the enterprise, together with advances in technology and its capacity to mimimise the risks previously thought to be uninsurable (pests, diseases and drought) has made agricultural industries viable commercial reinsurance risks. Also important is that these risks are not tied to government schemes, typically characterised by inadequate premiums, and government interference in indemnity payments.

Crop Insurance

Crop insurance, geared to covering losses from adverse weather and similar events beyond the control of growers, is emerging as a dynamic process and growth business area. The approach of risk management in the application of crop insurance in developing countries has grown over the years, following interest in risk-related schemes, and is still evolving. This is being driven by increasing commercialisation of agriculture, the availability of new types of insurance products, international trade policy developments and the need for the security of loans by banks to farmers. Some of this growth is occurring in the developing world where some 13% of global insurance premiums are paid (Roberts, 2005).

Like any business transaction, crop insurance must allow both parties to benefit. Portfolios of geographically dispersed crop insurance contracts can be as much as twenty times more risky than an equally valued portfolio of health and car insurance contracts. (Asian Development Bank, 2004). With respect to risk management, there are two caveats for successful crop insurance schemes, namely:

1) Buyers must be confident that the premiums and expected benefits offer value while the sellers must see opportunity for a positive actuarial outcome and profit, over time; and
2) Insurance can address only part of the losses resulting from some perils and is not a universal cure for the risks and uncertainties inherent to farming process.

Any limitations to the scope for effective and economic crop insurance, though real at any given moment, can change over time. That is because farming is dynamic and does present different patterns of risk and new ways of coping with effective production, farm management and other risks. As such the potential to develop new types of insurance products always exists.

Typical crop insurance schemes in the past were government subsidized or in some cases combined with mutual funds. These traditional agriculture insurance programs built upon multi-peril products have generally been failures because of high administrative costs, adverse selection and moral hazards problems all leading to inefficiency. Other than the high administrative costs of multi-peril crop insurance, political inability on the part of governments to charge fair premiums and enforce impartial loss adjustments has characterised schemes in developed and developing countries alike (Roberts and Dick, 1991). Indeed, while developed countries are able to afford such schemes, developing countries can ill afford such luxuries with limited national budgets and constraints on using state resources. Multi-peril agricultural insurance was widely discussed during the eighties but its adoption as a risk-mitigating instrument suffered from a dearth of analysis of the product and ways of efficiently implementing it (Roberts and Dick, 1991).

The experience of various developing and developed countries with crop insurance is varied and instructive.

- In *India* the experience suggests that multi-crop insurance and a mix of self-supporting schemes together with subsidy support are more feasible and economical approaches. The insurance products should be built on commercial principles and geared to producers of high quality products (Roberts, 2005).
- In *Brazil*, the government-subsidized crop insurance programme was constrained by major teething problems linked to an insufficient understanding of 'risk'. Recent developments have been better informed and include efforts to introduce crop revenue products, under area-based determination of loss. However, crop insurance is still very small in relation to the size of the agricultural sector.
- *Malaysia* offers crop insurance to both small scale and large enterprises, covering a number of horticultural products. However, the large-scale farmers are more likely to buy insurance. Experiences are varied but a business approach to understanding risk and design of appropriate policies

is evolving, along with possibilities of commercial pooling of insurers to cover important crops, such as rice.

- In *Mauritius* there is a well-established scheme offered by parastatal agencies, providing coverage to sugar farmers against looses to cyclones for over 50 years. More recently, coverage has been extended to fire, excessive rain and yellow spot disease (in conditions of excessive rain). The experience has led to a sound method for rewarding growers whose claims record has been good for the insurer. All growers for each insurance/growing season are positioned on a dynamic 100-point scale with the ranking on the scale determining their level of premium to be paid and the indemnity level to be received in the event of a claim for that period.
- In the *Philippines* current crop insurance emerged from an agricultural guarantee fund operated by the main government-owned agricultural development bank. The scheme is operated by a parastatal entity, provides risk management services to borrowing farmers and their lenders and offers policies to self-financed farmers. Participation in insurance is compulsory for maize and rice farmers in the higher-potential agricultural regions, but government and institutional lenders heavily subsidize the premiums paid (Roberts, 2005).

The United States of America (USA), Canada and Mexico have well developed and long-standing insurance products and services in agriculture.

In the *USA*, the over-riding driver for the insurance appears to be social welfare as opposed to the efficiency objective even though the programme seems intended to improve the social welfare of farmers, as well as deliver insurance products in an actuarially sound manner (Wenner, 2005). Coverage is extensive with policies covering up to 100 commodities in 2004 up from 59 in 1994. Four crops, corn, soybeans, wheat and cotton accounted for 79% of the total premiums collected in 2004. Six different yield and revenue insurance products are offered, with the most popular being the revenue ones (Wenner, 2005). Private insurance companies sell the products while the government provides subsidies to farmers to pay the premiums and also reimburses administrative and operating expenses for private companies, of approximately 22% of total premiums. The government also provides reinsurance to private insurance companies at an estimated subsidy rate equivalent to 14 % of total premiums. Although approximately 70% of the nation's crop acreage is insured, the participation rate is comparatively low. Wenner (2005) concludes that the programs are not actuarially sound and represent more of an income transfer program than a risk management tool.

In *Canada,* a tripartite system evolved from a 1939 disaster assistance program to grain producers. The system consists of three programs:

1) Crop Insurance which providing a yield guarantee based on an historical yield data for the farm;
2) Net Income Stabilization Account offering a matching savings program to help farmers achieve long-term income stability; and
3) Agricultural Income Disaster Assistance, designed to help farmers recover from external shocks that threaten the viability of their enterprise.

The federal government funds 60% of the cost while provincial governments meet the remaining 40%. The program is very participatory involving stakeholders in product design, rate setting and performance feedback.

In *Spain* the existing system is a public-private partnership involving three main players, namely a department of the ministry of agriculture, a pool of sixty private insurance companies and a public enterprise under the ministry of economy. The important features of the program include universal coverage (130 commodities to date), insurance of all agricultural risks, provision of income stabilization while maintaining actuarial soundness and participation rate of 31% and involvement ofmany players, with farmers, extension agents, cooperatives and insurance involved in products design. However, the programme's major weaknesses are in the areas of efficiency and long-term viability, particularly given attempts to insure all risks and all conditions. The administrative costs are severe, given the scope of the programme. However, the high fiscal costs have been justified in a political-economic basis since the cost of such subsidies is far less than sums to be budgeted for *ex-post* disaster relief.

Mexico's history of crop insurance dates back to 1926 and initially evolved to include government involvement in direct retail of all risk crop insurance product with 45-61% subsidy in the premium. This program ended due to high losses, high administrative costs and low premiums. A new and more liberalized state owned scheme which competed against five private companies under the same set of rules and regulations was instituted. Over time this scheme offered multiple risk products for both crop and livestock, diminishing moral hazard issues by insuring 70-90% of total value. Also through modern underwriting techniques, such as, deductibles, loss rations of 64.6% for crops and 78.6% for livestock were established in 1999. In 2000, this scheme was transformed into a second tier institution mainly providing reinsurance and to a lesser extent working to promote and develop the industry by providing technical assistance to mutual funds developing innovative instruments (parametric and catastrophic bond products). It has since proven to be a profitable scheme.

In exploring the potential for multi-crop revenue insurance for Mississippi crop producers, Coble *et.al,* (2001) observed that the introduction of revenue insurance products that insured against both price and yield shortfalls has prompted consideration of a number of other variants on the traditional yield insurance concept. Their study confirmed a substantial reduction in risk and insurance premium rates resulting from combined crop and revenue coverage with the possibility of a multi-crop option.

Wenner (2005) observed that agricultural insurance is re-emerging as a topic of interest to farmers, policy makers, insurance companies and development finance institutions in Latin America and the Caribbean after a long hiatus. In a recent IDB/FIDES survey in 16 Latin American countries, 35.3% of the insurance companies polled stated that development of crop insurance is important and 43.5% believed that the growth potential for this product is high (Tovar, 2005; cited by Wenner, 2005).

Wenner (2005) notes that renewed interest stems from a number factors;

1) A number of economically costly natural disasters in recent years;
2) The need to improve agricultural competitiveness in the region in light of ongoing trade liberalization and integration movements that will expose regional producers to farmers in industrialized countries that avail themselves to a greater extent to an array of modern agricultural risk management instruments, among them crop insurance; and
3) The promise that new information technology and advanced probabilistic risk modelling techniques holds to lower the cost of developing and supervising crop insurance products.

The Caribbean Experience

The history of crop insurance in the Caribbean is severely limited to traditional major export single crop industries. In the Caribbean region, crop insurance is active in the Dominican Republic, Jamaica and the Windward Islands. Surinam, Belize, Guyana, Bahamas, Barbados and Trinidad and Tobago do not have commercial agricultural insurance available (Wenner, 2005) although efforts are in train to establish a scheme in Trinidad and Tobago. Crop insurance is also active in many Latin American Countries.

Crop insurance programmes in the region tend to be specific to crops of special economic significance to each island. Workable schemes in the region are particularly exemplified in the case of WINCROP for bananas in the Windward

Islands, bananas, coffee and coconut in Jamaica and a multi-crop scheme in the Dominican Republic.

The **Windward Islands** since 1988 have insured their main export crop bananas. This is done through a private company WINCROP ownership of which is vested in the industry itself, through Banana Growers' Association in the three participating Islands. WINCROP has underwriting freedom and responsibility and enjoys a good international reputation and has access to reinsurance. WINCROP has been a viable insurance scheme and this can be attributed to the following:

- The scheme operated based on the principles of commercial insurance and in a business like manner.
- Administrative constraints were minimized due to the single marketing channel which facilitated an easy mechanism for premium collection, indemnity calculation and allowed for consideration of compulsory insurance.
- The scheme which is single peril coverage and had a simplified loss-assessment system which allowed a wide-scale loss event to be measured by on-call assessors.
- Proper levels of investment were made during start-up to enable transparency in its management and operations and a system respected and trusted by growers.
- A well-established data-base system facilitates efficient handling of grower registration and of claims events and this minimizes office overhead costs.
- There was also lack of pressure from grower interest to stray from prudent strategies for setting benefit and premium levels, and an ability to resist requests for loans from reserve funds.

Notwithstanding WINCROP has had its share of problems during its long hiatus and included the following:

- There were large numbers growers involved and this necessitated development of measures for cost-effective field operations.
- Large numbers also limited the effective implementation of grower education in the operation of the programme.
- Reliance on a computerized data-base requires careful staff planning between field workers and staff responsible for data entry;
- The coverage of a single crop for a single catastrophic peril provides for a very unstable annual underwriting result, where premiums and claims have to be balanced between years, instead of between crop types and perils within the same year.

A number of mechanisms and strategies have been developed to mitigate against some of these challenges. For example, assistance from other stakeholders such as the Banana Grower Associations in grower registration eased the burden with regard dealing with large numbers across the islands. Also, a simple system of claims evaluation and prior knowledge of previous schemes has helped with respect to grower education. Control of data processing and data-base management and in-house programming were areas targeted for scrutiny and capacity building.

The scheme has benefited from the spread of risks between islands and cooperation among islands and the status of WINCROP as an independent organisation amidst the high political profile in the islands has assisted greatly. The role of reinsurers in the operations of WINCROP was recognized from early and the organisation has maintained a strong and close relationship with its reinsures. However, there are concerns about the future of WINCROP. Its financial reserves have dwindled by more than 68% over the last few years to just over EC$3 million (US$1.11). It incurred an operating loss in 2005 and premium income was lowest on record due to non payment of dues by banana companies. Moreover, it is noted that it is impossible to recover these amounts given the vast number of farmers who have gone out of bananas. It is proposed that deductions be made through one channel (WIBDECO) instead of the banana companies or make premium payment mandatory as in the case of Dominica.

Jamaica has a well developed range of crop insurance programmes all of which are administered by parastatal boards. All of these schemes were established with some encouragement from government. Policies are named perils and in the case of bananas and coconuts, the peril is windstorm while for coffee, a range of natural disasters are covered. Some of these such as the banana windstorm dating back to 1934 being the oldest banana wind storm scheme in the world. A board manages the program and controls and manages a fund called the Banana Insurance Fund. Money for the fund is raised from the following sources: a cess paid by growers; premiums paid by producers to the Board. Money borrowed by the Board; Reinsurance claims; and sale of assets. Premiums payable are based on the number of acres under cultivation. In the case of coconuts, coverage is on a per tree basis and the farmer insures the quantity of trees he so desires. Insurance is via the Coconut Board which reinsures to cover itself. Premiums for coffee are paid on a per box basis. There are plans by government to restructure the Banana Insurance Scheme while insurance for coffee is reported to be no longer compulsory and there are reports of moral hazards;

In the **Dominican Republic**, crop insurance is provided by AGRODOSA the successor organisation to ADACA. AGRODOSA is a mixed public-private company (majority capital is public) which offer multi-peril policies which is yield based and covers damages due to wind, excessive rain, flooding, drought, earthquakes, disease, pests and hail that result to yields inferior to the expected. Indemnity covers up to 70% of investments and the principal crop insured is rice. There is a linkage with the state agricultural development bank, which sells policies but also provides credit which requires a policy in the name of the bank. Premium paid are related to the size of the loan, and to keep premiums affordable and expand the market, government subsidizes the premiums by 50%.

Previously ADACA which was government controlled and focused on insuring subsistence farmers for a range of crops was also tied to bank credit. There were problems such as absence of farmer representation; indication that the board was not operating independently and there were viability concerns since business development was restricted. Some best practices with regard AGRODOSA include;

- Higher private sector board representation;
- Focus on rice producers with a moderate to high level of technology and recognized good practices;

It is recognized that decisions with regard that Scheme more influenced by national agrarian reform (Wenner, 2005), it is noted that farmers are interested in crop insurance and in terms of priority price stabilization was key. Other areas were wind damage from hurricanes and drought.

In the case of **Trinidad and Tobago** where establishment of a crop insurance a scheme is being considered, what is proposed is a Multi Peril Agricultural Insurance Program where the perils and commodities covered will be as wide as possible to achieve the greatest coverage and to spread the risk over the widest range of commodities including machinery and equipment and farm buildings. It is also being proposed that as far as possible that the program should be made compulsory for farmers for the categories of farm enterprises covered by the insurance program, so that the widest possible participation in the program can be achieved, to increase its likelihood of success.

Given the risky nature of Agriculture, producers in the Caribbean face a multitude of risk among them production or yield risk. Other risks may affect viability of agri-enterprises but these risk arte typically managed through other instruments, although such coverage seems to be quite limited in the Caribbean. Production risk cannot be totally eliminated but could be reduced, mitigated and

managed. The mechanisms that have been employed to deal with financial problems coming out of production risk typically involve, risk mitigation, risk transfer and risk retention. Risk transfer is critical to implementation of crop insurance in the Caribbean.

While concerns about the reduction of agricultural risk suggest the need for multi-commodity crop insurance in the Caribbean, the global experience dictates that the mechanism for establishing any scheme must be well investigated. Any system must be based on a demand assessment, knowledge of the key insured parties, clear identification of the key perils, sound decisions on the crops to be covered, appropriate rating of premiums, and the respective roles perceived for governments and the private sector. It is likely that, in order to satisfy the earlier referenced basic requirements, any proposed scheme may have to be regional in scope and coverage.

Given the cited experience of other countries, and the underlying insurance principles, the core issues which must be addressed in attempts to establish agricultural insurance products in the Caribbean seem to be:

1) Designing a product that encourages a high participation rate.
2) Developing a product the delivery of which would be attractive to the private sector and would require minimal or no government financial support.
3) The gathering of reliable data on the potentially insurable crops and events to satisfy the actuarial requirements and other pre-requisites.

These issues point to the necessity for involving all stakeholders in the elaboration of any plans for agricultural insurance schemes in the Caribbean as an agricultural risk reduction measure.

The Importance of Multi-commodity Crop Insurance to Agricultural Repositioning in the Caribbean – Some Perspectives

It is clear that farmers, in paricular, face a number of different risks among them production or yield risks which cannot be fully eliminated but can be reduced and managed. Farmers have in the past depended upon a range of strategies for coping and include risk mitigation, risk retention and risk transfer. The first two being traditional risk managing and coping strategies. It has generally been argued that these traditional risk management and coping strategies are not robust and not cost effective (Wenner, 2005). Some on farm risk management mechanisms such as crop diversification, intercropping, integrated pest management, irrigation and accumulated savings among others are highly recommendable but Wenner (2005) cites various reports that point at other

practices such as plot fragmentation, reducing the amount of purchased inputs, and use of low-yielding but drought resistant varieties represent production efficiency losses. It is postulated that costly risk mitigation techniques can contribute to chronic poverty and increased vulnerability. Where trade liberalization and integration are already a global phenomenon, the absence of agricultural and crop insurance would place the developing countries at a disadvantage when compared to industrialized countries.

Where crop insurance programmes have been in existence in the Caribbean, they have contributed to a perception of reduced risk. This has been particularly so with banana cultivation in the Windward Islands and coffee and banana cultivation in Jamaica, in both situations these crops being prime export commodities in earlier times. Whether or not insurance for these crops have promoted increase investment is questionable given the significance of the challenges faced, primarily, the impact of new trading regimes (e.g. WTO) on preferential markets, increased competition from other markets, declining returns from these crops, new standards with regard quality and transportation and distribution of these commodities, among others. Moreover, it is recognized that should crop insurance be expanded in the Caribbean, there is a rapid emergence of new and other risk areas which should be addressed and include droughts and floods for bananas which is only covered for wind damage, pest and disease, quality and distribution risk, praedial larceny for vulnerable crops such as fruits and vegetables, in addition to equipment and machinery, buildings which requires a certain level of investment.

Where insurance has not been instituted but where plans are in train to establish same as in Trinidad and Tobago, the role of insurance in reduced risk is considered to be critical based on surveys conducted. What is important also is that farmers identified a range of risk which they faced including, disease, pest, price, yield, flood, praedial larceny, fire, technology failure, quality and hurricane. While these farmers typically used other management and production strategies to deal with these risks, they were of the firm view that sound crop insurance would help to reduce risk particularly with respect to production security, partial cost recovery, development of the sector, increased production and reduction of moral hazard. There was also the view that crop insurance should be supported by some form of disaster assistance programme.

Indeed while farmers have in the past relied on traditional methods of risk reduction, there is every reason to believe that a sound crop insurance programme should not only be responding to a few named perils such as windstorm, drought, and flood which are seasonal, but instead should respond

to some traditional and other emerging threats which are significantly impacting agricultural production. This is particularly important with increased commercialization of agriculture. Areas to be looked at include praedial larceny, pest and disease, and new risk and threats to agriculture such as price variability due to globalization, distribution including transport and handling quality and food safety concerns among others.

However, a critical component of the effort to revitalize agriculture in the region should be the establishment of effective and sustainable insurance as it would facilitate the following.

- Preservation of the farming community
- Encourage new entrants into agriculture
- Make capital available – formalize risk management in farming
- Encourage research into new in products by the private sector
- Encourage development of local production/processing industries
- Maintenance of food security
- Provides protection for income stream
- Improve response time for financial compensation

In many quarters in the Caribbean, there is expected growth in demand for insurance products based on various factors all of which are critical to the repositioning of agriculture in the Caribbean. These factors include the following.

- Evidence of an increasing incidence of crop damaging weather events;
- If farming is to be commercialized for increased competitiveness, this requires greater levels of financial investment. As such farmers/investors/banks will look to a financial mechanism to address part of the risk to that investment. Such a scenario is now playing itself out in the form of contract farming (hotels and various food processing companies are engaged in this practice) where along with inputs insurance is provided to farmers.
- Regulations of the WTO generally prohibit direct subsidy to agriculture by governments, but allow subsidization of agricultural insurance premiums. Governments of the region in seeking to revitalize agriculture, should have a common approach to effect transfer payments to the sector through insurance; this could be done through
    - Provision of information and data on weather patterns, incidents of perils, etc relevant to the assessment of risks
    - Payment for research leading to the establishment of new crop insurance programme
    - Direct subsidy of farmers premiums
    - Some form of reinsurance

- The developments in the design of new insurance products such as Crop Revenue and Index or Parametric products should be explored as having potential for sustaining multi-commodity crop insurance. This would aid greatly in the diversification effort which is important to, the revitalization of agriculture in the Caribbean.
- There is an emergence of exotic pest and disease (some introduced accidentally) in the agricultural sector in the Caribbean, which can nullify all other efforts aimed at revitalizing Caribbean agriculture. Crop insurance can address the risk of a breakdown of these measures.
- Insurance can also assist in managing on-farm production risk consequent to changes in pest management practices. These are becoming increasingly important to address issues of food safety and environmental protection. Indeed many of the export markets for Caribbean food crops are demanding that such issues be addressed from the on-farm practices thorough post harvest.

Indeed, while there are many other factors including greater government support for the sector, increased private sector involvement, use of new and updated technology, farmer education and training, improved extension services, availability of credit and finance, that are key to repositioning the agricultural sector in the Caribbean, the role of insurance is pivotal and is required for support of all these named and other elements.

Why a multi-commodity approach?

Whereas in the past, insurance in the Islands where it was active were specific to crops of special importance to each islands economy, now due to globalization and the establishment of various trade regimes, WTO requirements, dismantling preferential treatment, all making trade in agriculture more competitive, islands are moving away from mono-crop cultivation, and diversifying into multi-crop systems. These systems require significant investments and there is limited insurance coverage for such investments in agriculture. As such insurance should over multiple options.

The basis for expanded insurance coverage as elucidated previously should consider the increasing incidence of natural disasters, new trade requirements impacting competitiveness, issues of standards and quality, environmental protection and the required technological investments, emergence of new exotic pests and disease among other factors. One has seen the impact of some of theses factors in the case of bananas (e.g. Black Sigatoka now in the Caribbean) or nutmeg in Grenada following hurricane Ivan. In fact not just should crop

insurance in the Caribbean give coverage based on premium payments, but consideration should also be given to some kind of disaster fund.

Any insurance scheme for the Caribbean while targeting commercial production should be relatively broad in scope to cover anything that would constitute a disaster with the main objective of allowing some form of compensation to farmers/enterprises not just for production but in terms of total investment if such investments are not covered otherwise.

What Insurance schemes should be looked at?

- *Administration:* Other than the high administrative costs of multi-peril crop insurance, political inability on the part of governments to charge fair premiums and enforce impartial loss adjustments is a situation which has characterized schemes in developed and developing countries alike (Roberts and Dick, 1991). Governments in the region at this time can ill afford wastage of financial resources. Sound administration is most likely to come from private insurance or a parastatal organisation which is independent. This independence should rely on influences from external actuaries and reinsurers bearing in mind to keep staff to a minimum. In the region WINCROP probably best exemplifies an example of private insurance where ownership of the insurance company is vested in the industry itself.

It is proposed that WINCROP can be built into a viable scheme with some of the best practices from parastatal schemes along with its own best practices for a regional public-private insurance scheme.

- *Operational Features*: The decision to establish multi-commodity insurance must go through the basic developmental stages through an investigative process. The developments in the design of new insurance products such as Crop Revenue products and Index or Derivative should be explored as having potential for sustaining multi-commodity crop insurance. Classic insurance products, Damaged-based (e.g. named-peril insurance products) and Yield-Based products (e.g. Multi-peril crop insurance) still account for the significant proportion of crop insurance world wide. However, Wenner (2005) notes that these products are still restrictive and lack a high level of flexibility. The new products such as Index or parametric insurance and revenue based schemes offer much more promise and flexibility which could be suited to a Caribbean environment given the number of factors impacting negatively on Caribbean agriculture, but in the final analysis all reflected the income or revenue that accrues to the farmer. In the case of a Caribbean-wide insurance program, rainfall and seasonal drought, lend themselves for the weather index. One concern however, with using index insurance in

hurricane prone areas like the Caribbean is that it is difficult to define an accurate trigger. As such there is the possibility of mismatch between insurance payout and actual losses but it is envisaged that proposing two triggers could help alleviate this problem. According to Roberts (2005), that despite the paucity of experience with index insurance, there is a high level of interest in its development as it offer a practical solution to many problems of classical insurance (e.g. adverse selection, moral hazard, transaction costs, loss assessment expenses) to many dispersed farmers in less developed areas like the Caribbean.

In terms of a specific scheme or schemes, a detailed study would be required to determine which approach or mix of approaches would best suit the multitude of interacting conditions we have in the Caribbean. However, it is proposed that multi-crop insurance instead of single- crop insurance be considered in the Caribbean and that it be based on (i) an index or parametric based approach or (ii) a crop revenue scheme or (iii) a mix of both. It should also be multi-peril. A combination of the weather-index based and crop revenue insurance schemes would allow flexibility where weather perils are difficult to measure through some trigger but at the same time allow farmers to recover loss revenue when necessary as for example due to wind damage from hurricanes which may not always lend itself to a trigger measurement.

Multi-crop products will be quite complex and highly data intensive but it is believed further development of the proposed model could benefit farmers. This approach of multi crop insurance has potential for use in the Caribbean for a multitude of reasons.

- With the demise of bananas and the usual economic fallout when other traditional single crops such as nutmeg in Grenada, sugarcane, coffee in Jamaica, etc, the diversification of crops in regional agriculture must take on a more commercial approach. Conditions in the region allows a range of crops to be grown by anyone farming enterprise, but may sometimes be limited in terms of financial returns based on production/yield. A revenue based approach for multi-cropping systems presents an option to revitalize agriculture and diversification in the Caribbean.
- Insurance premiums for bananas have increased due to decreasing numbers of farmers. Diversification including banana production will allow a greater pool of farmers/enterprises to be insured and reduce premiums.
- The Caribbean is known to be a high risk area with respect to agricultural production. Risk areas of concern include hurricanes, heavy rains, flood, drought, volcanic eruption, wind, elements of pest and disease and praedial

larceny. Multi-crop insurance may be an option with respect to alleviate some of those problems associated with loss of revenue.

It is proposed that consideration be given to some form of multi-peril disaster scheme directly related to commercial production of selected crops and perils that may affect them. In addition it should be recognised that there are traditional risks or threats to the viability of agriculture such as praedial larceny that is becoming role widespread and significantly impact production that should be dealt with. Also while its know that on-farm management practices would help to reduce other risk such as pest and disease, increasing incidence of natural disasters/hazards, the threat of man-cultivated intentional hazards, these are not known to be sufficiently dependable and strong.

Conclusions

The issue of the delivery of crop insurance continues to evolve with two salient points being stressed from a review of recent literature on the topic, namely:

1) Expert opinion moved from a position supportive of public sector multi-peril programs targeted principally and preferentially small farmers, to one that realized that these programs were unsustainable, costly and unable to produce the befits previously anticipated from them. In support of abandoning the earlier position, administrative costs have been high with a significant loss of government resources and the data suggest that there are no welfare gains attained; and
2) The emerging view supports a specific-risk scheme operated on a sound financial basis, following the long established practice in countries such as the United Sates and Europe (Roberts and Dick, 1991).

The Caribbean governments are not in a position to provide massive subsidies to any agricultural insurance scheme therefore any such risk reduction measure must be actuarially sound and meeting the basic requirements for viability and sustainability. In addition the need for reliable data to support the evaluation and monitoring requirements of the insurance scheme must not be overlooked. Despite these seemingly insurmountable constraints, the embryonic experience with agricultural insurance in the Caribbean suggest that there is a possibility of insurance markets being developed sequentially, as one element in the risk management strategy within agriculture. Based on the above discussions, the following recommendations are made.

- It is recommended that multi-commodity crop insurance in the Caribbean should be a multi-peril scheme and consideration given to instituting a weather-index or parametric based approach, probably in combination with another scheme. Since guaranteed prices for most commodities in the region

no longer exist, a crop revenue approach may be considered as the complementary scheme. Any scheme chose should be supported by a regional disaster fund.

- Crop insurance in the region should be multi-peril addressing, not only yield or production risk, but also traditional threats to agriculture such as praedial larceny and pest and disease but new threats such as pertaining to quality and distribution issues. Insurance should also cover other areas of investment such as machinery and equipment and buildings.
- A crop insurance programme for the Caribbean should be managed by a separate joint private-public sector corporation. The Board of Directors should be representative of all stakeholders including farmers and should be private sector led. The structure of WINCROP could be utilized in establishing the scheme. Administration of the scheme at the local level could be through existing private sector insurance companies.
  - The establishment of a regional insurance scheme should be funded jointly by regional Governments (using a mechanism for proportional contribution) and private sector, with some form of subsidy to growers for payment of premiums, thus allowing the option of compulsory insurance.
  - An education programme for farmers on risk management at the farm level, good agricultural practices and investment in insurance should be established.
  - There is need to improve and extend agricultural extension services to support risk management at the far level particular as it relates to pest and disease, water management practices and post harvest handling.
  - Praedial larceny is now seen as a major threat (and risk) to various components of Caribbean agriculture. As such the process of enacting and/or legislation regarding praedial larceny need to dealt with as a matter of urgency.
  - The public sector should provide assistance in establishing a financially viable scheme and supporting the scheme in cases of catastrophic losses that exceeds coverage offered by private enterprise.
  - Where local private insurance is weak, the public sector role should be to support a financially and technically sound insurer and step back from the underwriting and loss adjustment portfolios.

In discussions with various parties and based on the available literature, it can be said that clearly there is a growing market for agricultural insurance and in particular crop insurance. The view is also held by some that while crop insurance is important, it may not significantly change the agricultural sector in the region but farmers and regional governments stand to benefit. Indeed high

participation rates would lead to private sector marketing and redirect the focus of farmers. Some are of the view that while multi-commodity insurance could work in the region it present special challenges in itself and must be carefully thought out. The information on the models presented earlier can be used as the basis for developing of a scheme, but general consideration must be given to issues of life cycle assessment, risk analysis, cost of infrastructure, selling price of premiums, and whether there can be a mechanism for pooling to enable adequacy of numbers as a regional approach is what is required. For that matter some are of the view that sustainability is suspect as numbers will matter.Financing is seen as one of the major challenges with respect to initiation and sustainability of the insurance programme. Some sort of development fund would be required at least for start-up of operations.

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PERSPECTIVES ON:

Catalysing and Expanding Investments in Agriculture and Rural Areas

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Catalysing and Expanding Investments in Agriculture and Rural areas

agriculture is ranked among the three most hazardous occupations

Understanding Agricultural Investment

The World Bank in its Agricultural Investments Sourcebook states "constraints to agricultural development are many, and access to financial services is only one response needed to address these constraints. However, improving the provision of, and the access to financing for agriculture, can meet a range of needs, and can be critical to the success of agricultural development programs. Indeed, many investments in agriculture are dependent on access to appropriate financial services". The obvious intervention which is required to address the constraint of limited finance and inadequate new investments is to increase the level of financing and investment in agriculture.

The consequences of poor capital investment decisions can directly determine the financial viability of a business enterprise, industry or sector. According to Bauer (2005), an investment involves making an expenditure of funds with the expectation of return at some time in the future. The future may be a long way off. Investment in agriculture might involve establishing an abattoir, an ethanol production plant or formation of an agricultural commodity marketing company. It might be an investment in primary agriculture, for example expanding a traditional farm business. It might mean starting up a new farm business or transferring asset ownership from one generation to another (Bauer, et al, 2005).

As attention is focused on catalyzing investment in agriculture it is important to recognize that the agricultural entrepreneur needs no other catalyst than the opportunity for gain economic gain on his or her investment. Broadly speaking agricultural investments can be categorized into three groups, the first is those that are pursued by agricultural entrepreneurs, the second is investments by the public sector and or donor agencies and the third is those that are jointly pursued by the public and private sectors, with or without agency participation. Governments or agencies are motivated differently however, usually with goals that also seek an improvement in the welfare of society. Each group, government, agencies and agricultural entrepreneurs, and society will benefit when circumstances occur such that the investments of governments and agencies lead to a reduction of the perceived risk of the agricultural entrepreneur that stimulates additional investment leading to greater output. In all instances, when contemplating the milieu of investment opportunities, consideration

should be given to the synergies available from partnerships among three main categories of potential investors.

- **Agricultural entrepreneurs Investment**

Agricultural investments by agricultural entrepreneurs, whether individually or collectively, are generally catalyzed purely by the desire to earn economic returns based upon perceived opportunities. Agricultural entrepreneurs, regardless of size, will decide to invest in any given agricultural venture based on the elements of their decision framework[1]. It follows then that the investment targets of the public sector and donors ought to be such that their perceived risks are reduced, thus catalyzing the private sector into additional agricultural investments and increased productivity there from.

Even experienced farmers with good management skills may be affected by technical failure of the investment: wells may fail, cattle may die or machinery may break down during the critical periods of the agricultural calendar. These risks increase if new technologies or farming activities are to be financed for which the spare parts and other support services might not be readily available and farmers have limited management experience. In view of the absence of risk mitigation financial instruments, such as, insurance markets, farmers have few options to manage systemic risks affecting physical production (droughts, floods, pests, etc.) or profitability (sudden price declines for produce, increasing costs of inputs, etc.). They normally respond through diversifying into a number of farm and non-farm related activities on a small scale. (Hollings, FAO)

- **Public Sector Investment**

Agricultural growth requires investments from the Public sector. Governments must provide public goods and establish supporting legal, administrative, and regulatory systems to correct for market failures, facilitate efficient operation of the private sector, and protect the interests of the disadvantaged. Public investment reduces rural poverty through improved growth in agricultural production, agribusiness development, rural non-farm employment, lower food prices, and migration. While there are often long time lags between investment and visible impact, investments in agricultural research, education, and rural infrastructure are often the most effective in promoting agricultural growth and poverty reduction.

[1] See the introductory piece in this booklet.

The role of the public sector is evolving, driven by trade liberalization and international agreements, and requiring new skills and analytical capacities. Support for policy and institutional development in the agricultural sector has evolved dramatically. In the 1970s and 1980s, much investment went into building state organizations to manage agricultural development programs. Ministries of agriculture, starting often with very limited capacity, expanded their range of agencies and programs, many of which attempted to supply inputs, credit, and services directly to producers, and to purchase and market agricultural products. Some of these public sector investments had high payoffs. However, economic returns on many of these investments (such as large-scale irrigation) are now lower, and some interventions (such as subsidies) are very costly in terms of the distorting effect that they have on domestic markets. The failure or lack of sustainability of many of these programs led to a rethinking of the role of the state in the agricultural sector.

Growth is not produced by passive "let the markets work" policies that do not include critical public investment programs. The proper role of government in a market economy is to devise and administer institutions (legal systems, regulations, competition policy) that provide incentives for efficient private (farm) production while, at the same time, investing in provision of public goods where appropriate. These public good investments will lead to improvement in agricultural productivity by addressing these main gaps in the agricultural growth process namely:

- The Extension Gap – investments in extension programs and infrastructure will increase crop yield from average to best practice;
- The Research Gap – investments in applied research program if successful will increase crop yield above practice yield;
- The Science Gap – applied adaptive research program which is supported by national and international science program will increase yield even further.

As for investments, the experience has been very different for investments in true public goods production for agriculture (research, schooling and extension) and for investments in most state-owned enterprises. Within the past two decades, institutional reform, prompted by international donors and structural adjustment programmes, have been undertaken in countries to privatise inefficient state-owned enterprises to eliminate marketing boards and other cumbersome regulatory agencies. However, some of these reform movements have not fully appreciated the historical role of public goods in agriculture in all economies. Public sector investment in rural schools, agricultural extension and applied agricultural research has been vital to agricultural development in every economy in the world. Institutional reform

without investment in these public goods does not produce economic growth in the agricultural sector.

The limited information available seems to suggest that Government expenditure in agriculture in CARICOM countries has been declining over the years and there has not been the corresponding increase in private sector expenditure. International donor agencies have also reduced their assistance to agriculture in CARICOM countries, this at a time when policy makers in developing countries are expected to show a clear commitment to agriculture.

- **Donor Investment**

There has been a dramatic evolution in the context for context for investment in agriculture and rural development. In the past twenty years, agricultural investments were geared towards increasing production and world food supplies. In today's emerging environment, investments in agriculture seek to increase competitiveness and profitability along the commodity chain from farmer to consumer, enhance sustainability of the environment and natural resource base and empower rural people to manage change.

Changing Emphasis in Agricultural growth strategies in the rural strategy	
Less Emphasis	**More emphasis**
Resource and input-led growth	Knowledge-led growth and sustainable production systems
Agricultural production	Agricultural chains and markets
Food staples	Higher value crops, animals, fish
Traditional exports	Non-traditional exports
Broad-based approaches	Poverty focused within differentiated farm types and ecological conditions
Source: World Bank, 2003	

In reviewing the priorities of four major international donor agencies, the following major themes in providing financing and investment funds for agricultural and rural development appear common:

Priorities and Perspectives of Major Donors by Major Theme	
Enabling Environment	CIDA: priority to strengthen national capacity for policy formulation, strategic planning, including gender analysis, agriculture-related conventions and protocols, etc
	EC: promote broad-base rural economic growth by supporting appropriate economic and sectoral policies
	USAID: strengthen economic policy framework conducive to agricultural growth especially policies that directly or indirectly

Priorities and Perspectives of Major Donors by Major Theme	
	affect agriculture
	WB: policy reform - shift from 1st generation market liberalization, and redefinition of role of state to 2nd generation policies and regulations to enhance competitiveness and growth
Institutional Reform, Capacity Building and Partnerships	CIDA: sustainable agricultural development requires strong institution (both public and private) and an appropriate enabling environment
	EC: build more effective, accountable institutions and support decentralized institutions and services, public sector reform to encourage growth of private sector services providers and community based institutions and other civil society organizations
	WB: support Institutional capacity to . . . evolve and adapt to a rapidly changing environment for agriculture . . . through a series of careful sequenced investments and Public and Private Sector partnerships;
Research, Technology and Human Resource Development	CIDA: priority to create and use traditional and new knowledge for development through *inter alia* actions that strengthen national, regional, and international agricultural research and transfer capabilities
	EC: Investing in human capital
	USAID: Supporting agricultural technology applicable to particular soil, water and climate conditions
	WB: greater diversification of regional/national agricultural production and marketing systems, with greater demands on the support systems for agriculture research, advisory services, irrigation and drainage, market grades and standards, and information services
Infrastructure Development	EC: contribute to rural infrastructure financing where it is a cost-effective means to reduce rural poverty,…., develop low-cost infrastructure for remote rural communities, ensure their effective operation and maintenance, and enhance community participation in the design, construction, operation and maintenance of infrastructure projects
	USAID: agriculture cannot perform well without some rudimentary infrastructure - …will finance road and related rural infrastructure to transport agricultural inputs and market agricultural outputs
Enabling Access to Resources, Equity and Empowerment	CIDA: create new options for the poor and achieve gender equity by empowering women,… through *inter alia* improved access, management and administration of land, support to agro-based processing and rural entrepreneurship, agricultural services through cooperatives, rural agricultural education, access to

Priorities and Perspectives of Major Donors by Major Theme	
	international markets and developing well functioning markets.
	EC: will take action to address inequities in areas such as access to land, rural finance and rural environment and social infrastructure, …., support several types of action to manage risks, and to lessen the impact of shocks through providing safety nets
	USAID: finance road and related rural infrastructure to transport agricultural inputs and market agricultural outputs, …, assist in securing tenure arrangement to encourage investments in land and other agricultural assets.
	WB: empowerment of farmers through *inter alia,* decentralized program management, participatory approaches to planning and implementation, building capacity of producer and community organizations, responsiveness and accountability of public agencies to users, and wide access to information about all these developments
Financing and Investments	EC: Ensure more equitable access to . . . rural finance . . .
	USAID: strengthen credit and other agricultural services
	WB: expansion of financial services and monetary functions
Sources: Canadian International Development Agency (CIDA) *' Providing Sustainable Rural Development Through Agricultural Policy'* European Commission (EC) *:'Fighting Rural Poverty:'* United States Agency for International Development (USAID): *1996 USAID Evaluation of its Investments in Agriculture in Developing countries '* World Bank (WB): *The World Bank in its Agricultural Investments Source Book 2003*	

In analyzing each of the donor agencies' priorities and perspective, a commonality of emphasis in the approach to agricultural and rural development and their priority areas for investments is obvious**.** In addition, both the CIDA and the USAID have prioritized agricultural sustainability through sustainable natural resources management.

The latter two types of agricultural investments – public sector and donor - while promoting economic gain for agricultural entrepreneurs, are in addition influenced by goals of increased social welfare. Experiences suggest that donors should target their investments at the community level in order to better assist small-scale farmers and producers in improving their technical skills and productivity as a basis for reducing poverty and hunger. This is borne out in the recent trends towards emphasis on wider rural development as opposed to sectoral agricultural development *per sé*, and public-private sector partnerships.

- **Public/Private Sector partnership**

Institutional reform without creating the environment for strategic public-private sector investment in critical services, including those divested by the public sector, will neither produce nor sustain economic growth in the agricultural sector. Agricultural repositioning will require more active public-private sector partnerships, particularly in joint financing, capacity building and with non-financial institutions such as equipment suppliers, agri-business, NGOs and government agencies to ensure the provision of complementary services, tri-partite risk sharing arrangements and interlinked transactions.

The recent IDB signal of a change in its business model which now permits lending to private, state-owned and mixed capital companies without government guarantees in all economic sectors will provide a catalyst to increasing the partnerships that promote effective economic development (IDB, 2006). This decision of the April 2006 IDB Board of Governors Meeting will enable direct lending to firms in sectors such as agribusiness, manufacturing, technology and tourism and is in support of the decentralisation taking place in Latin America and the Caribbean. The Chilean experience is instructive in demonstrating the results of the confluence of some of these issues highlighted herein.

A Brief Insight of Chilean Agricultural Productivity Increases

Over the past four decades, Chile's agricultural sector has grown to the point where the country's exports of fruit now account for nearly all of the table grapes, apples, peaches, nectarines pears and avocados that are available out of season in the USA's market. This is partly due to the country's initial investment in building a cadre of agricultural scientists (human capital) through an exchange programme with the University of California at Davis, beginning in 1965 (Holder, 2005). The application and adaptation of the new techniques and technology, particularly in relation to the scientific approach to problem solving, catalysed the transformation of agriculture in Chile. This was supplemented by institutional innovation and cooperation among agencies, the public sector and Chilean agri-entrepreneurs.

One example of such tripartite cooperation pertains to Chilean export of 'pomme fruit' (Apples, pears and peaches). The Chilean agriculture entrepreneurs became concerned that the shelf life of their exports to their main market, USA, was very short. In order to solve the problems being experienced a tripartite post-harvest technology research project was established, at the University of Talca in Chile, which itself was founded in 1981. The University provided the physical building space, the Chilean government the equipment and a consortium of agriculture entrepreneurs who were pomme fruit producers financed the research activities. The end result was two-fold. Several potential quality problems have now either been solved or can be identified and circumvented when the fruit is still in the fields. In

addition, Chile has been able to secure and expand its market share in these fruits. Another indication of the success of the project was the expressed desire of other agriculture entrepreneurs to become involved. In support of the country's agricultural sector the University of Talca now has five centers of technology, the research activities of which are concentrated in the areas of the country's agricultural focus (Universidad de Talca, 2006)

Another example of institutional innovation pertaining in the Chilean agricultural sector is the nonprofit business incubation agency Fundaciòn Chile created in 1976 by the Chilean government and ITT Corporation. The activities of the agency span agribusiness, marine resources, forestry and forest industries, environment and chemical metrology, human capital and information and communication technologies. Since its establishment Fundaciòn Chile has helped introduce many Chilean products on to the market as well as promoted the adaptation of technologies to Chilean production systems (Fundaciòn Chile, 2005). The agency is currently actively collaborating with personnel from the University of California at Davis in developing a nation plan to get Chilean research innovations to market. This is part of its goal to diversify the Chilean economy based on sustainable natural resources. Fundaciòn Chile is actively looking at the potential for Chile's commercialization of technologies developed at the University of California campuses (Holder, 2005).

It is well appreciated that well-targeted public sector and donor assistance tailored to the specific needs and operating realities and capacities of the country, sector and rural communities is an important stimulus for agricultural growth and rural development. However, there has been a decline in lending to agriculture, including term loans, since the mid-1980s, following the general disenchantment of many donors and governments using the "old paradigm" of directed agricultural credit. Since then, many agricultural credit projects have been phased out and many agricultural banks were liquidated in the context of financial sector reforms in many developing countries. This decline has not yet been compensated by other providers of finance. In this context, the need to build domestic and national capital for stimulating and sustaining private-sector led growth is a prerequisite for development.

Building Domestic and National Capital - Sources of Investment

The main sources of finance for agricultural enterprises in the region remain the Commercial Banks and to a lesser extent Credit Unions. There are Development Banks operating in member states and a few Venture Capital funds have recently been established. Private equity plays a small role in agricultural financing in the Caribbean, hence, very few agricultural base companies listed on local stock exchange. Most small agricultural enterprises are financed from savings. A review of the effectiveness of the various services of financing in the region with regard to agricultural enterprise revealed the following conclusions:

- a growing consensus amongst practitioners and donors that micro-finance with its current focus on small, but highly profitable short-term activities, is unable to respond to many of the financing requirements and opportunities related to agriculture, and particularly to those requiring larger amounts and longer maturities (Hollings, FAO);
- the financing needs of many agricultural enterprise which require longer term finance amortized (paid off) over several years are not appropriately met by Commercial Banks which view agricultural term loans as being extremely risky. Their preference is for short term lending and recovery;
- it is difficult to use trust funds to finance agricultural projects which are perceived as requiring risk capital since they are extremely limited in respect of loan size and term (Commercial Banks and Credit Unions, the latter being mutual funds which cannot maintain a high level of liquidity);
- Venture Funds are fairly new in the Caribbean and there are investing in agricultural enterprises in the region no known cases of their specific successes in agriculture investments. Most the venture capital funds investments are in corporations which are well established and have a proven track record and in sectors where the risks are considered low.
- the absence of a vibrant public market for securities in the region limits significantly the opportunity to raise capital through public listing or private equity;
- Development Banks have moved away from direct lending preferring instead to operate through intermediaries. However, the majority of agricultural financing institutions (AFIs) are commercial banks and credit unions.

Since commercial banks continue to be the main source of finance available for private sector investments in agriculture and term finance is the main instrument used by commercial banks, it is important therefore, to focus specifically on term finance as an instrument and its effectiveness for agricultural development. Term finance comprises debt instruments, such as, term loans and leasing, equity instruments, such as, term savings, third party equity and venture capital, and combined instruments, such as, savings-cum-loan products. However, the absence of viable term finance arrangements limits the abilities of entrepreneurial farmers to undertake term investments to enhance the scale or productivity of their farming operation or to exploit new market opportunities. From an aggregate perspective, this may result in slower pace and more uneven patterns of technology adoption and farm enterprise diversification. This weakens the potential of the agricultural sector to contribute to rural development and poverty reduction and respond to the challenges of an increasingly competitive environment (Hollings, FAO).

The scarcity of examples for successful term finance arrangements in agriculture highlights the intrinsic difficulty of this activity as compared to other fields of banking. Agricultural term loans are particularly risky, since they combine the particular risks of agricultural lending with those related to longer terms. The development experiences show that innovative financing products and technologies have allowed rural finance institutions (RFIs) to make some progress in extending the financial frontier of term finance to small farmers in rural areas. The combination of an enabling environment, a specific institutional mission and external support has been instrumental for these RFIs to successfully engage in term finance. RFIs will benefit from different types and levels of external support, including use of public funds for their establishment towards a specific mission to provide agricultural credit and considerable donor support for the development of term finance products. Some RFIs also comprise successfully reformed public agricultural development banks, and also RFIs which started as NGOs. In order to enhance the effectiveness and sustainability of RFIs, focus must be placed on the several constraints which limit the profitability of farm related investments and the borrowing capacity of farmers as well as the targeting of public-donor support to these RFIs.

Towards a Caribbean Template for Agricultural Investment

The changing context for agricultural development suggests a new vision for investment in agriculture based on a more comprehensive view of the requirements for stimulating investment in agriculture including: (a) the reorientation of investments now under way; (b) criteria for allocating investment resources in the future; and (c) identifying new sources of investment, including innovative partnerships and greater cooperation among agri-entrepreneurs, government and agencies in the sector.

With particular respect to a different approach to the criteria for allocating investment resources, essential criteria are that they must:

- promote projects that will foster synergies between agricultural production-trade chains and territories,
- link agriculture with other sectors to help create and stimulate economies of scale and clustering,
- foster the development of new productive activities, promote associations and help mobilize the savings that are generated within territories,
- strengthen human and social capital in rural territories. Rural people must be given the chance to participate in decisions on investment strategies and priorities (IICA, 2005).

Investment financing systems also need to be thoroughly revised to reflect the different levels at which innovation is appropriated: a) technology that is incorporated directly into production (inputs, tools, capital goods) should be financed by the producers themselves; b) technology of collective interest to producers' unions should be financed by union members; and c) technology of strategic interest, which includes basic research and technological development of some of the components of the two previous points (a and b) that are of collective interest (for small-scale farmers, food security or sovereignty), must be primarily financed by government. This scheme would bring greater clarity to policies and to the organization of knowledge markets (IICA, 2005).

The range of public and private options for financing agricultural investments and rural development must also be expanded. Innovative options could include funds that can be generated by environmental services markets (e.g. the Clean Development mechanism under the Kyoto Protocol, as an option for financing investment in biofuels), and, in some countries, the resources freed up as a result of debt relief (e.g. Honduras, Nicaragua, Bolivia and Guyana). Collaboration between multilateral cooperation and financing agencies and national institutions to promote strategies, policies and investments for the development of agriculture and rural life should recognize the specific features of countries, and to consider regional options for promoting integration (IICA, 2005).

There are many kinds of organizations, in particular NGOs, savings and loan cooperatives and even producers' organizations themselves that have forged links in the micro-financing or investment chain. These mid-sized institutions have developed the capacity to offer sophisticated financial products that can be adapted to a diverse and complex demand characterized by high operating costs. The strength of these interfaces lies in their location and their market targeting strategies. They reveal an in-depth knowledge of their clientele, a great capacity to create revolving funds, flexibility in the handling of collateral and guarantees that are more consistent with the reality of their customers, and the capacity to provide coaching and be responsive. In short, they are highly innovative financial systems. Although their intermediation costs are high, their rates are less usurious than those that small producers traditionally had to pay (IICA 2005).

A Perspective on the Way Forward

International competitiveness and social and environmental sustainability are the overarching goals for agriculture as the region moves closer to the reality of a Single Economy under the CSME. The Region must therefore embark on deliberate and concerted activities to develop a modern, efficient and holistic

agribusiness system, if it is to improve its ability to participate in the growth segments of the regional and international agri-food/markets and reduce its dependence on extra-regional food imports. Such dependence is also in terms of donor assistance. While it is widely agreed that donor assistance is often times a catalyst for agricultural growth and rural development, no developing country should perpetuate a reliance on donor assistance for development, particularly in agriculture. Agricultural repositioning will require more active public-private sector partnerships, including the process of creating an enabling economic and business environment for competitive and sustainable agricultural and rural development. The following will constitute some of the more critical elements of an environment that will foster greater investment in agriculture and rural sectors.

- **Comprehensive Agricultural Sector Policy and Strategy**

A comprehensive national agricultural sector policy and strategy is essential as a basis for investment. Such a strategy should include or form part of a broader national rural development strategy. In providing a vision for the sector, strategies should focus the efforts of donor organizations and governments on the most relevant problems and solutions and should ensure that initiatives are complementary rather than conflicting. Translating strategic priorities into budgetary allocations is often more difficult than formulation of sector strategies. Budgetary allocations must be well planned and based on revenue expectations, as well as realistic estimates of the funding needs for different policy priorities. Good analysis and effective information systems within the agricultural sector, backed by competent policy staff with good presentation and negotiating skills, are important for promoting public investment in agriculture, improving investment quality and strengthening policy-based lending.

- **Policy-Based Lending**

Sustainable economic development cannot take place in the absence of an enabling policy framework, effective allocation of resources in rural economies and development of sustainable financial intermediation in developing countries. Sector adjustment lending is of critical importance to removing market distortions in agriculture, rural economies and financial institutions, and to building effective linkages between informal financial institutions and the formal banking sector. It is important therefore, that National Governments in collaboration with national and regional financial institutions and donor support strengthen their involvement in policy base lending. This differs fundamentally from the traditional project-based lending for development assistance which has had limited impact in increasing rural incomes and reducing rural poverty in developing countries. Fragmentation, duplication and lack of participation by

local stakeholders in project design, implementation, and supervision are among the reasons for the lack of success. Policy-based lending is backed by a clear and comprehensive policy and strategy, built on full participation and collaboration in the design of future sector adjustment programs to address strategic issues in an holistic and integrated manner. Within this approach, adjustment lending would play an active role in policy dialogue with the CARICOM member states in addressing sectoral policy gaps to promote an appropriate policy environment for agricultural and rural development, while ensuring that the social costs of adjustment are mitigated by appropriate interventions.

- **Lending Strategies and Instruments**

Emphasis must be placed on increasing financial intermediation and linkages between informal sector financial institutions, apex organizations, and the formal banking sector. This will involve significant assistance for institutional capacity development. Lending and technical assistance could be restricted to selected viable development banks, and where feasible, assist in the privatization of these institutions and the development of permanent private sector mechanisms for funding rural development.

Some of the lending instruments with good possibilities at the national level include:

Lines of Credit: this remains a useful tool to increase the availability of development financing. However, recent research has indicated a reduction in the use of lines of credit as a number of developing countries close their agricultural development banks or express reluctance at assuming the foreign exchange risk interest in lines of credit. In going forward, efforts and initiatives to help rural households and enterprises to mobilize their own savings will have to be considered.

Micro Enterprise Lending: lending to micro-small-medium-enterprises (MSMEs) should continue where possible. This could be by matching grant funding to informal sector financial organizations and apex societies. Subsidies could be used, but only on a limited, time-bound basis, to provide start up assistance to institutional skills and capacity development. Lending to MSMEs will have to be done mainly through private sector banks and informal institutions with a particular focus on creating permanent access to credit funds through the development of sustainable guarantee mechanisms, such as end-user owned mutual guarantee funds, mutual and venture capital funds.

Beneficiary Contribution through Matching Grants: through the use of matching grant mechanisms to foster increased grassroots participation could also be considered. This strategy has proven to be an effective instrument in providing institutional development support to local institutions, including credit and savings associations and NGOs. These grants provide support for strengthening management capacity and systems, developing competency in the areas of commercial credit analysis, and developing apex organizations, which can then provide technical assistance to informal sector financial institutions and linkages to the formal banking sector. Matching grants also encourage indigenous savings mobilization.

At the regional level the proposal to establish an Agricultural Modernization Fund (AMF) within and managed by the Caribbean Development Bank (CDB) and taking into account the Regional Development Fund holds much merit.

An *AMF* will be an essential vehicle through which funding will be made available for actions required to support the regional policy framework desired objective of agricultural growth and rural development. An AMF intervention is critical to initiate actions in all of the other nine constraints highlighted in the Jadgeo Intiative, particularly as it relates to reducing and mitigating business risks and transactions costs. Further, through the operation of a Business Incubator and Agribusiness Development Services Facility, that utilizes and builds on national capacity and linked to international agencies, such as, Prolnvest, commercial activities and entrepreneurship could be stimulated and expanded in areas, such as, agro-tourism, herbal and neutraceutical products and value-added/diversified commodities (ethanol, snack foods etc). In this regard, the following is offered for special consideration of the AMF:

Establishment of a Regional Venture Capital Fund (RVCF): A portion of the AMF could be used to create a RVCF which would be dedicated to financing private sector projects geared towards agricultural and rural development. The Fund should be staffed with individuals who understands agricultural risk and are sufficiently trained in agriculture to assist in the effective design, evaluation, and monitoring of agricultural projects.

Conclusion

CARICOM Governments have accelerated efforts to reposition agriculture in the region to ensure that it plays a central role in sustainable growth and development. Ineffective policies at the national level and the absence of a coordinated implementation framework have been identified as two of the key

reasons for the poor performance of the region's agricultural sectors in the past. This deficiency partially explains the limited and reducing levels of financing and investment for agricultural development.

In this context, experiences have shown that investments made in a poor policy environment produce poor results, a more significant result being the low, limited and unsustained investment and reinvestment with the entrepreneurial community itself. In responding to 'limited private sector (mainly domestic) investment' governments, supported by international donors, have made heavy investments in public goods, such as infrastructure, research facilities and marketing structures. While these have, to some extent, impacted on production and transactions costs, there have been little, if any positive, meaningful and sustainable impacts in terms of reducing the level of risks or instilling investor confidence in the sector.

Public and donor investment must consider the fact individual producers are the ones that make decisions in agriculture. Agri-entrepreneurs, regardless of size, will decide to invest in any given agricultural venture based purely by the desire to earn economic returns based upon perceived opportunities and the significance of risk factors. It follows then that the investment targets of the public sector and donors ought to be such that the perceived risks of the agri-entrepreneurs are reduced, thus catalyzing the private sector into additional agricultural investments and increased productivity there from. If at an individual level, entrepreneur security does not sufficiently exist (including the core issue of praedial larceny), then no macro-led programme to catalyze or increase financing and investment will be sustained.

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Some Feedback on the Final Draft Perspectives on . . . .

Natural Hazards and Disaster management in Agriculture in the Caribbean

I read the document with great interest and it has indeed provided new insights into our own work in disaster preparedness/mitigation/recovery. I hope to put some of these insights into play in the upcoming High Level Conference on this issue which will be convened by the ACS next year. The prevention, mitigation and recovery from disasters in the area of agriculture has to be seen as part of the larger picture of security upon which our countries have insisted, particularly given the narrow focus it has taken post Sept-11.

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A Multi-Commodity Agricultural Insurance for Risk Reduction

I think the paper covered all the bases and the real challenge is to determine appropriate recommendations. These recommendations should come out of the research and literature and I think you have a good basis to derive them.... Perhaps a Caricom approach to this problem may be the better option where member countries provide some fund/pool to provide support. This fund is less likely to be subjected to the domestic politics of individual countries. Few insurance companies will be willing to take the risk of agriculture insurance without this kind of support.

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The way I see it, the principal risks to Caribbean agriculture are hurricanes, and this is a catastrophic risk that has to be handled by states. The smaller risks, drought, excessive humidity and pests, can be handled by insurance but a lot of investment is needed in information and developing delivery channels. I generally think the document is sound, …., however a clear roadmap is needed that includes analysis for private insurance companies - How many are active? How many are potentially interested in agricultural insurance? Can policy underwriting and pooling over several islands to compensate for small island sizes and small farmer population sizes. Smallness is major drawback.

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