



GRENADA:

**COUNTRY REPORT
TO THE FAO INTERNATIONAL
TECHNICAL CONFERENCE
ON PLANT GENETIC
RESOURCES**

(Leipzig 1996)

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Note by FAO

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CHAPTER 1

Introduction to Grenada and its Agricultural Sectors

1.1 BACKGROUND

Grenada lies at the southern end of the Windward Islands (Map 1 and 2), At Latitude 11°58" and 12°13" North, and Longitude 61°20" and 61°35" West. It consists of three main islands, a number of small islets and rocks with a total land area of 34,830 ha.

Table 1. Area of Grenada, Carriacou and Petit Martinique

| Island | Area (ha) | Population (1991 Census) |
|------------------|---------------|--------------------------|
| Grenada | 31,200 | 87,376 |
| Carriacou | 3,400 | 4,595 |
| Petit Martinique | 230 | 720 |
| Total | 34,830 | 90,691 |

The Climate is humid tropical marine, influenced mainly by the northeast trade winds. Local variations in climate are considerable. There is a dry season from January to May and a rainy season for the remainder of the year. Annual rainfall varies from 4060 mm to 1270 mm at Point Saline. Temperature ranges from 21°C — 24°C.

Grenada is volcanic in origin with a topography characterized by steep ridges and deep V-shaped valleys. A north east ridge rises to 840m at Mt. St. Catherine. The eastern side of the island has a gentle topography. Slope is a significant constraint to land use.

Table 2. Percentage slope of land area

| Land | Grenada | Carriacou |
|----------------|---------|-----------|
| land over 30° | 23.3% | 3.1% |
| land over 20° | 70.9% | 47.4% |
| land under 10° | 9.9% | 24.4% |



According to the 1991 population census, Grenada has a population of 91,000. Owing to past migration, population pressure is not an immediate environmental concern. The population declined in the 70's. However, migration slowed in the 1980's and the population grew in these years by about 0.2 percent per annum. Like many of the islands in the Caribbean, Grenada has a very young population, with about 41 percent being below the age of 15.

1.2 THE ECONOMY AND AGRICULTURE

Grenada has a small open economy, traditionally dependent on Agriculture, for foreign exchange earnings. However, over the past decade Agriculture's contribution to GDP has fallen from 20.9% to 14.8%, although it remains the major employer.

The national debt has risen steadily. In 1991, debt servicing was almost 15% of the recurrent expenditure. Improvement of fiscal position and reduction of public expenditure are top priorities of Government.

The Macro-Economic Framework (MEF) for 1992-1995 targets agriculture as a growth sector to increase export earnings and to reduce rural unemployment.

Agriculture plays a significant role in Grenada's economy as a source of income, export earnings and employment. Since 1960 however, there have been major changes in the share of income generated by the sector and in its traditional role as the largest employer of labour. In the early half of the 60's, the sector accounted for 36% of the GDP, which declined to a mere 20% in the 80's and even less in the 90's. Even so it is still one of the greater contributors to the economy since it is responsible for 78% of total domestic exports and employs about 20% of the labor force.

The major factor for Agriculture's contribution has been the performance of the three traditional export crops, cocoa, nutmeg & mace, and bananas. In 1987-1989, very high prices for nutmeg and mace was responsible for most of the increased earnings of the sector. Value contributions have been downward since 1989 due, not only to price declines (mostly for nutmeg, and to a lesser extent cocoa), but also to production deficiencies (banana and cocoa).

The contributions of Livestock and Forestry sectors have increased marginally since 1987, while the increase in fisheries has been more significant.



A marked feature of the structure of agriculture in Grenada is the preponderance of small farms. Holdings less than five acres represent over 88% of the number of farms but occupy 31% of the cultivated acreage. Farms 5-50 acres in 1981 accounted for 11% of total holdings and 30% of total acreage. Farms over 50 acres represent less than 1% of total acreage. While these general patterns remain, data reveals the substantial decline over time in the number of farmers and the acreage under farms. There is no data on the relative performance of large, medium and small farms. In the past the bulk of export production came from the estates, with the bulk of domestic food production coming from smaller farms. Seeds for most small as well as other farms come from imports, although some from plants are available.

Grenada's agriculture is defined between exports and domestic agriculture. Within export agriculture, there are the cocoa, banana and nutmeg sub-sectors. Each of the latter has its own Association providing services and technology peculiar to its "research organization" though in the case of nutmeg, this activity seems to be of less importance.

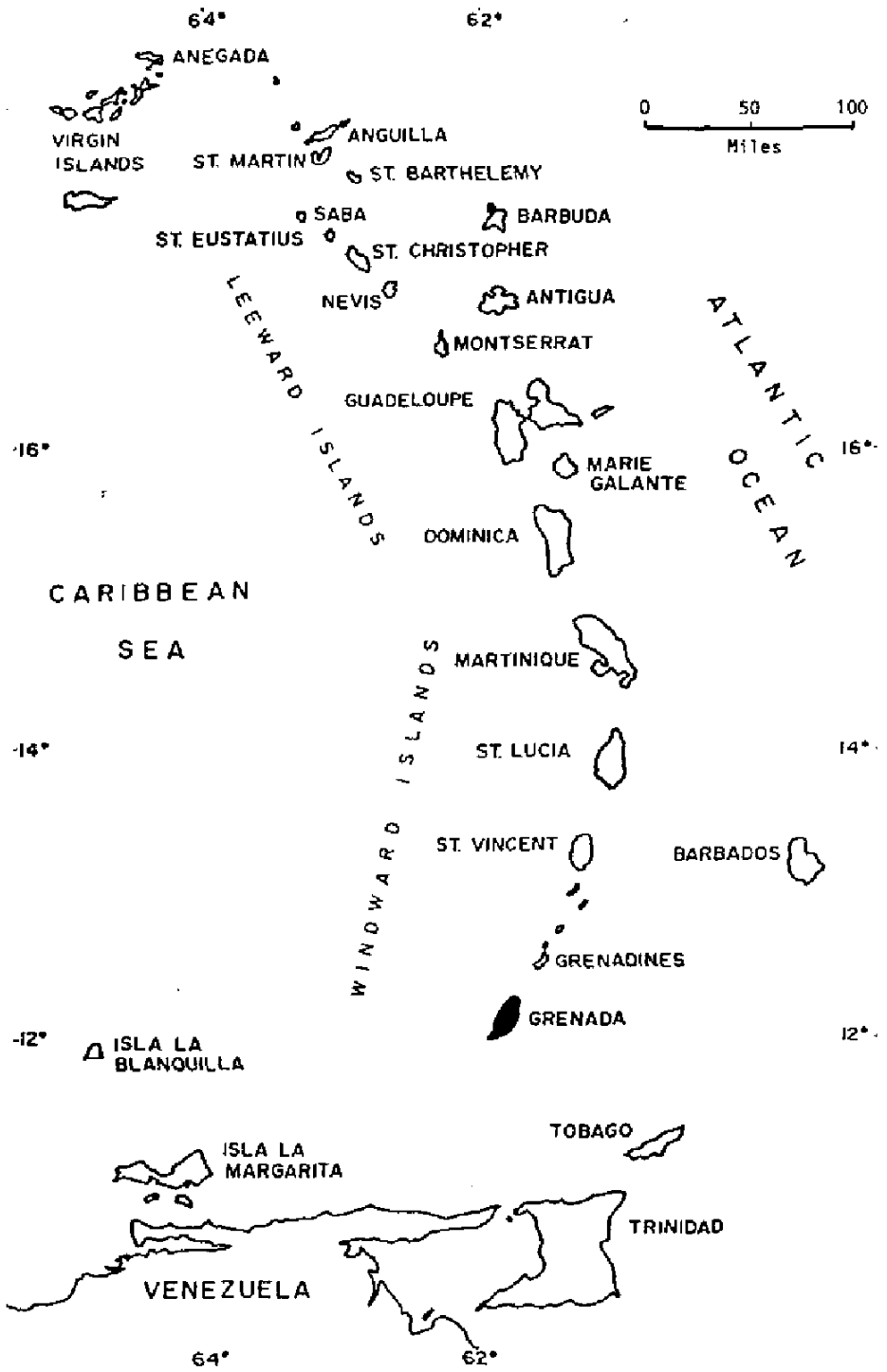
Cocoa, nutmeg and bananas dominate the production patterns of Grenada's agricultural sector, however, a large number of commodities are produced for domestic consumption, though some of these (minor spices and fruits) have been exported to regional and extra-regional markets. The output of "other crops" are being affected by the following factors :

- the small size unit; scattered production; low level techniques; limited availability of planting space; scarcity and high cost of labour and praedial larceny.

The Hibiscus or Pink Mealy bug is presently seriously affecting a wide range of plants throughout the country the majority of our crops island wide. This is having serious repercussions on export of certain food crops. Trinidad has stopped the importation of certain fruit crops from Grenada.



GENERAL MAP OF EASTERN CARIBBEAN, SHOWING LOCATION OF GRENADA





CHAPTER 2

Indigenous Plant Genetic Resources

Grenada has a diversity of plant genetic resources which may be grouped into the following categories - Forestry species, Industrial crops, Fruit crops, Food crops, Vegetables, Cereals, Aromatic, Spices, Stimulants, Medicinal, Ornamental and Pasture species.

2.1 FOREST PLANT GENETIC RESOURCES

Approximately 7000 ha. of Grenada's lands are classified as forests and woodlands. The state owns about 69% (4,830 ha.) of this, the rest (2,170 ha.) are privately owned. Forestry Division and National Parks are responsible for the management of the forests and protected areas. The major forest regions in Grenada is given in table 3.

Table 3. Major Forest Regions in Grenada

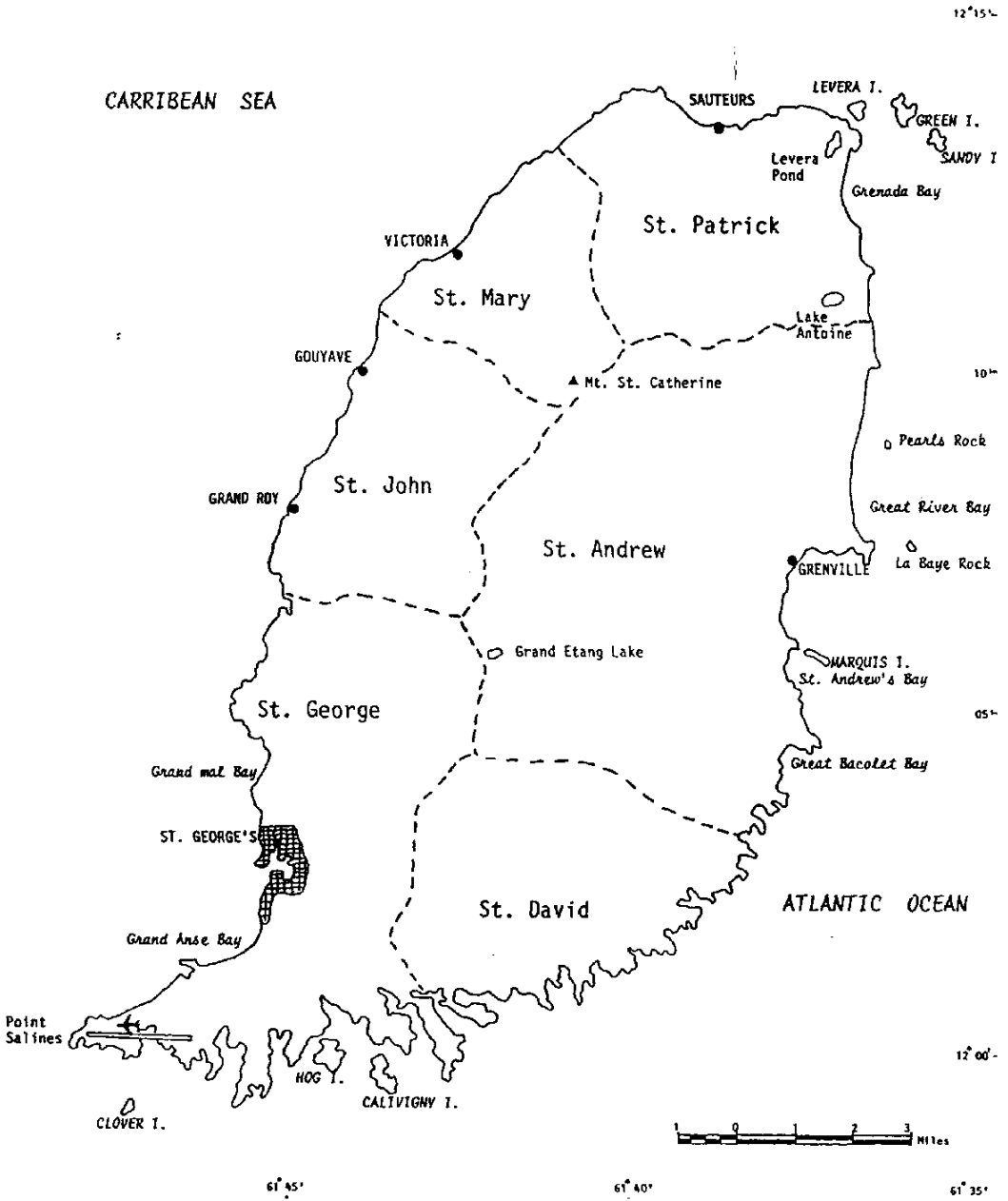
| Location | State Area (ha) | Private (Area ha) | Total (Area ha) |
|-------------------------------------|-----------------|-------------------|-----------------|
| GrandEtang Forest Reserve/ Proposed | 1,526 | 222 | 1,748 |
| National Parks | | | |
| Annandale Watershed | 202 | | 202 |
| Concord Watershed | - | 96 | 96 |
| Mt. St. Catherine | 573 | | 573 |
| Clabony Watershed | - | 262 | 262 |
| Proposed Levera | 48 | 172 | 220 |
| National Park | | | |
| Carriacou Forest Reserve | 136 | - | 136 |
| Petit Martinique | 0.6 | - | 0.6 |



Beard (1949) classified Grenada's Forests as follows - Cloud forest (mountain ticket, palm break and elfin woodlands), Lower Montane Forest, Deciduous Seasonal Forests and Dry Woodlands, Littoral Woodlands (scrub and cactus) and Mangrove swamps. Eschweiler (1992) estimates of the area of forest types is shown in table 4.



COUNTRY LOCATION MAP, ISLAND OF GRENADA





LOCATION MAP OF CARRIACOU

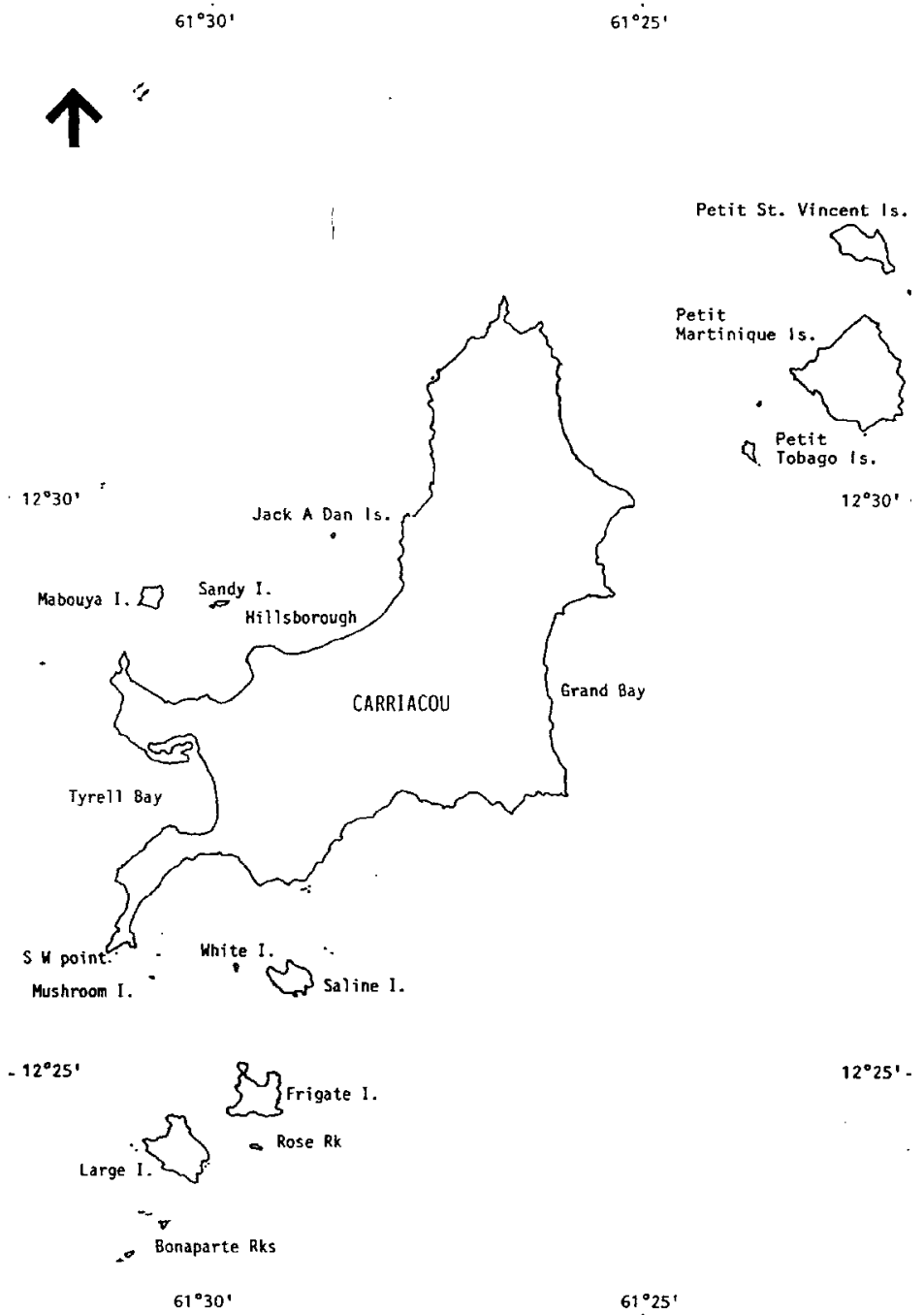




Table 4. Forest Types and Acreage in Grenada

| Forest Type | Acreage (hectares) | % of Mainland |
|-------------------------------------|--------------------|---------------|
| Cloud Forests | 1688 | 5.3 |
| Lower Montane | 2278 | 7.2 |
| Deciduous Forests and Dry Woodlands | 1752 | 5.6 |
| Littoral Woodlands | 1226 | 3.9 |
| Mangrove Forests | 190 | 0.6 |
| Total | 7134 | 22.6 |

(a) Cloud Forests

These formations exist on the upper summits of the highest mountains, Mt. St. Catherine, Mt. Qua Qua and Fedon's Camp. Where precipitation is above 4000 mm per year, relative humidity and exposure increases are the Elfin woodlands in association with Palm Break and scattered tree ferns. The dominant elfin species are:

- *Chriantus purpureus* Var, *Weigeltia antillana*, *Didymopana attenatum*, *Llex diderxyloides*, *Rondeletia stereocarpus*, *Rapanca ferruginea*.

These forest ecosystems have suffered little degradation and are under no serious threat.

(b) Rain Forest and Lower Montane Rain Forest:

These occur below the Cloud Forest where rainfall exceeds 2500 mm per year, temperature higher and exposure less than above. The two formations have little differences in floristic composition. The Upper Montane Forest contains the taller trees and the Lower Montane Forests the less taller ones.

Dacryodes Excelsa is the dominant species, reaching heights of 30 m - 35 m. The smaller trees are dominated by *Licania termatensis*. Other rain forest species include *Slonea caribaea*, *Micropholis chrysophylloides*, *Simaruba eimeria*, *Oxythece pallida*, *Slonea truncata* and *Ficuss spp.*

Lower storey species include *Cassipouria elliptica*, *Mythaceae spp*, *Melliosma herbertii*, *Guarea macrophylla*, *Enterpe glossa*, *Saportaceae spp.*

Most of this type of forests have disappeared except in the upper part of the Great River Watershed where a large tract can be found.



(c) Evergreen and Semi-Evergreen Seasonal Forests

This forest type is found in areas where rainfall averages 2000 mm - 2500 mm per year. Morne Delice Hill, a 20 ha forest block in the south of the island is an intact area of moist forest. The dominant species found there include - *Tabebuia pallida*, *Swietenia mahagoni*, *Manilkara bidentata*, *Bursera simaruba*, *Pouteria multiflora*, *Inga laurina*, *Citharexylon spp.* and *Bois bonde*.

In other areas evergreen forests are found on rocks and hilltops. Species found there include *Lonchocarpus latifolius*, *Albizia caribaea*, *Chlorophora tinctoria*, *Genipa americana*, *Cordia alliodora*.

(d) Deciduous Seasonal Forest:

Deciduous Seasonal Forests occupy the lower elevations. Rainfall in these areas range from 1000 mm to 2000 mm per year for five months. Most of this forest have been eliminated. This forest type is found in the north and south of the island in degraded condition.

(e) Littoral Woodlands:

Littoral woodlands are found along the coast but most have been wiped out . *Conocarpus erectus*, *Jacquinia barbosca* and *Tabebuia* form the edge of the Levera woodland. Behind is a mixture of species which includes - *Coccolobis uvifera*, *pisonia fragrans*, *Hippocrepis mancinella*, *Erithalis fruticosa*.

(f) Mangrove Woodlands

Twenty two mangrove sites, ranging from 0.5 - 13 ha exist along the northern and southern coast. The larger sites are found in the north at Levera, Lake Antoine, Pearls and Telescope. Four species of mangroves are found - *Avicennia racemosa*, *Conocarpus erectus*, *Rhizophora mangle* and *Laguncularia racemosa*.

2.2 AGRICULTURAL PLANT GENETIC RESOURCES

Cocoa, Nutmegs/Mace, Bananas and Fresh fruits are the chief exports crops. The island produces an average of about 55 tons of sugar cane utilizing farms mainly in the southern part of the island.



The major agricultural export crops are shown in table 5.

Table 5. Major Agricultural Crops Produced in Grenada

| CROP | 1992 Quantity | 1993 Quantity | 1994 Quantity |
|--------------|----------------|----------------|----------------|
| | '000 lbs | '000 lbs | '000 lbs |
| Bananas | 13862.7 | 10795.6 | 9915.5 |
| Cocoa | 2875.3 | 3533.8 | 2767.6 |
| Nutmeg | 3953.9 | 565.9 | 6460.1 |
| Mace | 396.7 | 565.9 | 578.4 |
| Total | 21088.6 | 19644.8 | 19721.6 |

Spices and Aromatics

Grenada is known as the isle of spice because it produces a wide ranges of *spices* - Cloves, Cinnamon, Bay leaf, Mountain Spice Sapot, Tanka bean etc. Appendix 1.

Fresh fruits and other tree crops

This group contains numerous species Important ones governor plum, starapple, tamarind, mauby, sapodilla, breadfruit, breadnut, soursop, sugarapple, mangoes, coconuts etc.

Vegetables

There are several varieties of vegetables indigenous to Grenada e.g. hot pepper, sorrel , thyme and tomatoes etc.

Cereals

The only cereal of importance grown is maize. Local varieties however are being replaced by imported hybrids.

Palms and Ferns

The Cabbage palm and Grandetang Fern are said to be endemic to Grenada. The Gru Gru Palm is an important source of oils but are not presently utilized.



Medicinal Plants

There are many species and varieties of indigenous plants (appendix 3) locally known to have medicinal properties. Commonly used ones are cassia allot, Cassia fistula, Cassia occidentals, Ricinus communis and Bois bonde. Ornamentals - The Heliconias, Ginger lillies and Antheriums are well known indigenous ornamentals. The natural forests also contains several species of orchids, but little or no information is available about them.

There are several species of indigenous and exotic ornamental plants. The natural forest contains three varieties of Heliconia and several species of orchids.

There are many wild species of plants which have not yet been identified and documented.



CHAPTER 3

National Conservation Activities

Conservation of plant genetic resources has played a very minor role in past land use planning. The Government of Grenada however, has displayed interest in the conservation of plant genetic resources through the following:

1. Development of a National Parks Systems in collaboration with the Organization of American States (OAS) and enacted the National Parks and Protected areas Act in 1990. The plan is premised on the statement of the policy of the Government of Grenada and its goals regarding National Parks. Number 5 of the eleven objectives of the park is to “Preserve genetic materials as elements of natural communities minimize the loss of any plant species and maintain biological diversity”.
2. The proposed National Parks and Protected Areas for Grenada and Carriacou are shown in Map 3 and 4.
3. Support and involvement in the FAO Tropical Forest Action Programme.
4. The Government is developing a revised Agricultural Policy in which the environment including the country’s flora will be given some priority.

3.1 *IN SITU* CONSERVATION

Grenada contains only one gazetted forest reserve which totals 1,526 ha. Plant genetic resources in the reserve are fully protected by legislation. The Forest Soil and Water Conservation Ordinance (Chap 129, 1994) as amended in 1984 (No. 34, 1984), supplemented by various rules covering State forest produce and protected forests (SRO No. 85. 1956 and SRO No. 87 , 1952). This legislation is comprehensive and up to date, authorizing the declaration of forest reserves on State land and under certain conditions on private lands. No legislation, however, relates directly to the management, conservation and utilization of plant genetic resources.



Forest areas outside the Grand Etang Reserve are not fully protected and although fifteen species of trees have some form of protection in the 1984 Revised Forest Ordinance, no enforcement occurs.

A British Development Division assisted Forest Management Project is scheduled for implementation at the end of 1995. One element of the project will be Surveying, demarcation and Gazetting of three major forest areas on mainland Grenada - Mt. St. Catherine, Annandale Watershed and Morne Delice.

Natural forest areas are presently protected mainly for soil and water conservation and biological diversity.

3.2 LAND RACES AND TRADITIONAL VARIETIES

There are many land races and traditional varieties of plants, especially fruit and tree crops, that are being conserved on farms and estates. Some of these - stinking toe damsel, mamee apple, sapote and mangoes are threatened.

3.3 EX SITU CONSERVATION

There are no national gene banks for storage of seeds for long term objectives. In cases where national collections of seeds occur , it is done on an annual basis to meet the current year's production programme.

Because of the lack of proper seed storage facilities national collections of seeds have been limited.

Grenada contains a Botanic Garden which shelters several species of trees. There is a arboretum for minor spices.



PROPOSED SYSTEM OF NATIONAL PARKS AND PROTECTED AREAS, GRENADA (SOURCE: GOG/OAS, 1988D).

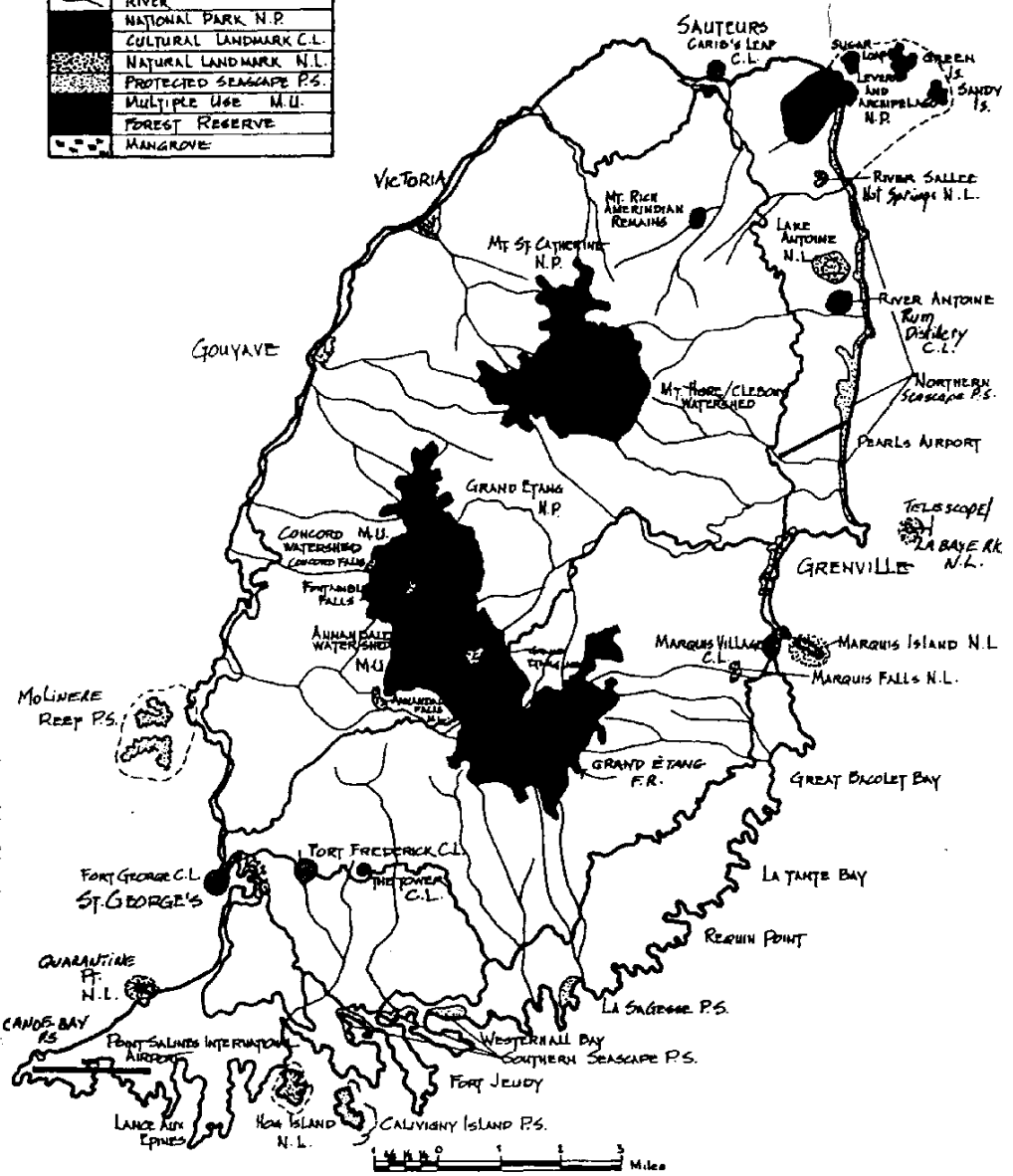
GRENADA

National Parks and Protected Areas



LEGEND

| | |
|--|-------------------------|
| | MAIN ROAD |
| | RIVER |
| | NATIONAL PARK N.P. |
| | CULTURAL LANDMARK C.L. |
| | NATURAL LANDMARK N.L. |
| | PROTECTED SEASCAPE P.S. |
| | MULTIPLE USE M.U. |
| | FOREST RESERVE |
| | MANGROVE |





PROPOSED SYSTEM OF NATIONAL PARKS AND PROTECTED AREAS, CARRIACOU (SOURCE: GOG/OAS, 1988D).

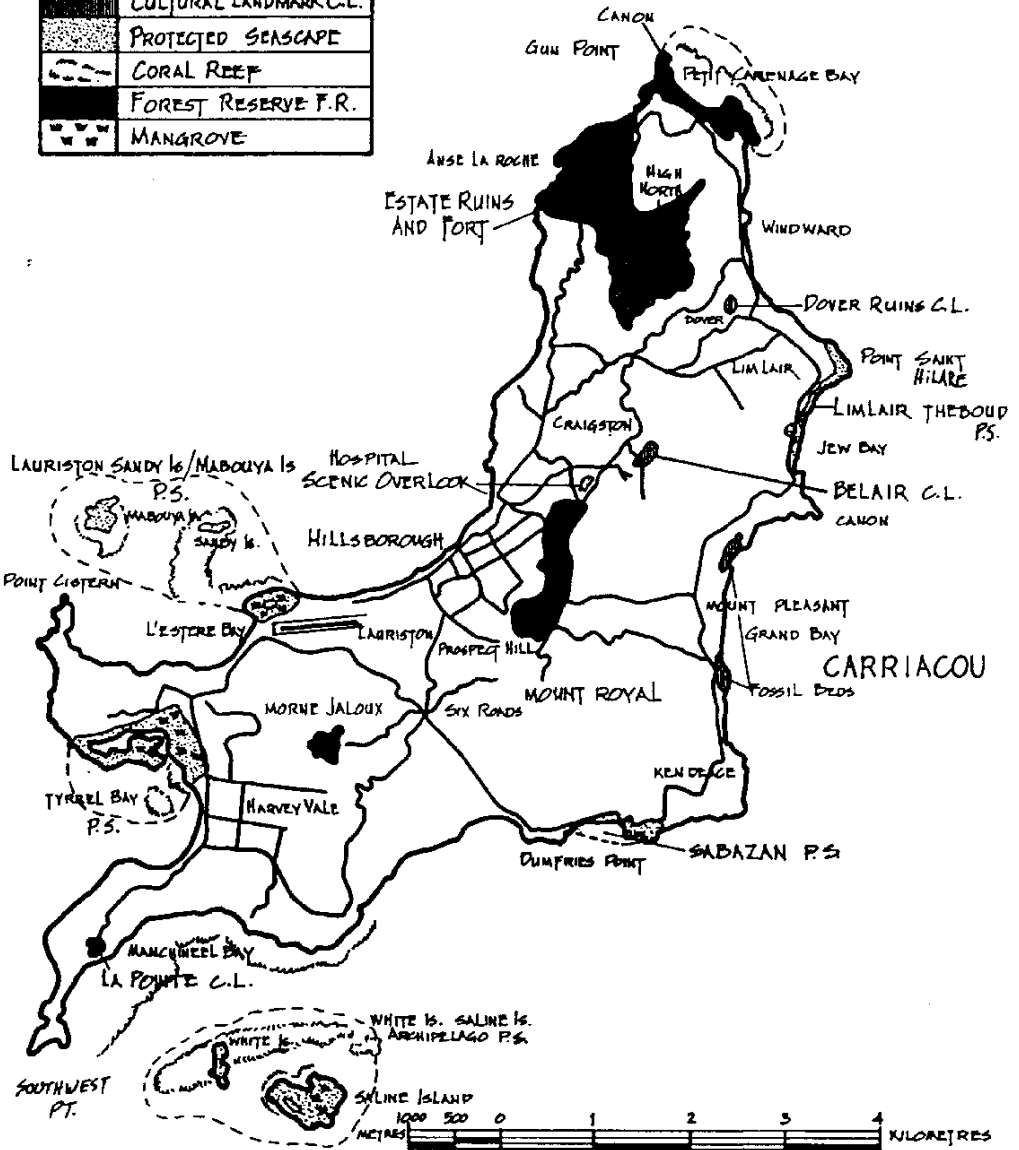
CARRIACOU

National Parks and Protected Areas



LEGEND

| | |
|--|------------------------|
| | MAIN ROAD |
| | NATIONAL PARK N.P. |
| | CULTURAL LANDMARK C.L. |
| | PROTECTED SEASCAPE |
| | CORAL REEF |
| | FOREST RESERVE F.R. |
| | MANGROVE |





CHAPTER 4

In-Country Use of Plant Genetic Resources

In Grenada there are several agencies involved in collection, propagation and distribution of plant genetic resources - The Miribeauc Agricultural nursery, the Grenada Cocoa Association, the Forestry Department and the Banana Tissue Culture Laboratory.

Several species of plants are involved but the most widely used ones are *Theobroma cacao*, *Musa spp*, *Manifera spp*, *Spondias spp*, *Annonis spp*, *Persea americana*, *Citrus spp*, *Cinnamomum spp* and *Mahogany*.

4.1 FRUIT AND TREE CROPS

The Ministry of Agriculture operates a tree crop nursery which produces over 1000 plants annually. The main types of plants propagated are - mangoes, citrus (oranges, limes, and grapefruit), and avocado (appendix 1.) which totals about one third of annual production. Over the past 3 years 60,000 mangoes, 45,000 citrus and 9,000 avocado plants were produced and sold to farmers. The other species of plants totals the remaining two thirds of production.

Germplasm from the production of plants are obtained locally either from seed orchards or farm fields. The three main methods of propagation are from seeds, stems cuttings.

4.2 COCOA

Several varieties of cocoa are produced in Grenada, Table 6.



Table 6. Vanities of Cocoa propagated in Grenada

| | |
|-------------------------------------|------------------|
| GS - Grenada species | up to 100 clones |
| UF - United food | 5 clones |
| OMC - Intermediate cocoa | 1 clone |
| IGS - International cocoa selection | 4 clones |

Over the past three years 91,058 cocoa cuttings and 22,382 seedlings were produced and sold to farmers.

4.3 BANANAS

Prior to 1992, planting materials for banana production were obtained from farmers fields and estates and were mainly in the form of “suckers” or “ Bull heads”. A Banana Tissue Culture Laboratory for mass production of banana plants was established in 1992. Germplasm was initially imported from Martinique and distributed to farmers. Presently, however, tissues are collected from selected farmers fields in Grenada. Over the past two and a half years 60,000 tissue culture banana plants were produced and sold to farmers.

4.4 VEGETABLES

The Chinese established an Agricultural Mission in Grenada in 1994 to test the performance of several vegetable food crops. The main objective of the mission is to transfer the technology of students, farmers and the general public.

Research is being conducted on a variety of food crops - hot and sweet pepper, egg plant, beans, broccoli, massif, watermelon, cherry, cauliflower, Chinese lock tomatoes etc. About 95% of the germplasm originates from China.

The Forestry Department operates a 1.5 ha nursery with a capacity of 200,000 plants annually. Seedling are produced mainly for reforestation, agricultural extension and for the public.

The species propagated are *Swietenia mahagoni*, *Tabebuia pallida*, *Cedrela odorata* and exortic species of *Hibiscus elatus*, *Pinus caribaea*, *Cupressus*



lusitanica, *Eucalyptus spp.* All the above species except *Hibiscus elatus* are propagated from seeds in the forest nursery. Seeds of white cedar, and some mahogany are collected locally. Pines, *Cupressus lusitanica*, *Cedrela odorata* and *Swietenia Macrophylla* King are imported from Setropa Seed Company.

The main function of plantation species are for production of wood products which includes timber, poles, posts, split fencing and charcoal. Timber from Blue mahoe are used mainly in the furniture industry.

The in - country use of plant genetic materials is summarized in table 7.

Table 7. Summary of in - country use of Plant Genetic Materials

| Station | Crop Type | quantity produced (3 yrs) | Source of germplasm | No of professionals | Users |
|---------------------------|-----------------|---------------------------|---------------------|---------------------|----------------|
| Agricultural nursery | mangoes | 60,000 | local | 1 | farmers |
| | Citrus | 45,000 | local | | general public |
| | Avocados | 90,000 | local | | |
| Cocoa Association | Cocoa Seedlings | 91,053 | local | 1 | Farmers |
| Tissue Culture laboratory | Bananas | 59,000 | local | 1 | Farmers |
| Forestry Nursery | Mahogany | 15,000 | local | 1 | Farmers |
| | White cedar | 1500 | local | | |

4.5 CROP IMPROVEMENT PROGRAMMES AND SEED DISTRIBUTION

Crop improvement practices for most crops are restricted to selection and breeding using simple techniques like budding, grafting and layering. The practice is done mainly to improve local varieties and to adapt imported germplasm to local conditions. The ultimate objective is to increase production for export opportunities and diversify production systems.

Current plant breeding activities are low keyed and inadequate to meet national demands for improved plants. The main constraints are lack of trained personnel , shortage of facilities and financial resources



Plant breeding of commercial crops are done by Government. The products of crop improvement are for use by all subsistence, Commercial and Semi-Commercial Farmers. Farmers, however, are not directly involved in plant breeding activities which are conducted primarily by Agricultural officers. The annual supply of improved varieties are generally short of demand.

4.6 USE OF FOREST GENETIC RESOURCES

There are no national programmes for the production and supply of forest seeds. Only two indigenous plantation species - *Swietenia mahogany* and *Tabebuia pallida* are used in reforestation and extension activities. Seeds for the production of plants of these two species are collected annually. Seeds are not stores for long periods because of the lack of seed storage facilities.

4.7 BENEFITS DERIVED FROM USE OF PLANT GENETIC RESOURCES

Grenada has no gene banks, hence no species of indigenous plants are maintained for foreign use. The benefits derived from the use of indigenous plant genetic resources are increased production.

In the past individuals from abroad have collected samples of indigenous species for research, but the results of these researches are not known to Grenada.

4.8 IMPROVING PLANT GENETIC RESOURCES UTILIZATION

The main achievement of Grenada's existing plant genetic resource activities lie in the improvement of commercial production of crops which can be exported. The conservation, improvement breeding, seed production and utilization of many non commercial species are yet to be realized.



CHAPTER 5

National Goals, Policies, Programmes and Legislation

Grenada has no integrated national programme or institutional framework for plant genetic resources management and conservation. There are also no policies or legislation directly related to the subject. The Government Agencies involved in matters related to plant genetic resources are coordinated by the Ministry of Agriculture but not in the area of PGR management. The Agencies, however, work in isolation in respect to plant improvement.

The only role played by commercial firms in plant genetic resources is in the importation of hybrid seeds for certain food crops, which are sold to farmers.

There are no Non-Governmental Organizations in Grenada with interest in Plant genetic resource or natural resources management in general.

There is a Grenada Farmers Organization, but it has no involvement in plant genetic resources.

Plant Genetic resource programme will be part of the national environmental policy of Grenada. There is a drive to preserve certain land and marine space against encroachment by developers in all fields. This will ensure the protection of natural resources of the country. Programs are being developed to protect certain forested areas, especially where the loss of bio-diversity and indigenous plant materials are of concern. Reforestation programmes are also part of this effort.



5.1 TRAINING

The availability of human resources in the area of Plant Genetic resources is limited. There are no plant genetic training facilities in the country and there are no specialists directly involved in this area. However, Agronomists are involved in other areas such as plant improvement, tissue culture and extension related work, but skills in this area of plant genetic resource management is deficient.

Training in the area of Plant Bio-technology is non-existent. As part of the programme to develop this area of work, Grenada will seek assistance from international organizations such as FAO, I.I.C.A. and other agencies for short and post graduate courses in this discipline.

5.2 NATIONAL LEGISLATION

The Physical Planning unit in the Ministry of Agriculture is in the process of developing a physical plan and an environmental management program. Among the objectives of this project is the provision of advice and recommendations on environmental legislation and the provision of consultancy services to assist in the preparation of coordinated environmental legislation.

This effort will pay particular attention to the legislation governing quarantine control. Quarantine measures in Grenada are weak. It is hoped that the tissue culture facility in Grenada and the quarantine measures at various ports will help to strengthen the entire system.

It is also the intention that Grenada will become a signatory to CITES. This will allow some control in the trading of endangered species.

There are some traditional plant varieties which are becoming rare. For example, tannias and sweet potatoes. The Ministry of Agriculture is encouraging farmers to cultivate and store such planting materials, but there is a lack of an incentive programme.



CHAPTER 6

International Collaboration

Collaboration in Plant Genetic resources with the International Community have been mediocre. Through the initiative of FAO, Grenada has been increasing its activity in this area. There have been some collaboration on fragmented issues, such as Bio-diversity programmed organized by I.I.C.A. Most of these programmes has been agreed upon by the adopting of Agenda 21. Since then Grenada has taken steps to ensure the successful implementation of same. This has resulted in the adoption of a National Environment plan and the development of a physical planning project. Grenada has collaborated with UNDP for the implementation of this project.

Grenada has had experiences with various organization in areas not directly related to ICPPGR. Nevertheless, these collaborations are considered useful as many of the issues are indirectly related. Grenada has received assistance from the Agricultural Technical Mission from the Republic of China on Taiwan and the French Agricultural Mission. The former has provided technical assistance and capital investments tissue culture laboratory and seed research center, while the latter has been involved in infrastructural development for small farmers.

From a regional perspective, CARDI has been involved in a wide range of research which will be useful in the field of plant genetics. Its international links will also be an asset to our programme. Locally, the Grenada Science and Technology Council has been conducting research on medicinal plants.



CHAPTER 7

National Needs and Opportunities

7.1 MAJOR NEEDS

Having reviewed the situation as it relates to plant genetics resources in Grenada, the followings needs must be fulfilled in order for the country to effectively manage, conserve and utilized its indigenous plant genetic resources.

1. Political awareness and support.
2. Establishment of an institution for coordinating plant genetic resource activities.
3. Training of nationals in plant genetic resource management and biotechnology.
4. An inventory of Grenada's indigenous plant genetic resources. This should include characterization, evaluation and documentation.
5. Development and implementation of a public awareness campaign on plant genetic resource conservation and utilization.
6. Establishment of an information system on plant genetic resources.
7. Establishment of facilities for germplasm storage and utilization.
8. Financial support.

7.2 OPPORTUNITIES

The development, establishment and implementation of programmes for plant genetic resources in Collaboration with Regional and international Bodies, will give Grenada the opportunity to accomplish the following.

1. Gain more knowledge on its indigenous plant genetic resources. This will enable the country to develop and use more non-traditional crops in its agricultural crop diversification process.



2. The acquiring of new and sophisticated technology for development, improvement and utilization of indigenous varieties.

7.3 CONSTRAINTS

The main constraints affecting the effective management and utilization of indigenous plant genetic resources in Grenada are as follows :

1. Lack of political awareness on the values of conserving plant genetic resources.
2. A declining agricultural sector.
3. Lack of research and storage facilities.
4. Lack of human and financial resources.



CHAPTER 8

Proposals for a Global Plan of Action

Grenada submits the following proposals for inclusion in the Global Plan of Action.

- 1.** International assistance be provided to countries in establishing the infrastructure and appropriate technology required to develop and maintain their national germplasm banks and improvement of sub-regional and regional laboratories for storing plant genetic materials.
- 2.** ICPPGR should ensure that “copy write” laws are put in place to ensure that plant genetic materials in developing countries are protected. This is particularly important in cases where plants valuable medicinal properties.
- 3.** There is need for greater regional and international efforts to develop the data base on plant genetic resources at the national, regional and international levels.
- 4.** There is need to identify sources of funding to assist some countries in establishing their own gene banks.
- 5.** Universities and research institutions such as UWI and CARDI and existing research bodies in the Ministry of Agriculture should be supported to undertake research studies in plant genetic resources.



APPENDIX 1

Main agricultural species grown in Grenada

| Local Name | Scientific name |
|----------------|------------------------------------|
| Avocado | <i>Persea americana</i> |
| Arrowroot | <i>Maraula arundinacvea</i> |
| Breadfruit | <i>Artocarpus altilis</i> |
| Cassava | <i>Manihot esculenta</i> |
| Cabbage | <i>Brassica oleracea capitata</i> |
| Carrots | <i>Daucus carota</i> |
| Carambola | <i>Averrhoe carambola</i> |
| Chive | <i>Allium schoenoprasum</i> |
| Coconuts | <i>Cocos nucifera</i> |
| Corn | <i>Zea mays</i> |
| Cucumbers | <i>Cucumis sativus</i> |
| Ginger | <i>Zangiber officinalis</i> |
| Grapefruit | <i>Citrus paradisi</i> |
| Mangoes | <i>Manigifera indica</i> |
| Oranges | <i>Citrus sinensis</i> |
| Paw Paw | <i>Carca papaya</i> |
| Pigeon peas | <i>Cajanus cajan</i> |
| Beans | <i>Phaseolus spp</i> |
| Pepper(hot) | <i>Capsicumfrutescens</i> |
| Pepper (sweet) | <i>Capsicum annuum</i> |
| Plantains | <i>Musa spp</i> |
| Pine apple | <i>Annoa comosus</i> |
| Eddoes | <i>Colocasia esculenta</i> |
| Sapodilla | <i>Manilkara achras</i> |
| Sorrel | <i>Hibiscus sabdariffa</i> |
| Soursop | <i>Annona muricata</i> |
| Sugar apple | <i>Annona squamosa</i> |
| Sweet potatoes | <i>Ipomoea batatas</i> |
| Tannia | <i>Xanthesoma sagittfolium</i> |
| Tomatoes | <i>Lycopersicon esculentum</i> |
| Yams | <i>Discorea spp</i> |
| Clove | <i>Eugenia aromatica</i> |
| Cinnamon | <i>Cinnanum spp</i> |
| Celery | <i>Apium graveolens V rapaceum</i> |
| Ochro | <i>Hibiscus esculentis</i> |
| Limes | <i>Citrus auranti folia</i> |
| Lemons | <i>Citrus limon</i> |
| Guava | <i>Pisidium guajava</i> |
| Golden apples | <i>Spondias cythera</i> |



APPENDIX 2

Uncommon valuable tree species found in agricultural areas

| Local Name | Scientific name |
|-------------------|-------------------------------|
| Damsel | <i>Phyllanthus acidus</i> |
| Gru gru | <i>Acrocomia aculeata</i> |
| Hog plum | <i>Spondias mombin</i> |
| Mamme apple | <i>Mammea americans</i> |
| Mountain cabbage | <i>Euterpe haglei</i> |
| Penny piece | <i>Pouteria multiflora</i> |
| Pomme rose | <i>Eugenia Jamhos</i> |
| Sapote | <i>Calocarpum mamosum</i> (L) |
| Tamarind | <i>Tamarindus indica</i> |
| Stinking toe | <i>Hymenaca courbaril</i> |



APPENDIX 3

Common Medicinal Plants found in Grenada

| Common Name | Scientific Name | Uses |
|------------------|----------------------------|------|
| Ring worm bush | <i>Cassia alata</i> | |
| Purging cassia | <i>Cassia fistala</i> | |
| Wild coffee | <i>Cassia occidentalis</i> | |
| Violette | <i>Chime glabra</i> | |
| Fat pork | <i>Chrysobalanus leaco</i> | |
| Nut grass | <i>Cyperus rotundus</i> | |
| Castor oil plant | <i>Ricinus communis</i> | |
| Iron bush | <i>Sauvagesia erecta</i> | |
| Crab eyes | | |
| Man better man | | |
| Bamboo | | |
| Galba | | |



APPENDIX 4

List of main Timber Species in Grandetang Forest Reserve

Common Name

Almomd
 Bois Agoutie
 Bois Bande
 Bois Pini
 Bullet
 Galba
 Gommier
 Laurier *spp*
 Maruba
 Mauricif
 Penny Piece
 Tapaná
 Bois Rouge
 Caca Poule
 Chataignier
 Crappo
 Bois Gris
 Bois Lait
 Cacolie

Scientific Name

Terminalia calappa
Maytenus grenadensis
Roupala montana
Amyris elemifera
Manilkara bidentata
Calophyllum antilianum
Dacryodes elcelsa
Phoebe elongate & Ocotea spp
Simarouba amara
Byronima martinicensis
Pouteria multiflora
Hieronyma caribea
Guarea macrophyla
Illex sideroxyloides
Slonea spp
Carapa guianensis
Licania ternatensis
Rouvolfia nitida
Ingia spp