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PROCEEDINGS

OF THE

38th ANNUAL MEETING

June 30th – July 5th 2002
Hôtel Méridien, Trois-Ilets, Martinique

**“Quel devenir pour l’agriculture caribéenne ?
Qualité, économie, progrès social, environnement”**

**“What is the future of Agriculture in the Caribbean ?
Quality, Economy, Social Progress, Environment”**

**“¿ Cuál es el futuro de la Agricultura en el Caribe ?
Cualidad, Economía, Progreso Social, Medio ambiente”**



UE



Conseil Régional
de la Martinique



Conseil Général
de la Martinique

Proceedings edited by:

Xavier MERLINI
Isabelle JEAN-BAPTISTE,
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CHAMBRE
D'AGRICULTURE
MARTINIQUE

Published by:

AMADEPA
Ex Hotel de ville, Rue Schoelcher,
97 232 Lamentin, Martinique
E-mail : amadepa@wanadoo.fr
Phone : 596 76 62 36
Fax: 596 76 66 95



SEED SECTOR DEVELOPMENT: A WEAK LINK IN CARIBBEAN AGRICULTURE

N.C. McAndrew

Caribbean Agricultural Research and Development Institute, 2 Forest Dr., PO Box 2, Belmopan, Belize, Central America. E-mail : cardi@blt.net

RESUME

La semence améliorée est une donnée fondamentale dans le transfert de technologie de la production de plantes à destination des agriculteurs, et la pleine exploitation par les pays en voie de développement des résultats de la recherche sur les plantes seulement quand il y existe entre autres choses, les mécanismes de réserves de semences nationales, efficaces et effectives, qui répondent bien aux besoins des agriculteurs. Dans beaucoup de pays caribéens, ces mécanismes sont encore sous-développés en dépit des investissements importants de ressources, à la fois nationales et sous la forme d'assistance de la part d'agences bilatérales et multilatérales pendant des années. Le sous-développement du secteur de la semence impose des contraintes sur la production et la productivité des cultures, sur l'exploitation économique des ressources génétiques de plantes alimentaires disponibles dans la région, et sur la capacité des pays de répondre aux désastres qui affectent le secteur de la production alimentaire. Les semences de qualité des variétés adaptées et améliorées, est essentiel pour le développement, l'amélioration et la durabilité de l'agriculture dans la Caraïbe. Elles ont besoin que des réglementations nationales et régionales soient promulguées et des mécanismes mis en œuvre, pour assurer l'opportunité, la fiabilité et la fourniture de quantités de semences partout dans la région.

ABSTRACT

Improved seed is a fundamental input in the transfer of crop production technologies to, and their efficient utilisation by farmers. Full exploitation by developing countries of the results from crop research is possible only when there exists, among other things, effective seed supply mechanisms that are responsive to farmers' needs for adequate, timely and affordable supplies of quality seed of improved varieties. In many Caribbean countries these mechanisms are still underdeveloped despite significant investment of resources, both national and in the form of assistance from bilateral and multilateral agencies, over the years. Underdevelopment of the seed sector imposes constraints on crop production and productivity, on the economic exploitation of the food crop genetic resources available in the region, and on the capability of countries to respond to disaster events that affect the food crop sector. Quality seed of improved, adapted varieties is pivotal to the expansion, improvement and sustainability of crop agriculture in the Caribbean and requires that national and regional policies be enacted, and appropriate strategies implemented to ensure, and assure, the adequacy, timeliness, reliability and affordability of improved seed throughout the region.

INTRODUCTION

Improving the commercial viability of agricultural production and marketing systems now requires increased focus on the economics of production and on the application of improved production technologies. In agriculture, perhaps more so than in other productive sectors, technology plays a crucial role in determining competitiveness, profitability, effectiveness, efficiency and sustainability. Over the years technological advances such as the development of hybrids, use of fertilizers and agrochemicals, and improvements in drainage and irrigation have made significant contributions in improving the overall performance of crop agriculture, and additional improvements are being realized with the use of transgenic varieties with the *Bt* insect resistance and with resistance to specific herbicides, which are more recent products of genetic engineering and biotechnology. As technological advances in crop agriculture are made, seeds⁴ conveniently function as the vehicle by which some have been directly transferred to, and others exploited by farmers.

The role of seeds in crop agriculture has been aptly summarized by Dr. James C. Delouche⁵ (2001) in his statement, *“Improved Seeds are, and will continue to be a key component in the package of inputs required to improve crop production, and a catalyst for the exploitation of other technological improvements in crop production.”* From the time humans began cultivating crops to present-day agriculture seeds have been the key element in the expansion and improvement of crop production, the main mechanism in the introduction and dissemination of crop types and varieties, and the principal vehicle in the transfer of improvements from plant breeders to farmers. Seed embody the genetic potential of plants, determining the ultimate productivity of other inputs and the upper limits of crop yields. Seed therefore are, or should be considered the single most important input in crop production, and adequate, timely and affordable supplies of quality seed considered the basic element in any undertaking to increase and sustain crop production and productivity, production efficiency, and competitiveness.

In many countries of the Caribbean region, where the agriculture sector is considered crucial to the economic development of most states and the region as a whole, and to the well-being of its people, the seed sector has, for the most part, remained underdeveloped, as evidenced by the absence of policies, programmes and strategies for local production and marketing/distribution of seed. Consequently, genetic improvements achieved by plant breeders in the region are of little value to many of the region's farmers, and the variety introduction, evaluation and selection process in crop improvement remains biased toward varieties for which seed can be readily obtained, usually through importation. Well-adapted indigenous or 'local' varieties of food crops remain largely ignored and unimproved, indigenous plant genetic resources remain unexploited or under exploited, and improved varieties developed by the international agricultural research centers (CIMMYT, CIAT, IITA, etc.) are underutilized. Additionally, post-disaster responses to the needs of the food crop sector continually depend on extra-regional inflows of seed of often untested and unadapted varieties. Underdevelopment of the seed sector has seemingly committed food crop agriculture in many Caribbean countries to a future characterized by the inability to make full use of advances in plant breeding and other technological advances in crop production, the inability to fully exploit indigenous plant genetic resources, and the increased dependence on imported seed.

⁴ In this paper the term “seed” is used in its broadest sense to include vegetative propagules.

⁵ Professor Emeritus, Mississippi State University, Mississippi State, USA.

THE CARIBBEAN

Two countries of the Caribbean region, Cuba and the Dominican Republic, have a well-developed seed sector, therefore the discussion in this paper focuses mainly on the Caribbean Community and Common Market (CARICOM) which is made up of three mainland countries, Belize in Central America, Guyana and Suriname in South America, and eleven island states, namely Antigua and Barbuda, the Bahamas⁶, Dominica, Grenada, Haiti⁷, Jamaica, Montserrat, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, and Trinidad and Tobago. Located between 2⁰ and 25⁰ N latitude, and 54⁰ and 89⁰ W longitude, the countries have a total land area of about 478,000 km², population of about 14 million, and per capita income of approximately USD 2,600. Countries of the CARICOM are small, the majority being island states, with small economies that are in many cases highly dependent on agriculture, and more recently tourism. Agriculture, once the dominant sector in their economies, has experienced a decline in its economic contribution in recent years and now contributes more than 10% of GDP in only six of the fourteen states – more than 50% in Haiti (Paul, 2001), 39% in Guyana, 21% in Belize, 20% in Dominica, 18% in Suriname, and 12% in St. Vincent and the Grenadines. The sector however accounts for 20% or more of exports in nine countries, and as high as 80% or more in Belize, Grenada and St. Vincent and the Grenadines. Agriculture is also a significant employer of labour, providing employment for more than one-quarter of the labour force in at least six countries and for almost one-third of the labour force in Belize and Dominica (Thomas, 2002).

The greater part of the Caribbean region lies in the southern periphery of the sub-tropical high-pressure zone where, during the summer months in the northern hemisphere, atmospheric conditions are highly favourable for tropical cyclone development. Belize and most of the CARICOM island states are within the hurricane belt, between 10⁰ and 20⁰ N latitude, which runs through the region. Part of the region is in a seismically active zone. Many Caribbean islands were formed from volcanic activity and there are some twelve active volcanoes in the region. Disasters therefore are an integral part of the Caribbean environment and over the years a number of events have severely impacted both mainland and island states. It has also become increasingly apparent that geographic location and topography combine to make a number of Caribbean states highly vulnerable to potential hazards associated with global climate change.

CROP AGRICULTURE IN CARICOM COUNTRIES

During the colonial era crop agriculture in the CARICOM countries was dominated by industrial and plantation cash crops such as cocoa, coffee, cotton and sugar cane, which were mainly for export, with little attention paid to domestic food crop production. In several countries the trend continued into the immediate post-independence period, to be later followed by a period in which a number of governments instituted policies and programmes to improve the national level of food self-sufficiency and food security. In crop agriculture the primary objective was to strengthen national agricultural research and production systems to facilitate increased production and productivity of traditional food crops, and at the same time introduce new crop types and production technologies into the national agricultural picture (McAndrew, 2000). In addition to rice, which together with banana and sugar at present account for almost 75% of the value of

⁶ The Bahamas is a member of the Caribbean Community but not the Common Market.

⁷ The Republic of Haiti has satisfied all the terms and conditions required for membership of the Caribbean Community, except the deposit with the CARICOM Secretary-General of an appropriate instrument of accession. When this formality has been completed, Haiti would become a full member of the Community.

regional agricultural exports (Thomas, 2002), the traditional food crops – corn, plantain, peas and beans, root and tuber crops, and an assortment of indigenous and introduced vegetables – are very important to the food security and are part of the unique culture of the region. In CARICOM countries traditional food crops are produced mainly for domestic consumption with some exports to markets within the region and to niche markets in the USA, Canada and the United Kingdom. Significant amounts of sugar and rice are also both consumed in producer countries and exported to other countries within the region.

In the region crop agriculture is carried out on three main categories of farms. One category is comprised of a large number of small traditional subsistence family farms involved with mixed cropping, often on marginal lands. Two other categories consist of much smaller numbers of commercial small farms that produce primarily for domestic markets with occasional exports mainly to regional markets, and large commercial farms that produce for the domestic and export markets. The fourth category of farms in the region is comprised of large idle farms that are under absentee ownership. Crop production is subject to several constraints, among which are the under-utilisation of pre-production, production and post-harvest technologies, the lack of quality local planting material with consequent strong dependence on imported seed (Paul, 2001), and the effects of disasters, particularly those associated with hurricanes, tropical storms and other severe tropical weather systems, which impact the region on an almost annual basis (McAndrew, 2002).

Constraints due to a lack of quality local planting material are reflective of the underdevelopment of the seed sector, and in the CARICOM countries these constraints persist despite significant effort and resources, both national and in the form of assistance from bilateral and multilateral agencies, having been directed at establishing seed programmes in some countries over the years. In Jamaica plant breeding activities had resulted in the release of three locally bred open-pollinated varieties of corn and two varieties of red pea, and Thetford Seed Farm was established and equipped with assistance from the FAO. In Trinidad a seed center to support large scale mechanised production of corn and soybean was established at Chaguaramas with financial assistance from the Federal Republic of Germany. During the 1970's Guyana received technical and financial assistance from the USAID for establishing and equipping seed facilities and for training professional and technical staff, and in the 1980's from the FAO for improving seed production and handling capabilities. More recently, in the 1990's the FAO funded regional project, GCP/RLA/108/ITA Improved Seed Production for CARICOM Member Countries and Suriname, was carried out with one of the main objectives being the *"Strengthening of regional and national seed production activities so as to meet the demand for planting materials"*. Activities under these initiatives have either ceased or have become very limited in their capability to locally produce and market quality seed (McAndrew, 1994).

SEED AND SEED SUPPLY SYSTEMS

The role of seed as the conduit of important elements for crop production and improvement has been recognized since the early days of agriculture. Seeds are recognized as the traditional vehicle by which improvements made by plant breeders have been passed on to farmers, and it is well established that sustained increases in crop yields can be realised when improved seed is used in combination with improved production technologies such as drainage and irrigation, fertilizers, pest and disease management, and weed control. Compared with other production inputs such as fertilizers and agrochemicals, improved seed is considered a low-cost, environmentally friendly input that assists farmers in increasing crop output, or in adapting crop production to meet agro-

ecological, marketing or dietary changes. More recently the role of seeds has been expanded to include, among other things, the delivery of nitrogen-fixing bacteria, plant growth regulators, soil ameliorants, and treatments to protect the planted seed and young seedling against disease, insect pests and weeds (Delouche, 2001).

The seed system is comprised of the arrangements and activities undertaken by, or on behalf of farmers to obtain seed to plant crops, and both the informal and formal seed supply systems, the former usually of greater significance in developing countries, are of importance in ensuring, and assuring, that seed are available for planting. The local or informal seed supply system, the accepted predecessor of the formal system, encompasses all on-farm arrangements and activities undertaken by farmers to increase the quantity and improve the quality of their seed. Seed selection and saving by farmers and farmer-to-farmer seed exchanges are common activities in the informal system that have been used by farmers from time immemorial to improve both yield and quality of their crops. The formal seed supply system, which is of more modern origin, institutionalizes in a structured seed programme/industry the independent but closely linked activities relating to the production and supply of certified seed of verified varieties. The cornerstone of the formal seed supply system is the development and release of improved varieties with superior genetic properties that are then evaluated to ascertain their suitability to the environmental conditions and farming practices under which they would be grown. The supply of seeds *per se*, and the acquisition of new crop types or varieties, or their replacement, are two of the main functions of seed supply systems, and have been on-going since the dawn of crop agriculture and evolution of the informal seed supply system (Delouche, 2002).

Activities in both the informal and formal seed supply systems are taking place throughout the Caribbean. In the informal system, which provides the bulk of the seed used for the production of traditional food crops, saving a portion of the previous crop for replanting purposes, farmer-to-farmer seed exchanges and seed purchases from local marketplaces are common occurrences. In most CARICOM countries the seed that is available through the informal system has remained mostly unimproved with farmers receiving little, if any, technical input in seed selection, production, post-production handling, and seed quality assessment. Rice is an important export crop to Guyana and Suriname and measures have been taken by the rice industry in both countries to develop improved varieties and to produce and market quality seed paddy, although a significant acreage is still planted with farmer-saved seed paddy from the previous crop. In most CARICOM countries however, activities in the formal seed system center mainly on the importation, repackaging and sale of vegetable crop seed, and, in some countries, seed of field crops such as hybrid corn and sorghum, cowpea, red kidney bean and soybean.

SOME RECOMMENDED ACTIONS FOR CARICOM COUNTRIES

Rectifying the inadequacies in the seed sector in the CARICOM countries requires, as a basic prerequisite, recognition of the importance of efficient and effective seed supply systems in the expansion, improvement, competitiveness and sustainability of crop agriculture. This would underscore the need for appropriate seed initiatives and encourage the formulation and implementation of requisite national, sub-regional and regional policies, programmes and strategies to develop the seed sector.

CARICOM countries must establish, through in-depth analysis, the characteristics of the seed supply systems in each country, including details on crop types and varieties cultivated, the

quantities, sources, value and quality of seed used seasonally or annually, and on the technologies and practices employed in seed production and marketing. The study must also, as a matter of importance, identify and characterize the constraints and deficiencies of the seed supply systems in each country and provide recommendations for their improvement based on technical knowledge and prospects for economic/financial sustainability. A 'one size fits all' approach must be consciously avoided.

A critical step would be convincing policy makers to commit the requisite financial, human and material resources to rectify the identified constraints and deficiencies in both their informal and formal seed supply systems. The region's agricultural research system – the Universities, the Caribbean Agricultural Research and Development Institute (CARDI), and the National Agricultural Research Systems (NARS) – must also be convinced to re-think and re-focus their plant breeding and variety evaluation and selection programmes to assure the continuous release of improved varieties, developed or selected in response to farmers' needs, to ensure the development and sustainability of the region's seed sector.

Finally, there are misconceptions in both the policy-making and agricultural communities that the informal seed supply system is of little or no value in the dissemination of improved seeds, that good seed has to be certified seed, and that the production and marketing of quality seed can only be done through the formal seed supply system. These misconceptions have to be urgently corrected and due recognition given to the important role of the informal seed supply system in crop production. Caribbean farmers have been selecting and saving seed from the beginning of crop agriculture in the region and, given appropriate technical guidance and inputs of new improved varieties for which seed will be required, their practices could be improved and they can be organized either as individuals or community projects to produce and market high quality seed. Such farmer-led initiatives have the potential of later becoming the foundation for the establishment of local seed industries in many countries.

CONCLUSION

The future of food crop agriculture in the countries of the Caribbean Community and Common Market hinges, to a large extent, on the will of governments and commitment of policy makers and programme implementers in responding to the needs of the sector. While technological advances in genetics, genetic engineering, bio-technology, tissue culture and in other areas of crop improvement are rapidly providing the tools to deal with the many challenges posed by a more discriminating and competitive world, it is improved seed that provides the greatest potential for an eco-friendly response to the call for improved productivity, production efficiencies, product quality and competitiveness in the region's crop sector. Effective and efficient seed supply systems are the logical justification for the investments made in crop research since they make it possible for farmers to have timely access to adequate and affordable supplies of quality seed and planting material of improved varieties of important food crops. Actions to overcome deficiencies in the seed supply arrangements in CARICOM countries are straightforward, first requiring recognition of the importance of the seed supply systems, followed by identification and characterization of the deficiencies or inadequacies in both the informal and formal seed systems, and early implementation of requisite improvements that are based on technologies and procedures that have been successfully applied in other countries.

REFERENCES

- Anon., 1987. Proposal to Barclays Development Foundation for CARDI Seed Production and Testing Programme. CARDI, Trinidad.
- Anon., 1998. Seed Production and Improvement: Assessment for Sub-Saharan Africa. In reference: FAO, 1998.
- Auguste, A.D. 1996a. Proposals for the Establishment of National Seed Programme in St. Lucia. Paper Presented at the National Seed Forum on Seed Policy and Plan. 27 August 1996. St. Lucia. Min. Agr., St. Lucia.
- Auguste, A.D., 1996b. Current Status of National Seed Programme in St. Lucia. Paper Presented at the National Seed Forum on Seed Policy and Plan. 27 August 1996. St. Lucia. Min. Agr., St. Lucia.
- Bigman, D. (Ed.), 2002. Globalisation and the Developing Countries. CABI/ISNAR Publication. In Press.
- Delouche, J.C. 2001. Seed Policies and Programmes for the Early Years of the 21st Century. Under review. FAO, Rome.
- Delouche, J.C., 2002. The Informal Seed Supply System: An Underutilized Development Resource. Under review. FAO, Rome.
- FAO, 1998. Seed Policy and Programmes for Sub-Saharan Africa. Report of Regional Technical Meeting, 23 –27 November 1998, Abidjan, Cote d'Ivoire, Seed and Plant Genetic Resources Services, FAO, Rome.
- FAO, 2000. Seed Policy and Programmes in Latin America and the Caribbean. Proceedings of Regional Technical Meeting. 20 – 24 March 2000, Merida, Mexico. FAO Plant Production and Protection Paper 164. FAO, Rome.
- Ford, J.R., 1998. Trade Liberalization and CARICOM Agricultural Development. Performance, Prospects and Proposals. FAO Project Paper. TCP/RLA/5612/7823(A) – Assessment of the Impact and Implications of Trade Liberalization on the Agricultural Sector of CARICOM Countries. FAO. Rome.
- Indalsingh, T., Bedasie, S., Paul, C., 1999. Status and Potential for Corn and Sorghum Grain and Seed Production in Trinidad and Tobago and the Caribbean. Paper Presented at the CARDI/MALMR Training Course on Maize Seed Production. 26 – 30 April 1999. Trinidad. CARDI, Trinidad.
- Larinde, M.A., 1996. The Role of Improved Seeds in Agricultural Development. Paper Presented at the National Forum on Seed Policy and Plan. 27 August 1996. St. Lucia. Min. Agr., St. Lucia.
- McAndrew, N.C., 1994. Improved Seed Production for CARICOM Countries and Suriname. Consultant's Report for Project GCP/RLA/108/ITA. FAO, Rome.
- McAndrew, N.C., 2000. Coordinating Regional Mechanisms for Facilitating Collaboration and Exchange of Expertise Among Stakeholders Dealing with Seed Production in Latin America and the Caribbean. In reference: FAO, 2000.
- McAndrew, N.C., 2002. Disasters and Their Consequences on Seed Availability in the Caribbean Region. Under review. FAO, Rome.
- Paul, C.L., 2002. The Reorganisation of Public Agricultural Research in the Caribbean Under the Pressure of Globalisation and Privatisation. Chapter 14. In reference: Bigman, D. (Ed.). 2002.
- Reid, R.A., 1994. Commercial Seed Production in Jamaica. Agri-business Consultant Report. CARDI, Trinidad.
- Scowcroft, W.R. and Sowcroft, C.E.P., 1998. Developing a Strategy for Sustainable Seed Supply Systems in Sub-Saharan Africa. In reference: FAO, 1998.
- Thomas, C., 2002. Caribbean Agriculture in the New Trade Order. Newspaper Article. Sunday Stabroek. 05 May 2002. Georgetown, Guyana.