COUNTRY REPORT ON THE STATE OF PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

DOMINICA

Second Country Report on the State of Dominica's Plant Genetic Resources for Food and Agriculture

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Note by FAO

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LIST OF ACRONYMS

ACP	African, Caribbean and Pacific
AVRDC	Asian Vegetable Research and Development Center
CAPGERNet	Caribbean Plant Genetic Resources Network
CARDI	Caribbean Agricultural Research and Development Institute
CATIE	Centro Agronómico Tropical de Investigación y Enseñanza
CIA	Central Intelligence Agency (USA)
CIAT	International Center for Tropical Agriculture
CIMMYT	Centro Internacional de Mejoramiento de Maíz y Trigo
CIP	Centro Internacional de la Papa
CIRAD	Centre International de la Recherche Agronomique pour le Dévelopement
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DEXIA	Dominican Export Import Agency
EMBRAPA	Empresa Brasileira de Assistencia Tecnica e Extensao Rural
EU	European Union
FAO	Food and Agriculture Organization
GCDT	Global Crop Diversity Trust
GDP	Gross Domestic Product
IDIAF	Instituto Dominicano de Investigaciones Agropecuarias y Forestales
IICA	Instituto Interamericano de Cooperación para la Agricultura
IITA	International Institute for Tropical Agriculture
INIBAP	International Network for Improvement of Banana and Plantain
INIFAT	Instituto de Investigacion Fundamentales en Agricultura Tropicales
INIVIT	Instituto Nacional de Investigaciones de Viandas Tropicales
INRA	Institute National de la Recherche Agronomique
MUSALAC	Musa Network for Latin America and the Caribbean
NORGEN	Plant Genetic Resources Network for North America
PROCICARIBE	Caribbean Agricultural Science and Technology Networking System
PROCISUR	Cooperative Research Program for the Technological Development of the Agro-food and Agro-industry in the Southern Cone
REDARFIT	The Andean Network on Plant Genetic Resources
REMERFI	Red Mesoamerica de Recursos Fitogeneticos
TM	The Taiwan Mission
TROPIGEN	Amazonian Network on Plant Genetic Resources
UPOV	Union for the Protection of Plant Varieties
WIBDECO	Windward Island Banana Exporting Company Limited
WTO	World Trade Organization

SECTION 1

EXECUTIVE SUMMARY

Dominica is located in the Caribbean island chain of the Lesser Antilles between the two French islands of Guadeloupe to the North and Martinique to the South. Its coordinates, 15°20" N Latitude and 61°20" West longitude, put the island directly in the path of destructive hurricanes. The temperature range from 25 - 28°C and the rainfall from 1,250 – 7,500 mm. The mountainous interior experiences torrential rainfall whilst the coastal lowlands receive much lesser precipitation. The vegetation is lush and diverse. This island can be said to represent the ideal tourist destination.

The 2008 population was estimated at 72 540 of which about 20% was employed in agriculture. The average age of farmers was between 55 – 60 years; the trends showed a decline in the numbers of farmers as well as senescence.

The agricultural sector is mainly characterized by banana, plantain, coconut, tree crops and root crop plantations. A wide range of short term vegetables are also featured. These locally grown crops provide the basis for a favourable level of food security, rural employment and the export of products to the Caribbean, North America and Europe.

Farm sizes ranged from 0.5 – 10 ha; small, subsistence farms were mainly involved in food crop, complex multiple cropping systems whilst the larger commercial farms practiced monoculture of banana and plantain, coconut, citrus, mango, avocado or root crops (dasheen, tannia, yam, cassava and sweet potato). Approximately, 30% of the total land area was under farms of which 54% was cultivated.

Management of plant genetic resources is a major component within the framework of crop development programmes. There are no separate programmes designed to treat directly with the use, conservation, neither collecting, inventorying nor characterizing PGRFA. The crop development programmes addressed accessing new varieties, evaluating them and supplying seed or planting material to farmers. These operations were mostly carried out on the six agricultural stations operated by the Ministry of Agriculture and sited strategically across the island. Private, commercial, agricultural outlets sold true seeds of a wide range of food crops (mainly vegetables) imported from the multinational seed companies (Seminis, Hazera etc), along with other inputs such as fertilizers, biocides, tools and equipment.

Germplasm collections were limited to small working collections of fruit trees (mango, avocado, coconut and citrus etc) sited on the agricultural stations. Similarly, root crop collections were established as dictated by crop development programmes. The main sources of new, improved varieties of crops were the regional and international institutions such as CARDI, INRA, CIRAD, INIBAP, MUSALAC, and the Republic of China Agricultural Mission etc. Germplasm was also accessed through CAPGERNet which linked into the hemispheric and global PGR networks.

The national programmes never had the capacities to sustain any breeding programme nor focus directly on any aspects of PGR management. The genetic diversity forming the base of those crops which originated in tropical Americas, is sufficiently broad to support potential breeding programmes. However, the majority of those other crops that were introduced from other centers of diversity, rest on narrow and risky genetic bases. Dominica, therefore, needs to strengthen linkages to regional and global PGR networks and gene banks in order to facilitate access to improved germplasm for its crop species.

The local under-utilised species found *in situ* need to be inventorised, collected and developed into products for export. The main driver to propel the agricultural sector into the future is industrialisation which will attract investments.

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SECTION 2

INTRODUCTION TO DOMINICA AND ITS AGRICULTURAL SECTOR

Dominica located between the French islands of Guadeloupe to the North and Martinique to the South at Latitude/ Longitude 15º 20″N, 61º 20″W. The country covers 750 square kilometers (289 square miles). Dominica lies in the hurricane and tropical storm belt. Hurricane devastated the agricultural sector of the island in 1979, 1980, 1989, 1995 and 2007. Dominica's high relief affects its climate which can be described as humid, tropical and marine. The average temperature during the winter months is 25°C or 77° F and in summer it is 28°C (82°F). Annual rainfall ranges from 250 – 300 inches (6 350 – 7 620 mm) per year in the interior to 50 – 70 inches (1 270 – 1 778 mm) per year in the coastal lowland. These factors contribute significantly to the extremely lush vegetation and to the high level biodiversity. The vegetation consists of more than 1 000 species of flowering plants and about 60 woody plants and tree species. There is an impressive plant diversity of 155 families, 672 genera and 1 226 vascular plants and trees (James et al 1995).

The climate is considered marine tropical; winter months averaging 25°C (77°F) and summer 28° C (82° F).

In July 2008 the population was estimated at 72 540 (Table 1).

TABLE 1

Population distribution of Dominica

Age structure	% of total population	Male	Female
0 – 14 yr	24.7	9 175	8 762
15 – 64 yr	65.1	24 192	22 995
>65 yr	10.2	3 178	4 212
Total	**100**	**36 545**	**35 969**

Source: CIA Fact Book

The percentage of individuals working in the agricultural sector declined from 30.8% in 1991 to 21% in 2001. This trend continued to the present when that percentage is much lower (The Statistical Unit, Roseau). The average age of farmers is between 55 to 60 years. If young people are not attracted to agriculture then the senescing farm population will not be able to stem the decline of this sector. In addition, the number of agricultural workers is declining with negative implications for production and productivity. The rural to urban drift has exacerbated this trend of a reduction in the agricultural labour force.

The agricultural sector was characterized by a tradition of banana production along with traditional non-banana crops such as citrus (*Citrus* spp), coconut (*Cocos nucifera* L.), plantain (*Musa* spp), dasheen (*Colocasia esculenta* Schott.), tannia (*Xanthosoma saggittifolium* Schott.), yam (*Dioscorea* spp), cassava (*Manihot esculenta* Crantz), tous-les-mois (*Canna edulis*), sweet potato [*Ipomoea batatas* (L.) Lam.], tomato (*Solanum lycopersicon* L.), sweet pepper (*Capsicum annuum* L.) , hot pepper (*Capsicum chinense* Jacq.), egg plant (*Solanum melongena* L.), ochra (*Hibiscus abelmoschus* L.), cabbage (*Brassica oleracea* var *capitata* L.), lettuce (*Lactuca sativa* L.), patchoi (*Brassica* L. x var chinese (Lour) Rupr.), amaranthus (*Amaranthus* spp), mustard (*Sinapsis alba* L.), spinach (*Spinacea oleracea* L.), cauliflower (*Brassica oleracea* var. *botrytis* L.), broccoli (*B. oleracea* var *botrytis* L.), beet (*Beta vulgaris* subsp. *vulgaris*), carrot (*Daucus carota* L.), turnip (*Brassica rapa* var. *rapa* L.), radish (*Raphanus sativus* L.), red kidney beans (*Phaseolus vulgaris* L.), pigeon pea (*Cajanus cajan* (L.) Millsp.), string bean (*Phaseolus vulgaris* L.), black eye (*Vigna unguiculata* (L.) Walp), saem (*Dolichos niger*), pumpkin (*Cucurbita pepo* L.), cucumber (*Cucumis sativus* L.), watermelon (*Citrullus lanatus* (Thunb.) Mansf.), musk melon (*Cucumis melo* L.), squash (*Cucurbita* spp), christophine (*Sechium edule*), pineapple (*Ananas comosus* Mill.), mango (*Mangifera indica* L.), avocado (*Persea americana* Mill.), guava (*Psidium guajava* L.), papaya (*Carica papaya* L.), passion fruit (*Passiflora edulis* L.), breadfruit (*Artocarpus* spp), cocoa (*Theobroma cacao* L.) and coffee (*Coffea arabica* L.), soursop (*Annona muricata*), sugar apple (*Annona squamosa*), and golden apple (*Spondias* sp).

The above species are grown mainly in multiple cropping systems except for banana which is largely monoculture. Banana used to be the main export but it is in decline due to the unstable European market for all Caribbean bananas.

Agricultural production is generally in the hands of small private entrepreneurs whose farm sizes ranged from 0.5 – 10 ha and who typically grew a wide range of crops for subsistence and the local and regional markets. Approximately 30 % of the total land acreage was under farms (1995 Dominica Agricultural Census.) of which 54% was under cultivation.

Nobody is known to starve in Dominica. There is sufficient food for the population; however, one can say that agricultural production has declined over the past decade. This has resulted in an increase in the food import bill and the proportion of the number of undernourished persons has increased (Table 2).

TABLE 2
Food security statistics - Dominica

Food deprivation	1990-1992	2001-2003
- Proportion of undernourishment (%)	4	8
- Number of undernourished(000)	2.9	5.9
Nutrients	1990-1992	2001-2003
- Dietary energy consumption (kcal/person/day)	2 940	2 770
- Dietary protein consumption(g/person/day)	76	83
- Dietary fat consumption (g/person/day)	83	76

Source: http://www.fao.org/faostat/foodsecurity/Countries/EN/Dominica_e.pdf

The small size of the country allows easy and equal access to food supplies by all the populated areas. However, the different purchasing power of different segments of the population may have affected food consumption patterns.

The agricultural sector derives its planting material from governmental, private commercial companies and farmers recouping seed from previous crops. Botanically, there are two types of planting material: true seed and vegetative propagules. The true seeds are mainly imported by private, commercial agricultural, input suppliers. Farmers themselves import a proportion of true seeds. A small proportion of true seed (hot pepper, pigeon pea, sorrel, red kidney bean, papaya and ochra) was recouped from previous crops. The farmers supply about 85 – 90% of root crop planting material through recouping from the previous crops and utilizing a mixture of traditional and improved propagation techniques. With the perennial fruit crops, such as avocado, mango, citrus, annonas, coffee, cocoa and West Indian cherry, the greatest proportion of planting material is supplied by specialized nurseries operated by the Ministry of Agriculture. These nurseries utilize a combination of improved propagation techniques such as budding, grafting, tissue culture (and weaning and hardening), air layering and cuttings.

A recent trend in propagation is the appearance of specialized, commercial vegetable seedling nurseries growing seedlings under protective cover. One of the main reasons for this trend is the commercialization of vegetable production utilizing protective cover (greenhouses). In the case of tannia and yams, important root crops, pest and disease problem have forced the application of improved technologies for planting material multiplication.

1. The agricultural sector

The Agricultural Sector is characterized by a tradition of banana production along with traditional non-banana crops such as citrus, root crops, coconuts, plantains and other food crops. Banana was the most important cash crop and it accounted for 1.3% of agricultural exports in 1991. Developments in regional and international trade have reduced the economic contributions of coconuts and citrus. Root crops, beverage crops and plantain have assumed greater significance in recent times.

Small, privately owned farms ranging from 1 - 5 acres dominate the sector and are characterized by varied intercrop combinations which depend on the agro-ecological conditions. Approximately 20% of the total land acreage of arable land is under cultivation, 15 000 acres are intercropped while 10 000 acres are under pure stands.

2. Agriculture's contribution to the economy

Though the contribution of crops to the GDP has declined overall since 1981, when it contributed 24.8%, crops remain by far the most important component of the agricultural sector and contributed 19.3% of total GDP in 1993. The 1991 Census classified agriculture, forestry and fishing together, which group accounted for 30% of employed persons.

In terms of trade, primary agricultural products exported in 1991 accounted for 67.3% of the value of total exports in that year. The proportion of primary agricultural exports has fluctuated over the years but has shown some increase since 1989. The continuing dominance of bananas in domestic exports compared to other agricultural produce was noteworthy. In 1991, bananas accounted for 61.3% of total domestic exports.

Banana production has experienced a very sharp decline due mainly to heavy dependence on the unstable European banana market. The greatest stability and steady increase was shown by the root crops [yams, aroids (dasheen, tannia and eddo), cassava and sweet potato]. Plantain production also increased by about 200%; this was due to the fact that farmers logically replaced the banana plantations with plantain (Musa spp.). Adding impetus to the changes in the crop production systems were the new policy positions adopted by the government to "diversify around bananas".

Changes in the crop production systems were mainly driven by the government policy of diversification to achieve the following:

- Replace banana by niche- market crop products
- Increase the availability of more healthy, nutritious, safe, locally grown and lower-costing staples thereby reducing the food import bill

The major constraints to production are follows:

- Praedial larceny
- Crop pest and diseases (such as the tannia root rot/leaf burning disease, viral diseases in vegetables, tuber weevils and grubs in sweet potato, anthracnose on yams, white fly, fruit fly on perennials, Lepidoptera on cucurbits, tristeza virus on citrus etc.)
- Lack of irrigation facilities
- Inadequate marketing facilities
- Limited feeder roads
- Spiraling costs of agricultural inputs
- Limited research capabilities (analytical diagnostic-soils, water, disease ect.)
- Unavailability and high cost of skilled labour
- Very limited processing facilities to create value added products
- Lack of access to agricultural credit and little or no crop insurance
- Rugged terrain and limited opportunities for agricultural mechanization

The needs to address the above-mentioned constraints are as follows:

- More efficient legal system
- A comprehensive marketing system
- More developed infrastructure (feeder roads, irrigation and postharvest handling facilities)
- More effective financing mechanisms
- Stronger research and development capabilities

CHAPTER 1

THE STATE OF DIVERSITY

1.1 Major Crops for Food Security

The major crops that ensure the staple food supply to the population of Dominica are shown in Table 3.

TABLE 3
A list of major crops for food security not in order of importance

Dasheen	Tomato	Guava	Ochra
Banana	Pumpkin	Pigeon pea	Lettuce
Sweet potato	Pakchoi	Passion fruit	Cabbage
Plantain	Maize	Sugar apple	Cucumber
Solanum potato	String bean	Mango	Pineapple
Yam	Watermelon	Citrus	Avocado
Cassava	Carrot	Coffee	Cocoa
Tannia	Egg plant	Amaranthus	Breadfruit

1.1.1 Banana and plantain (*Musa* spp)

Banana, plantain, avocado, citrus, mango and coconut are major components of rural hillsides in Dominica. There are currently more than 13 different cultivars of banana and plantain which are cultivated in Dominica. Of these, eight (4 banana and 4 plantain) are used for commercial production and were exported weekly. Recently a new cultivar was introduced as part of the banana replanting program.

1.1.2 Root crops (aroids, cassava, yam and sweet potato)

The root crops were the main staple food. The genetic base consisted of the following approximate number of varieties:

- Aroids –12
- Cassava – 5
- Yam – 13
- Sweet potato – 12

There is high priority need for early maturity, high yielding and low-input genotypes. The need is to identify genotypes that are disease resistant and which lend themselves to processing into marketable, value-added products such as flour, chips, ice-cream, livestock feeds, starch, baby foods, invalid diets and so on.

1.1.3 Fruit bearing vegetables (tomato, ochra, eggplant, cucurbits and hot pepper)

These species are cultivated by commercial and subsistence farmers using imported commercial seed obtained from a large number of international seed houses. Thus prevailing is a situation where a large number of varieties inclusive of hybrids, developed varieties, pure lines and landraces, are in circulation. Genetically, this is closest to the ideal situation where access to large numbers of different kind of varieties, is available. At the same time, this represents one of the greatest threats to food security especially in cases where these foreign multinational companies may become unable to maintain a steady seed supply for whatever reason. The other threat is the possible entry of technologies which would prevent farmers from recouping viable seeds from previous crops (not referring to hybrids) and lead to the contamination of the local landraces and wild types. The latter actually happened with the landraces of hot pepper where a landrace was almost lost since farmers bought the easily available seed of introduced hot pepper varieties.

1.1.4 Leafy and flower bearing vegetables (cabbage, lettuce, cauliflower, broccoli, pac choi and amaranths)

The situation with these species is the same as with the above group. The only difference is the fact that seed cannot be recouped by farmers from previous crops due to the ability of these plants to set commercial seed only in the temperate zone.

A major challenge is to breed cultivars or have access to germplasm with resistances to tropical pests and diseases.

The exception is amaranthus, popular local spinach, which sets seeds under local conditions.

1.1.5 Vegetables with edible roots and tubers (carrot, radish & beet)

Seed is supplied by the same overseas seed companies with significant investments into genetic improvement. As a result, numerous improved varieties are available on the market. Future needs would also be the same as above.

1.1.6 Perennials (mango, coconut, citrus, pineapple, guava, avocado, passion fruit and breadfruit)

The perennials fall roughly into two groups; one originating in the tropical Americas and the other introduced since the dawn of colonization; over time they have become endemic to the Caribbean. The first group of species comprises papaya, pineapple, guava, avocado and passion fruit. The other introduced germplasm includes mango, coconut, citrus and breadfruit.

The propagation of mango, citrus and avocado is mainly done through budding and grafting. There are citrus orchards, coconut groves and smaller avocado orchards. The other tree crops are mainly cultivated in mixed cropping systems and backyard gardens.

Many different varieties of mango were introduced.

The pineapple is represented by about six commercial varieties.

Breadfruit is seasonal and there are two main types, the yellow and the white flesh. There is no organized system of breadfruit propagation. There is room for much R&D work to develop more efficient propagation methods, shorten the time to flowering and bearing, create dwarf trees through crossing and selection and/or through the application of biotechnology. The whole process could be accelerated if high value, marketable, processed products are developed and commercialized.

1.2 Minor crops and underutilized species (tous-les-mois, medicinal herbs and spices, christophine, wild yam, seaside grape, fat pork, star apple, dunks and pomerac)

Many different fruits are underdeveloped and underexploited. The plants are found in the wilds where, when in season, they are harvested by wild life, small children and other gatherers. Some entrepreneurs harvest herbs in the wilds, process and sold them as herbal remedies.

The other underutilized species can be targeted with the aim of developing products destined for niche markets.

CHAPTER 2

THE STATE OF *IN SITU* MANAGEMENT

Inventories and surveys- assessments and priorities

2.1 Actions taken to improve inventories and surveys of plant genetic resources, crop-associated biodiversity and wild plants for food production over the past 10 years

Over the past ten years no action has been taken to improve inventories and surveys of plant genetic resources, crop associated biodiversity and wild plants for food production.

2.2 The greatest constraints to carrying out inventories and surveys for PGR crop associated biodiversity and wild plants for food production are as follows:

- Lack of policy direction specific to PGRFA
- No allocation of financial resources
- Absence of an adequate number of appropriately trained farmers, technicians and scientists

2.3 Ecological functions of crops and crop-associated biodiversity

The main agro-ecological functions played by crops and crop-associated biodiversity are first and foremost to provide a vegetative ground cover to vast expanses of lands located on steep hillsides. These areas are thereby protected from the ravages of heavy, torrential rains which can cause soil erosion, land slides and loss of significant quantities of water and soil resources. The second important function is to provide food and feed for human and animal populations. They also help in the entrapment and conversion of carbon dioxide to oxygen and helps in the reduction of greenhouse gases.

2.4 Priorities for future inventories and surveys for crop-associated biodiversity and wild plants for food production

Emphasis will be placed on the following:

- Plants with potential to improve food and nutrition security of the populace
- Medicinal herbs/plants
- Legumes and grass forages
- Plants with insecticidal and other such properties for use in pest management.

2.5 Capacity building needs and priorities to support inventory and surveys

In order to conduct inventories, the minimum personnel and infrastructure required will be the following:

- Trained farmers living in the communities
- Taxonomist, biochemist and other processing skills required for product development
- Laboratory facilities
- Legal and policy framework

On-farm management and improvement of plant genetic resources for food and agriculture

2.6 Extent of on-farm management of PGRFA within Dominica

A number of agricultural stations keep working germplasm collections of perennial fruit species and the root crops. These are utilized as mother plants to produce quality planting material for distribution to commercial producers and subsistence farmers. Private farmers as a rule, do not keep germplasm collections of food crops. A list of the perennials for which working collections are maintained, follows:

Crop Type	No. of cultivar/variety
Plumrose	2
Avocado	20
Citrus	16
Mango	20
Indian jujube	2
Guava	4
Golden apple	1
Coconut	4
Carambola	5
Sapodilla	3

2.7 Incentives used to promote on-farm management of PGRFA

There were currently some incentives offered to promote on-farm management of vegetable seedlings and root crop planting material. Training and some production inputs were provided to farmers gratis.

2.8 Establishment of national/regional forum for stakeholders involved in on-farm conservation

There was no establishment of any forum for stakeholders involved in on-farm conservation.

2.9 Support for on-farm participatory plant breeding programmes

The only example of participatory plant breeding was when segregating lines of hot pepper were circulated in order to get farmers to participate in the selection process.

No feedback was received from the farmers.

2.10 Support for the development of local planting material/seed multiplication

A programme for multiplication and distribution of selected tree crops and root crop planting material was carried out by six government owned agricultural stations at Grand Bay, Botanical Gardens, Hillsborough Horticultural Centre, Portsmouth Agricultural Station, Woodford Hill Agricultural Station and La Plaine Agricultural Station. No programme was implemented to promote small-scale seed production. Farmers were trained in the production of their own clean planting material for the root crops (dasheen, tannia, yam, cassava and sweet potato) and plantain and banana.

2.11 Additional actions to support on-farm management

Facilitation of access to a wider range of planting material was sustained through the following activities:

- Maintenance of germplasm collections on government agricultural stations
- Private farmers are supplied with inputs to assist in the maintenance of small core collections of selected fruit trees
- Subsidized sales of perennial planting material including root crop and vegetables
- Zero taxation on agricultural inputs
- Strategic collaboration between the MoA and CARDI/CAPGERNET, the Peoples Republic of China (PRC) Agricultural Mission, and the FAO International Treaty on PGRFA .
- Training of farmers and technicians in propagation and conservation methods

2.12 Establishment of mechanisms to replace plant genetic resources for food and agriculture after disaster

FAO is assisting with plans, now in progress, to develop a formal disaster preparedness and mitigation plan for the agricultural sector. However, the following are some activities commonly undertaken after hurricane disasters:

- Distribution of vegetable seed and root crop planting material
- Distribution of agricultural inputs such as fertilizers, propagation media and greenhouse and shade house covering
- Training in rapid multiplication techniques to farmers and technicians
- Increased distribution of planting material of perennials

2.13 Major constraints to the establishment of effective plant genetic resources disaster response mechanisms

- Shortages of mother plants after natural disasters
- Lack of resources in personnel, facilities and funds

2.14 Needs and priorities to improve plant genetic resources disaster response mechanisms

- Development of a National Disaster Preparedness and Mitigation Plan for the agricultural sector
- Budgetary allocations for the maintenance of germplasm banks on-farms and agricultural stations to support disaster response.
- Budgetary allocations to support public sector plant propagation programmes for food production. Incentive should also be provided to encourage private sector operatives involved in plant propagation post disaster.

2.15 Requirements for improving regional and international disaster response mechanisms

The main requirement is a network to move information and germplasm safely and rapidly between the member countries around the region. Germplasm from international gene banks should be accessed in an equally rapid and safe fashion. There is also the need for a mechanism to help prevent large scale destruction through timely action assessment of the scope of the disaster.

2.16 Actions taken to encourage and support *in situ* conservation of PGR, crop associated biodiversity and wild plants for food production

The actions taken are as follows:

- 28% of total land area has been devoted to national park system whereby strict regulations govern the conservation and utilization of the PGR including those for food and agriculture
- Only selective felling and removal of timber is legally allowed

2.17 The greatest limitations to *in situ* conservation of plant genetic resources, crop associated biodiversity and wild plants for food production

- Praedial larceny and security
- Lack of infrastructure, human resources, and other capacities
- Weak collaboration and linkages among national institutions
- Unawareness of international protocols and lack of legal framework at the national and regional level – no local laws to specifically regulate this activity
- Rapid and steady genetic erosion in small island states

2.18 Priorities and needs to enhance *in situ* conservation

Correct the points listed above at 2.17. Additionally the following should be done:

- Conduct inventories and surveys of *in situ* PGRFA
- Put legal, financial and institutional mechanisms in place to make *in situ* conservation of PGR possible
- Plan comprehensive *in situ* conservation programmes and make adequate budgetary arrangements for implementation

2.19 Research priorities to support *in situ* management

- Inventorying and characterization of plant genetic resources
- Develop marketable products (including botanicals, neutraceuticals, craft etc.)
- Train stakeholders for operationalization of programmes
- Determine carrying capacity of natural rangeland pastures of indigenous forage species
- Determine methods of propagating, replanting and establishing commercial production

2.20 Priorities for policy development to support improved plant genetic resources *in situ* management

- Appropriate legislation and policy for the efficient management of *in situ* plant genetic resources for food
- Develop and finance programmes for efficient management
- Facilitate free exchange of information and germplasm regionally and internationally

2.21 Other strategic directions relevant to improving the state of *in situ* management of PGRFA

- Development of programmes to conserve all the forested mountain slopes which are too steep to cultivate; mobilize resources through green schemes for carbon credits from international supporters/donors. Plant fruit bearing and useful plants within this framework
- Involve the local communities in monitoring this development and devise an incentive system to reward the local populace to interplant, care for and utilize the PGRFA *in situ* in a sustainable manner
- Develop handicraft, nutritional and medical products from species found in the wilds and establish sustainable industries in these rural communities

2.22 Methods employed to achieve *in situ* management of plant genetic resources for food and agriculture

The methods described below encompass entire ecosystems inclusive of plant genetic resources for food and agriculture such as the medicinal plants, forage species and wild fruits.
These methods have been applied at the national level for the conservation of natural resources.
A number of legislative instruments indirectly affect the management and development of PGRFA within protected areas. These include:

- National Parks and Protected Areas Act, 1975;
- Forest Act, 1958;
- Forestry and Wildlife Act, 1976; and
- Physical Planning Act, 2002.

The National Parks and Protected Areas Act, 1975 provides for the declaration of protected areas, leasing of land to add to parks, and the organization of all parks and protected areas into a system of protected areas (Section 3(1)). One purpose for which protected areas may be declared is "preserving the natural beauty of such area, including flora and fauna."

The Morne Trios Pitons National Parks and the Cabrits National Park were both declared under this Act.

The Forest Act, 1958 focuses on forest management. An entire section of the Act (Part II) focuses on protected areas. It provides for the declaration of forest reserves (Section 3) and protected forests (Section 4) for a range of purposes, including disaster mitigation.

The Forestry and Wildlife Act, 1976 is focused primarily on wildlife conservation, though it deals with the issue of hunting to a much larger extent than species management or habitat protection.

The Physical Planning Act, 2002 provides for the orderly development of land through the preparation of development plans and regulation of construction activities. The Act also established the Physical Planning and Development Control Authority to implement the provisions of the Act (Section 4).

The Act treats protected areas in a number of ways. First, it allocates land for conservation purposes through the preparation of land use/development plans.

Secondly, it provides for the use of environmental impact assessment (EIA) tools to assess development impacts, even within protected areas. Third, the Act contains provisions for environmental protection, which address the protection of historical resources through the use of building preservation orders (Section 47); landscape features and habitats through the use of plant preservation orders (Section 49); and general environmental quality through the use of environmental protection area designations (Sections 56-60).

Source: "REVIEW OF THE POLICY, LEGAL AND INSTITUTIONAL FRAMEWORKS FOR PROTECTED AREAS MANAGEMENT IN DOMINICA" Prepared by: Lloyd Gardner, Environmental Support Services, LLC, December 30, 2006

2.23 Obstacles to improving methods for *in situ* management of plant genetic resources

Although a legislative framework is already in place for *in situ* management of plant genetic resources, the following obstacles must be removed in order for the legislation to be fully effective:

- Lack of personnel at all levels (farmers, extensionists, research scientists, policy makers)
- Absence of R&D programmes specially designed to improve the *in situ* management methods

2.23.1 How to overcome these obstacles

- Sensitize policy makers to the need to safeguard the available plant genetic resources and energize them to ratify relevant international protocols (International Treaty on Plant Genetic Resources for Food and Agriculture, The Global Crop Diversity Trust Fund, UPOV, Plant Breeders Rights etc). Pass relevant laws to empower the local authorities (farmers) in the sustainable utilization and conservation of PGRFA.
- Mobilize resources and establish programmes with the goals to analyze, assess genetic diversity, halt genetic erosion and remove the vulnerability of plant genetic resources and biodiversity, in general.

CHAPTER 3

THE STATE OF *EX SITU* MANAGEMENT

Sustaining and expanding *ex situ* collections

3.1 Actions taken to sustain *ex situ* plant genetic resources over the past ten years

The following institutions were involved in maintaining *ex situ* collections of plant genetic resources: The Forestry and Wildlife Division of the Commonwealth of Dominica with responsibility for the Botanical Gardens, National Parks, and National Forest Reserves, The Chinese Agricultural Mission (previously the Taiwan Agricultural Mission, now the PRC Agricultural Mission), the Caribbean Agricultural Research and Development Institute (CARDI) and the actions of farmers and hobbyists in maintaining private collections . Some of the important collections that were maintained for food and agriculture, were sweet potato, cassava, pitaya, pineapple, herbs and spices, banana, plantain, citrus, avocado, guava, papaya, plumrose, mango, Indian jujube, golden apple, coconut, carambola and wax apple.

3.2 Greatest constraints to sustaining *ex situ* plant genetic resources collection over the next ten years

- Lack of infrastructure, human resources and other relevant capacities
- Disaster prone environment (from hurricanes, earthquakes, pests and diseases, floods and droughts)
- Lack of a clear policies
- Praedial larceny and security
- Rapid genetic erosion

3.3 Involvement of botanic gardens

Botanic gardens are not involved in the conservation of PGRFA. This particular botanic garden in Roseau functions more as a public park than anything else.

3.4 Greatest constraints to expanding plant genetic resources *ex situ* collections over next ten years

- Lack of policy
- Competition for limited land space and other resources
- Inadequate human, infrastructure and financial resources
- Low level of awareness of populace and policy makers of the importance for expansion
- Frequency and scope of natural disasters (hurricanes and earthquakes)

3.5 Priorities for sustaining and expanding *ex situ* plant genetic resources over next ten years

Major crops

- Root and tuber crops (Aroids, yams, cassava and sweet potato)
- Perennial fruits (avocado, guava, sapodilla, sugar apple and golden apple)
- Annual fruits (pineapple, papaya and passion fruit)
- Vegetables (cucurbits, pigeon pea, ochra, tomato and hot pepper)

Minor crops

- Underutilized fruits (sea grapes, plumrose, star apple)

Wild plants

- Wild fruits and medicinal plants
- Indigenous grass and legume forage crops

3.6 Safety duplications for unique accessions

Safety duplications have not been established for unique accessions; however, this is a priority activity and should be done as soon as the following obstacles can be surmounted:

- Inadequacy of trained personnel, land, funds and other essential capacities
- Inadequate infrastructure of laboratory, hardening nurseries, greenhouses and fields

3.7 Establishment of systems to better document *ex situ* plant genetic resources collections

Improved documentation systems for characterization hand recording data for *ex situ* plant genetic resources collections, have not been put in place: however, this activity is of high priority and should be done as soon as the following needs are met:

- Strengthen linkages with regional and international PGR network
- Put in place a mechanism with appropriate staffing and equipment to manage information (characterization, data base and information network)

3.8 Priorities for research to expand and improve *ex situ* PGR conservation over the next 10 years

- Increase the number of accessions in the working collections for the priority food crops
- Collect the accessions of the indigenous food crop species and establish working collections
- Set up a computerised database to record, store and exchange characterization data
- Create security duplicates of working germplasm collections in collaboration with regional and international gene banks

3.9 Regional and international cooperative arrangements to enhance *ex situ* plant genetic resources

The national efforts are linked to international institutions via the regional PGR network of CAPGERNet which has established linkages with some hemispheric PGR networks (NORGEN, INIFAT, IDIAF, INIBAP, CATIE, REDARFIT, REMERFI, TROPIGEN, PROCISUR, MUSALAC, NORGEN and PROCIANDINO), with Bioversity International, the GCDT and FAO/IAEA, IICA, TM, FAO/AGPS, EMBRAPA, CGIAR centers (CIAT, CIP, CIMMYT, IITA etc), AVRDC, CIRAD, INRA and commodity networks such as COGENT. Germplasm (cassava, banana, vegetables, sweet potato etc.) has been supplied to the region on a regular basis through some of these networks.

3.10 Management practice employed to prevent genetic erosion in collection during regeneration

- Ensure against loss by storing true seeds
- Duplicate working collections at more than one site

3.11 Priorities for maintaining viability and preventing genetic erosion in *ex situ* plant genetic resources collection over the next ten years

Top priority is assigned to maintaining viability and preventing genetic erosion in major crops listed in Article 3.5. The constraint of inadequately trained and small numbers of scientific personnel and weak infrastructure (such as seed storage facilities, unreliable power supply, autoclaves, growth chamber etc) are the main challenges.

3.12 Priorities for regional and international cooperation and assistance for maintaining viability and preventing genetic erosion

Technical assistance in the form of improved germplasm would be sought first among regional and international organizations and countries such as CAPGERNet/CARDI, Cuba (INIVIT, INIFAT), Guadeloupe (INRA) and Martinique (CIRAD), INIBAP, IICA, the PRC, FAO, AVRDC, EMBRAPA, CIAT, CIP, CIMMYT, JICA and Bioversity International.

3.13 Collecting activities undertaken over the past ten years to improve *ex situ* plant genetic resources coverage

Over the last decade, the following species were collected by three organizations as follows:

- Ministry of Agriculture: *citrus* 13 accessions
- CARDI: 1 group of hot pepper (the landrace called Bonda Ma Jacque)
- The collections of perennial fruits and nuts (*Musa* spp, mango, avocado, citrus, breadfruit, coconut) as compared to the total existing diversity, is minimal.

3.14 Identification of major gaps in *ex situ* plant genetic resource

Gaps were identified within the categories of Major crops, Minor crops, underutilized species, forages and wild plants. The gaps identified are as follows:

TABLE 6
Estimates of the gap in collected and uncollected PGR for food

Species	Percentage collected	Percentage uncollected
Papaya	0	100
Avocado	0	100
Guava	2	98
Mango	40	60
Cashew	0	100
Breadfruit	15	85
Banana and plantain	40	60
Hot pepper (*C. chinense* Jacq.)	10	90
Ananas	0	100
Cucurbits	0	100
Aroids	25	75
Yam	15	85
Sweet potato	68	32
Cassava	8	92
Passion fruit and wild relatives	5	95
Herbs and species	10	90
Grass and leguminous forage species	0	100
Tomato	0	100

Overcoming the identified gaps will be addressed by implementing the following:

- Greater public and political awareness of benefit of PGR conservation
- Create an inventory of all PGR germplasm in country
- Web-based access to information on PGR for the 20 priority crops

- Develop systems that will enable greater utilization by farmers, processors and breeders. For instance exploitation of the PGR to develop agric-food industries
- Research and development leading to innovative technologies for conservation and utilisation of germplasm

3.15 Greatest constraints to collecting missions in the next ten years

- Reduced accessibility to hinterland because of reduced security
- Difficult terrain due to rugged hilly mountainous topography
- Lack of a comprehensive system (human resources and physical capacities) for the management of PGR germplasm after collection
- Lack of an efficient system that will enable greater utilization of PGR by farmers, processors and breeders in order to create agric-food industries and generate wealth.

3.16 Collecting priorities and needs for major and minor crops, underutilized species, forages, wild plants for food production, and wild relatives

The main staples that were introduced into the island were usually collected and maintained in the international gene banks which could be accessed when the need arose. However, the indigenous species of food crop that are represented by a wide genetic diversity growing *in situ* on-farms and in the wilds, need to be collected and conserved.

Some of these species are the guava, papaya, avocado, hot pepper, forage legumes, yams, cucurbits, medicinal herbs and culinary spices.

3.17 Research and development needs and priorities in relation to enhancing collecting of PGR for food and agriculture

- Technology and the infrastructure to develop marketable products from collected PGR
- Research and development infrastructure and equipment
- Trained personnel at all levels
- Marketing system for developed products from PGR
- Linkages with successful cutting-edge regional and international institutions for product development, marketing and germplasm conservation according to the national needs and capabilities

3.18 Priority needs and measures

- Rationalizing collections through regional and international collaboration and sharing of facilities
- Improved germplasm management of working collections which should be expanded to widen the available genetic base of major crops
- Complete safety duplication arrangements with other regional and international organisations

3.19 Other strategic direction

- Inventorising and assessment of PGR biodiversity vis-à-vis rate of genetic erosion of the indigenous species

3.20 Methods employed for *ex situ* conservation of PGR

- True seeds
- *In vivo*

In vitro conservation techniques represent the latest innovative technique utilized in PGR conservation.The sole laboratory for *in vitro* conservation was closed down. Germplasm is received from regional and international *in vitro* such as the root crops which are subsequently weaned and hardened locally.

3.21 Obstacles to obtaining and using available *ex situ* methods for conservation of PGR

- Inadequate land availability, ill equipped laboratory, inadequate weaning nurseries and lack of other essential resources
- Praedial larceny and reduced security
- Inadequately trained human resources, and other sub-standard capacities
- Weak collaboration among regional institutions eg with the UWI and INRA

The above mentioned obstacles are not exhaustive.

CHAPTER 4

THE STATE OF USE

Distribution of PGRFA

4.1 Established mechanisms to record the distribution of samples of conserved PGRFA to breeding programmes

No institution distributes PGR germplasm to breeding programmes. Planting material in the form of true seeds, grafted/budded plantlets or hardened plantlets are distributed to farmers for commercial production purposes.

4.2 Examples of recent improvements in crop production through the use of particular varieties that demonstrate the contribution of PGRFA

- A hot pepper variety called CARDI Green was introduced for production and it was a success on the Miami market

4. 3 Constraints to the improved use of PGR

- Insufficient capacities for plant breeding and management of PGRFA generally
- The long-term nature of pre-breeding activities required to broaden the base of breeding materials
- Weak policy development
- Lack of coordination among researchers, breeders, gene bank managers and farmers

4.4 Activities undertaken to enhace the use of PGR

- Work is in progress on the establishment of a citrus certification programme. This includes the introduction of germplasm (rootstocks), a propagation facility, improvements in plant and equipment for the plant protection laboratory, capacity building for staff and recruitment of additional staff.
- In the case of and hot pepper (Bonda Ma Jacque), CARDI Dominica has been involved in the collection and bulking up of seed of hot pepper for pungency assessment, agronomic evaluation, stabilization and commercialization. CARDI has also conducted research on the problem of anthracnose in yams, and validation of the performance of three marketable cultivars of pineapple in different agro-ecological zones.
- A number of plant enthusiasts and hobbyists continue the maintenance of their different collections.

4.5 Current priorities and needs to implement them

- Strengthening capacity and improved training in plant breeding and germplasm management
- Increased collaboration among researchers, breeders, gene bank managers and farmers
- Exploring marketing opportunities for products of local varieties and diversity-rich products
- Facilitate the direct use by farmers of landraces/farmers varieties and other genetic material which should be conserved in gene banks
- Improve the regulatory and policy frameworks to facilitate greater use and conservation of plant genetic resources for food and agriculture

4.6 Characterization and evaluation of PGR for food and agriculture

As noted earlier, characterizing and evaluation of hot pepper landrace for pungency assessment and commercialization, and evaluation of pineapple and resistant citrus rootstocks, are ongoing. Information systems are still in the developmental stages.

4.7 Obstacles to utilization of PGR owing to non-characterization and non-evaluation

Characterization and evaluation are not the main limiting factors to the utilization of PGRFA.

4.8 Core collection establishment

The obstacles to the establishment of core collections are mainly the lack of human and other resources for the proper management of PGRFA.

4.9 Plant breeding Capacity and plant breeding goals

Dominica does not have capacity in plant breeding. However, skills can be requested from regional and international organizations when necessary. There are no plant breeding goals in the national agricultural programmes.

4.10 Future research priorities to enhance use of PGR

Establishment of an efficient information system which details PGR inventory and accurately defines farmer's needs in terms of type of varieties, quantities and planting schedules. Moreover there is need for the creation of a feedback mechanism on the performance of PGR on-farms.

4.11 Constraints to achieving diversification and broadening genetic base of crops

- Policy and legal obstacles
- Marketing/commercial obstacles
- Limited capacity to produce increased volumes of planting material

4.12 Strategies to address genetic vulnerability in farming systems

Strategies to address genetic vulnerability in farming systems include the following:

collaboration with regional and international organizations in order to increase the number of varieties introduced and evaluated; increasing the capacities for R&D in refinement of production systems, stabilizing the slopes through terracing and planting of the right species for soil conservation, protecting the most rugged and mountainous terrain from destructive utilization and conservation measures to stop deforestation. The physical conservation measures directly help prevent genetic erosion.

4.13. Seed supply system and role of markets

Both the public and private sectors are involved in seed production and distribution.

4.14 Constraints to the availability of good quality seeds of a wide range of plant varieties

The current system of planting material production and distribution is not fully efficient in that the farmers fail to access quality planting material at the right time; sometime low germination seed is supplied later than required. The main reasons are the absence of consultation between farmers and suppliers of seed/planting material. There are also no regulatory body to oversee the quality of planting material sold to farmers.

4.15 Priorities to improve seed production and distribution over the next ten years

- Establish an information system for smooth flow of farmer needs to the planting material/seed suppliers
- Establish a national regulatory body to monitor inputs supplied to farmers by the private and public sector services
- Improvements to seed/planting material propagation facilities based on international standards

4.16 Major constraints in making seeds of new varieties available in the market place

- Prohibitive costs to farmers
- There is no conscious search and acquisition of new and improved varieties of different crop by the current private sector seed suppliers. However, the public sector does perform this function to a limited extent. Vegetative planting material is multiplied and distributed by the Ministry of Agriculture, CARDI and the Republic of China. There is a conscious and successful effort to utilize superior germplasm for the major food crop species.

4.17 Effects of the location of market

Different varieties are cultivated for the local and export markets for the following crops:
tannia, dasheen, bananas and mango. However there is no differentiation between varieties for all the other crops.

4.18 Measure undertaken to support development of new markets for local varieties and diversity rich products

Activities undertaken include but not limited to the following:

- Establishment of DEXIA (Dominican Export Import Agency) to promote production and export marketing of a wide range of tropical crop products
- Promotion of products at trade shows
- National and international exhibitions and workshops
- Consultation with foreign importers of tropical products
- Establishment of agro processing laboratories

4.19 Constraints faced by Dominica in attempting to increase markets for local varieties and diversity-rich products – needs and priorities:

One of the biggest constraints is the variable quantities and quality produced by many small farms. The main export markets do not demand diversity-rich products; the demands are for large quantities of uniform products. Advertisements and promotion of diversity-rich products in North America and Europe are too costly for small economies.

4.20 Strategies to better link small scale producers with local and export markets:

- Establishment of a marketing agency, DEXIA.
- Training in production, post-harvest and processing practices for the export market
- Improvements to the deep water harbors in Roseau and Portsmouth
- Improvements to feeder roads and packing houses

4.21 Other strategic directions relevant to improving the state of use of plant genetic resources, including minor and major crops and underutilized species at the national, regional and global levels

There are national programmes addressing the utilization of PGR for particular food crops. The efforts are usually sporadic by private entrepreneurs. Needs at the national level include the industrialisation of the agricultural sector whereby infrastructure would be improved. Skilled and qualified scientists can be drawn from the regional and international levels. These coupled with financial resources can then implement programmes to improve the use and conservation of PGRFA.

Crop improvement programmes and food security

4.22 Best description of the state of Dominica's crop improvement programme:

- Basic formal-sector crop improvement programmes in place.

4.23 Crops that have benefited from improvement programmes

- Banana, plantain, dasheen, tannia, eddo, yam, sweet potato, vegetables, *citrus*, mango, avocado, coconut, pineapple, passion fruit, hot pepper and herbs.

4.24 Contribution of crop improvement to food security

The crop improvement programmes have resulted in the production of the staple crops (dasheen, eddo, tannia, yam, banana, plantain, vegetables and fruits) in adequate quantities to ensure food security. In addition, Dominica exports significant quantities of banana, dasheen, tannia, yam, plantain, fruits (mango, avocado, citrus and coconut products) and hot pepper products (fresh berries and hot sauces) to the Caribbean, North America and Europe.

4.25 Plant breeding programmes to increase crop resistance to pests and diseases

Dominica does not carry out any plant breeding programmes; however, collaborative work is being done with UWI and CARDI with the aim of breeding for yam resistance to anthracnose and the selection of the local landrace of hot pepper for tolerance to the major pests and diseases.

4.26 Participatory crop improvement programmes in Dominica

All the stakeholders were involved in the crop improvement programmes implemented so far. The Ministry of Agriculture convened regular periodic meetings of all stakeholders, particularly representatives of the farmers, for review and planning of these programmes. The farmers were given a range of inputs and monitored in order to provide feedback.

4.27 Expected changes in the use of plant genetic resources in the next 10 years in Dominica

Significant changes in the use of PGRFA can be expected in Dominica over the next 10 years because of the following main reasons:

- Many farmers are turning towards protected production systems through the use of greenhouses. This production system impacts on the reduction of drudgery, protection from harsh weather conditions and keeps out certain pests and diseases. However, new varieties and inputs must be used to maximise benefits from this production system which could increase both yields and quality of products;
- The entire Island has been declared a "green" zone where organic farming is actively being promoted and conservation measures implemented ;
- Since the decline in the banana industry, the landscape is changing rapidly; other crops are replacing banana. Perennial (*citrus*, mango, avocado etc) orchards are being developed. Root crops (dasheen, tannia, yam, cassava and sweet potato) will regain prominence in the fields, diets of the people and on the marketplace.

State of the Art

4.28 Plant breeding methods employed in Dominica

The genetic improvement work being done in Dominica centers on the purification and stabilization of the hot pepper landrace "Bonda Ma Jacque". Selfing and selection are practiced in order to retain the lines with the best quality and agronomic characters. Screening and selection for resistance in yam to anthracnose are done in collaboration with UWI, Cave Hill Campus in Barbados. In addition, the country is the recipient of improved varieties supplied for evaluation by regional and international breeding institutions and seed houses.

CHAPTER 5

THE STATE OF NATIONAL PROGRAMMES, TRAINING AND LEGISLATION

Nationals Programmes

5.1 Dominican National Programme for PGR – structure and main functions

Such a national programme has not been instituted as yet.

5.2 The ways in which national stakeholders are involved in planning and implementing National Programmes

National stakeholders make their inputs into planning and implementation through various consultative forums such as the following: a forum of stakeholders convened by the Ministry of Agriculture periodically; workshops and conferences on crop commodities (hot pepper, *citrus* etc). Progress reports and plans on implementation of National Crop Development Programmes are presented at these forums (review and planning process).

5.3 The legal framework for PGR Strategies, Plans and Programmes

There is no separate legal framework addressing PGR.

5.4 Integration of PGR National Programme with the other National Programmes for agriculture, biodiversity, development and environment programmes

The national crop development programmes include aspects of PGR management, conservation of biodiversity and environmental protection.

5.5 Trends in support of PGR Programmes over the past 10 years

Over the past 10 years the situation remained the same as described in Article 5.4 above.

5.6 Gaps in current level of financial support necessary to achieve national PGR goals

The annual budget for agriculture includes financing for the supply of various types of planting material and seed. This level of financing is inadequate to achieve national PGR goals in any comprehensive way.

5.7 Main challenges, needs and priorities in maintaining or strengthening national PGR Programmes over the next 10 years

Over the next 10 years, the entire question of developing national PGR programmes should be addressed beginning from capacity building to institutionalizing the programmes. The main challenges are as follows:

- Capacity building [programme development, training human resources, establishing physical infrastructure (planting material production and storage facilities, nurseries, biotechnological laboratories etc)
- Mobilizing financial resources
- Establishment of working germplasm collections for priority crops
- Establishment of a programme of inventorying and characterizing the indigenous species for food and agriculture

Networks

5.8 National Networks developed for PGR over the past 10 years

No national networks were developed for PGR over the past 10 years. However, the linkages with the regional networks, CAPGERNet, CAROT, CIPMNet etc, were functional.

Education and Training

5.9 Needs and priorities for education and training in support of the sustainable use, development and conservation of PGR

Training at all levels is needed.

5.10 Main obstacles to providing required education and training and what can be done to address the obstacles

The main obstacles are the availability of young scholars who are willing to be trained in the agricultural sector and remain to work in the country. On the short and medium term, the lack of skilled personnel can be addressed through the implementation of special PGR projects with training components.

5.11 The national strategy to address education and training needs for PGR

The UWI trains young scientists. This is done on a voluntary basis; the young people coming out of the high schools, once they attain the level of success, may opt for training in the UWI or in universities in North America or Europe. Some governmental scholarships are awarded to the youths upon graduation from the high schools.

5.12 Identified opportunities for education and training abroad and the obstacles in accessing these training opportunities

The obstacles in accessing training opportunities are firstly the availability of suitable candidates followed by the lack of financial resources.

National Legislation

5.13 Legislation or Regulations relevant to PGR over the past 10 years

Some laws on conservation of the natural environment and biodiversity were passed. These were indirectly relevant to PGR management.

5.14 Obstacles identified to the development of legislation and regulations relevant to PGR – needs and priorities to address the obstacles

Low level of priority, the lack of trained personnel and financial resources.

Information System

5.15 Information management systems to support efforts to sustainable use, develop and conserve PGR

Weak information management systems exist within crop improvement programmes, to indirectly support PGR management.

5.16 Computerized documentation systems with standard formats to facilitate data exchange

Such systems have not been established.

5.17 Main challenges, needs and priorities for developing and enhancing information management systems for PGR and seeds

Lack of trained personnel, no programmes in place and little financial resources.

Public Awareness

5.18 The level of awareness of the roles and values of plant genetic resources in Dominica

The level of awareness is fairly well developed but little resources were allocated to support PGR management.

5.19 Awareness programmes for PGR developed

Crop development programmes include components for PGR awareness.

5.20 Constraints to developing public awareness programmes for PGR – needs and priorities to address constraints

Lack of trained personnel and financial resources.

State of the Art

5.21 Methods to assess value of PGR and its contribution to the economy

The current methods include the level of food security, income derived from crop products and hard currency earned from export of crop commodities. In addition, the percentage of the GDP contributed by the agricultural sector and the provision of employment are important criteria.

5.22 Financial incentives and other funding measures for the conservation and sustainable use of PGR

Such incentives are included in schemes and measures taken to develop particular crops. Planting material from improved varieties is distributed at low cost to farmers.

5.23 Other state of the art legal and economic methods employed to achieve PGR goals

The laws passed for the general protection of the environment and biodiversity, in general, apply to PGRFA. The crop development programmes utilize resources to improve the use of PGRFA.

CHAPTER 6

THE STATE OF REGIONAL AND INTERNATIONAL COLLABORATION

Regional and International Programmes

6.1 Regional, sub-regional, crop-based or thematic networks for PGR International Programmes

CAPGERNet, CIPMNet, CAPHNet and CAROT.

6.2 Needs and priorities to develop or strengthen international networks for PGR

The greatest needs are in trained personnel followed by financial resources. Without trained personnel there will always be a low level of appreciation of the full importance of PGRFA.

6.3 Most beneficial international programmes for PGR in Dominica, the reasons and changes over the past 10 years

No direct PGR programme was implemented.

6.4 The needs of Dominica and priorities for future international collaboration

- Capacity building in areas training of human resources, of policy and legislative framework,
- Inventorising, characterisation and monitoring and evaluation of PGR programmes,
- product development, industrial production and marketing.

International Agreements

6.5 International agreements, treaties, conventions or trade agreements over the past 10 years that are relevant to the sustainable use, development and conservation of PGR and their impact on the PGR of Dominica

The CBD Convention, the Biosafety Protocol, and CITES. The Treaty on PGRFA is pending ratification.

CHAPTER 7

ACCESS TO PGR AND SHARING OF BENEFITS ARISING OUT OF THEIR USE, AND FARMERS' RIGHTS

Access to PGR

7.1 International agreements relevant to access to PGR over the past 10 years and sharing of benefits arising out their use

The CBD Convention and the Biosafety Protocol.

7.2 Over the past 10 years, has Dominica developed or modified national legislation and policies or taken other actions in terms of providing access to PGR within the country and sharing of benefits arising out of their use?

No. However, several meetings and workshops have put recommendations forward on the use of PGRFA.

7.3 Over the past 10 years has Dominica undertaken any management action to maintain or enhance access to PGR located outside the country?

New varieties of hot pepper were introduced through CAPGERNet/CARDI and the commercial seed houses brought in vegetable seeds of new varieties routinely.

7.4 Is gaining access to PGR about the same, improving or more difficult over the past 10 years?

It is about the same for PGR in the form of true seeds. However, it is getting more difficult for PGR entering the country as vegetative propagules.

7.5 Over the past 10 years, has Dominica encountered any difficulties in maintaining or enhancing access to PGR located outside the country? Is access adequate to support agricultural food security and development goals? If not, what should be done to improve the situation? Describe the obstacles, if any, and lists the ways to overcome them.

Access to PGR is not adequate.

More efficient and vibrant ways should be found to introduce new and improved varieties of all the major crop species from regional and international gene banks in order to institute a process of continuous evaluation for resistances to pests and diseases, higher productivity, higher quality and higher nutritive value inter alia. Such a system of continuous introductions is essential since there is no breeding programme in the country.

The obstacles and ways to overcome them are as follows:

- No breeding programmes - such PGR management programmes should be put into place
- Lack of trained personnel - train or recruit the requisite skills to manage PGR
- Lack of resources - resources should be obtained from donors to implement a PGR management programme

7.6 Restrictions to access certain types of PGR; describe them and give reasons for themOnly plant quarantine restrictions apply to all introductions.

Only plant quarantine restrictions apply to all introductions.

Fair and Equitable Sharing of the Benefits of the Use of PGR

7.7 What are the benefits arising from the use of PGR in Dominica?

Benefits include food and nutrition security for the populace, employment and income, health and wellness. There is no starvation in the country.

7.8 Who shares in the benefits arising from the use of PGR in Dominica?

The populace is supplied with sufficient quantities of staple foods. The farmers and food vendors make their living directly from the use of PGR. Other stakeholders such as the Ministry of Agriculture and external institutions involved in agricultural R&D also benefit.

7.9 Has Dominica established mechanisms for sharing benefits arising out of the use of PGR? If yes, describe them.

No mechanisms in particular have been established apart from commercial and subsistence farming and trade in food products. Importation and sale of planting material benefit the private entrepreneurs.

7.10 Identify and describe the obstacles to achieving or enhancing the fair and equitable sharing of the benefits from the use of PGR

The main obstacle is the absence of a policy and associated legislation/regulations on access and benefit sharing.

7.11 The importance of maintaining or enhancing access to PGR and benefit sharing and provide any other strategic directions for maintaining or improving access and benefit sharing

No farmer should be hindered in any way whatsoever from recouping seeds from the previous crop.

Planting material which are imported and sold to producers provide access at a price which benefit the local vendors and the foreign seed companies.

Implementation of Farmers' Rights

7.12 Over the past 10 years, has Dominica subscribed to any international agreements that are relevant to the implementation of Farmers' rights? If so, list them.

The CBD Convention.

7.13 Over the past the past 10 years has Dominica developed or modified national legislation and policies to achieve or enhance the implementation of Farmers' Rights? If so, describe the action taken and reasons for it: No action on these issues

No action has been taken on these issues.

7.14 Has Dominica identified obstacles to achieving or enhancing the implementation of Farmers' Rights? If so, describe the obstacles and ways to overcome them

Farmers' rights over fields, crops and PGR were always taken for granted. No obstacles to these rights have been identified.

CHAPTER 8

THE CONTRIBUTION OF PGRFA MANAGEMENT TO FOOD SECURITY AND SUSTAINABLE DEVELOPMENT

8.1 Indicate the status, needs and priorities to improve the contribution of PGR management to food security and sustainable development

The country is enjoying a satisfactory state of food security. There is no starvation reported or evident. There may be malnutrition but that is another health matter to be solved mainly through education. The need is to increase and sustain the diversity of PGR used for food and provide affordable staples through maintaining and improving the present levels of productivity in plantain, banana, root crops, fruits and vegetables.

8.2 Provide information in the following areas

Contribution to agricultural sustainabilityl

In order to sustain agricultural production it is necessary to achieve the following:

1. Provide quality planting material of improved varieties of banana, plantain, the staple root crops, fruits and vegetables; the prices of these inputs should be kept within the reach of the farmers.
2. All the other essential inputs should also be made affordable through subsidies.
3. The rural farm infrastructure (feeder roads, irrigation facilities, extension services and analytical laboratories) should be strengthened.
4. the urgent industrialisation of the agricultural sector whereby the processing capabilities would be expanded in order to increase the export of only high priced products with long shelf life.
5. Improve all aspects of marketing of agricultural products

Contribution to food security

1. Guarantee the sustainable supply of quality planting material of all the staple crops (Musa spp, root crops, perennial and annual fruit crops and vegetables). Ensure good rural infrastructure (to permit easy access to and from fields, to facilitate drainage and irrigation, to allow for processing into convenience foods and marketing facilities.
2. Facilitate access to safe, effective and affordable agricultural inputs such as fertilisers, pesticides and herbicides
3. Ensure good support from the extension services

Contribution to economic development

The industrialisation of the agricultural sector will drive economic development. The processing facilities will purchase increased supplies of raw material from the farmers and export products with higher shelf life. Processed products will fetch higher prices and earn foreign curreny on the export market. Expanded production will be associated with increased employment and the generation of wealth primarily in the rural areas. This will translate into an increase in the buying power of farmers who can afford cutting-edge technology such as greenhouses and agricultural machines.

Contribution to poverty alleviation

The development of the rural areas will lead to poverty alleviation of the most disadvantages section of the population. Increased rural incomes and employment will bring about improvement in the standard of living.

8.3 What are the priorities in Dominica to better understand the roles and values of PGRFA (economic, social, cultural, ecological values)?

The Dominican economy is predominantly based on agriculture and tourism. Agriculture is the more stable of the two economic sectors. The social and cultural life of the island has been shaped by its agriculture. Although the food import bill is very high, it is reasonable to state that the country can sustain itself by eating what it grows. Owing to the very mountainous and rugged topography of the island, it is well understood in Dominica that the vegetative cover on its slopes and farms are priceless in many ways. The ecological functions of the vegetative cover contribute to the conservation of soil, water and wild life. Hence, the priorities to better understand the roles and values of PGRFA are, viz.: food security, poverty alleviation, protection of the environment and improvement in the general quality of life.