BAHAMAS:

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

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Note by FAO

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CHAPTER 1
Introduction

Location

The Commonwealth of the Bahamas is an archipelago located between 21° and 28° degrees north longitude and between 72° degrees and 80° degrees west latitude. The combined land mass of 14,500 square kilometers is composed of thirty-five islands and two hundred cays aligned in a northwest to southeast direction from the eastern coast of Florida to the southeastern coast of Cuba.

Population

The Population Census (1990), estimated the population at 254,000 individuals resident on fourteen islands. The average annual growth rate was 1.9%. Sixty-seven percent of the population reside on the island of New Providence. This is an increase of nearly three percent in the proportion of the population resident on this island which suggests a continuous migration of the population from the Family Islands to New Providence. The distribution of population on the Family Islands was as follows: Grand Bahama 16%, Abaco 4%, Andros 3%, Eleuthera 3%, Exuma and Long Island 1% respectively.

Geology and climate

Geologically the Bahama Islands are low lying, relatively flat in relief and composed entirely of calcium carbonate. Approximately two thirds of the country is located north of the Tropic of Cancer with a range in maximum temperatures between 25° and 33° Celsius and a range in minimum temperatures of 17° to 24° Celsius from north to south. Average rainfall varies from 660 mm in the southeast to 1,550 mm in the northwest.

Vegetation

Vegetation type and density are directly determined by rainfall distribution patterns. The larger wetter islands of the northwest are forested with pine compared to broadleaf coppice vegetation of the central and southeastern islands. Broadleaf coppice vegetation is reduced to scrub in the extreme

southeast. A total of 46,800 hectares of pine forests are located on three major islands, Andros, Abaco, and Grand Bahama in the northeast. Mixed broadleaf stands of the Central Bahamas, Eleuthera, Exuma, Cat Island, Long Island, and San Salvador are considered to offer little in harvestable forest products.

Agriculture

Of the 1.3 million hectares of total land area, 95,000 hectares is considered arable, of this total, only 7,650 hectares is currently planted to crops and pasture. Major crops include citrus fruit and vegetables both for export and local consumption. Total production in 1993 was estimated at 34,600 metric tons representing twenty-two major crops. The volume of production in descending order by crop included grapefruits (11,800 mt.), cucumbers (4,700 mt.), tomatoes (3,000 mt.), bananas (2,900 mt.), oranges (2,000 mt.), limes (1,800 mt.), watermelons (1,300 mt.), and lemons (900 mt.).

With respect to agricultural production, the Bahamas may be considered as three zones as largely determined by rainfall and available ground water. Islands in the southeast receiving less than 760 mm of rainfall are incapable of supporting more than subsistence agriculture based on the practice of shifting cultivation. All on-farm land clearing and cultivation operations are done manually. Since production is totally dependent upon limited rainfall only tried landraces are used.

The Central Bahamas experiences rainfall of up to 1,000 mm annually and is a mixture of subsistence and commercial agriculture. This zone has some exploitable ground water resources and few mechanized production practices. Although much primary site preparation is done by machinery, many production sites are cleared and managed by traditional shifting cultivation practices using slash and burn methods. Both commercial seed and landraces are used in this zone. Subsistence farmers are almost exclusive users of landrace seed.

The northern zone by contrast experiences up to 1,500 mm of rainfall annually with relatively large amounts of exploitable ground water. These islands are relatively flat in relief and are the sites of most mechanized agriculture. Virtually all export crops originate from this zone. The use of landrace seed is nominal in this zone, improved open pollinated and hybrid seed is used to meet local and export market demand for consistency and quality. In contrast to landraces used in subsistence production where chemical pest control and fertilizer use is minimal, improved seed is demanding high levels of fertilizer and chemical pest control to maintain yields.

CHAPTER 2
Indigenous Plant Genetic Resources

Of the 1,371 varieties of Bahamian higher plants recognized and described more than 120 are endemic (Correll, 1982). Included in this listing are many wild relatives of cultivated species including grape (*Vitis*), sweet potatoes (*Ipomea*), and yams (*Dioscorea*) to name some more commonly recognized plants. It is certain that the described list is incomplete for both terrestrial and marine plants. As an intended list of higher plants there is no listing of algae and fungi of either marine or terrestrial environments. The unique geography of the Bahamas provides a range of specialty micro environments in both aquatic and terrestrial environments. The occurrence of many small lakes of fresh, salt, and hyper-saline water provide many micro environments with an equally diverse complement of organisms. The aquatic marine environment varies from exposed Atlantic coastline to tidal flats and mangrove swamps. The myriad of environments have fostered a wide range of plant tolerance to drought and salinity.

2.1 FOREST GENETIC RESOURCES

The Pine *(Pinus caribaea* var. *bahamensis*) forests of the northern islands are the only species presently recognized of value as timber. These forests are now in a recovery period following two previous harvests for timber during the 1920's and pulpwood from 1957-1972. Hardwood species formerly considered as valuable for timber is virtually unavailable at this time due to the loss habitat and over- harvesting. The interior of northern islands are covered by pine with broadleaf coppice covering the coastal strip of these islands and forming the vegetation of the remaining islands of the Central and Southeastern Bahamas. Traditionally, the coppice covered islands of the Central Bahamas and the coastal areas of the Northern Bahamas where the sites of early settlements resulting in private and commonage[1] types of land tenure. Consequently, these sites were no longer public lands and were used for both human settlements and agriculture.

[1] Commonage land is a form of land tenure where the land is held by the community for use according to need.

The resultant changes in the makeup of the flora can only be surmised at, however, the shifting nature of the disturbance should have resulted in less depletion than the complete clearing of large tracts. The remaining diversity has served to provide timber, construction materials, food, pharmaceuticals for traditional medicine and export products such as indigo, brasiletto, and sandalwood in the past. The true nature of this diversity remains to be described and catalogued.

2.2 RELATIVES OF CROP PLANTS

Within this diversity are wild relatives of many crop plants such as sweet potatoes, yams, grapes, passion fruit and many other fruit crops. None of these relatives have been used to date in breeding and improvement of existing crops. There is no plant breeding and development programme being implemented at this time.

2.3 LANDRACES

Traditional use of landraces in the Central and Southeastern Bahamas continues to provide a reservoir of well adapted although low-yielding cultivars of maize, sorghum, pigeon pea, okra, pepper, and sesame along with long-standing varieties of vegetatively propagated selections of manioc, sweet potato, banana, eddoe and pineapple. There is great diversity in characteristics in many seedling fruit crops. Many are deserving of description and preservation as useful varieties. There is no organized system of cataloguing and conserving any of these landraces at this time.

Comparatively, broadleaf coppice areas appear to offer the greatest diversity in genetic material for crop improvement. Pine forests by contrast do provide some examples such as wild yams (*Dioscorea*) and grapes (*Vitis*).

CHAPTER 3
National Conservation Activities

3.1 CROP CONSERVATION

There is no organized conservation effort targeting landraces of traditional crops. The introduction of high-yielding improved varieties and hybrids have resulted in the displacement and loss of traditional landrace varieties in the Northern Bahamas. The remaining landraces in Central and Southern Bahamas are in danger of loss due to the lack of sound conservation practices. The reduction in numbers of subsistence farmers due to population migration from the surrounding islands to New Providence has resulted in fewer farmers in the Central and Southeastern Bahamas and a general increase in the average age of the remaining farmers. The number of custodians of the traditional varieties is diminishing annually.

3.2 GENERAL CONSERVATION ACTIVITIES

General conservation activities aimed at preserving Bahamian fauna have resulted in the conservation of many native plant species occurring in those habitats. The Bahamas National Trust, a non-governmental statutory organization oversees the management of: the Exuma Land and Sea Park on Exuma island, Flamingo National Park on the island of Inagua, the Village Road Retreat on New Providence island and more recently the Abaco Parrot Reserve on the island of Abaco. This latest reserve comprises 17,000 acres of mixed coastal coppice and pine forests reserved specifically for the conservation of the Bahama Parrot (*Amazona Leucophala Bahamensis*). Inadvertently, this site includes most hardwood and coppice species of the Northern Bahamas, many of the fresh water wetland species of plants of the Northern Bahamas and the full complement of species found in the understorey of the Northern pine forests.

The Department of Forestry has proposed extensive legislation to regulate and identify specific areas where future harvesting of timber will be permitted and other areas where existing forests will be preserved. This legislation is pending.

The Department of Agriculture maintains a small botanical collection of both native and imported species.

CHAPTER 4
National Goals and Policies

Apart from the major conservation efforts of the Bahamas National Trust which have been directed more at preserving fauna than f lora to date, there is no collective national programme of plant genetic conservation. In view of increasing development pressure and private and commonage ownership of coppice lands, there is an urgent need for a concerted national effort to identify, catalogue and preserve plant genetic resources.

There is now need for legislation, human and financial resources to foster the identification, collection and preservation of plant genetic resources in The Bahamas.

4.1 POLICY

An urgent need exists to make policy decisions regarding the known and potential value of Bahamian genetic resources. Such policies must be inclusive of and sensitive to the need to protect the rights of private ownership of land owners, while ensuring that unbridled development does not destroy existing genetic material before it can be catalogued and appropriate conservation measures implemented. This component of future policy is deemed of utmost importance considering the amount of broadleaf coppice land in direct, commonage, and generation ownership[2].

Policy considerations must therefore address the mechanism of arresting the loss of habitat to development. Whether by legislation, tax incentives, joint partnerships with landowners, direct acquisition of reserves or other means, an effective mechanism must be found to control the loss of habitat and the organisms present. Such a policy should be founded on the realization that controlling the rate of loss would be the most realistic impact considering the current rate of population growth and the attendant need for housing and economic activity.

In a country which is resource poor and technologically underdeveloped, direct use of both the marine and the terrestrial environment is the only

[2] Generation land is a subset of commonage land. It is land passed within a family from one generation to another.

currency of development. This development is likely to be in the forms of agriculture, tourism, expatriate second home ownership, and fisheries. All of which can negatively impact upon the existing environment.

Tourism, specifically ecotourism, offers some hope for an acceptable mix of limited economic activity and conservation. This recent phenomenon has yet to survive beyond faddism to be declared truly sustainable. Policy decisions regarding ecotourism should also be cognizant of the relatively large areas required to market a tourism product and the limited numbers of tourists that would be permitted to use the facility in order to minimize the impact on the "resort" environment.

Acceptance that the rate loss of diversity can only be reduced rather than prevented and the anticipated complexity of issues related to private ownership of land, discussions on policy issues must begin immediately. Important participants to these discussions which are likely to be poorly represented are parties such as farmers, fishermen and private landowners who are not organized in formal groups or associations to make effective representation.

Several bodies exist in the country that could with the input of more informal organizations contribute to a sound policy framework. These include:

Non-Government Organizations

Bahamas National Trust
Friends of the Earth
Friends of the Environment
Family Island Development Associations etc.,.

Government Organizations

Ministry of Lands
Department of Forestry

Ministry of Health
Department of Environmental Health Services

Ministry of Education
College Of The Bahamas

Ministry of Agriculture and Fisheries
Department of Agriculture

Ministry of Tourism
Desk of Eco-tourism

Office of the Prime Minister
Commission of the Environment, Science and Technology
Department of Local Government

Ministry of Works
Department of Physical Planning

Ministry of Transport
Port Department

4.2 LEGISLATION

There is no legislation in place at this time that specifically addresses the conservation of plant genetic resources. Legislation related to broad conservation issues include the Ministry of Agriculture and Fisheries Act (1938) and the Bahamas National Trust Act (1959). Any attempt at implementing a programme for the identification, cataloguing and conservation of plant genetic resources would require the revision, expansion or amendment of existing legislation or the passage of a new Act.

Conservation legislation in the past has preserved mainly habitats, it is important that in the future efforts be made to include regulations that would allow for study at the national level to understand the dynamics of the ecosystems in which the habitats exist and the species involved. The large expanse of water surrounding the Bahamas and changes from man-made exploits such as the collection of sponge, sea fans etc., and the effect of climatic change suggest that both the marine and terrestrial environments are in need of a thorough inventory of plant genetic resources and the required legislation to conserve their existence.

4.3 TRAINING

There needs to be a public awareness programme for the whole population prepared for the media that is informative and instructive of local plant diversity and biology, conservation importance and regulations governing its exploitation.

Moreover, an awareness programme that would include the organized training of professionals/technicians in both the private and public sectors to install a work culture that is aware of its potential impact on plant genetic resources. The training would not only include the ability of these persons to write environmental impact assessment reports but also to comment on the adequacy of any report given the plant genetic resources of the area and guidelines.

4.4 GOALS

1. Create an awareness of the importance of preserving the genetic diversity among planners, regulatory agencies, technicians, developers and the general populace.
2. Foster broad participation of non-governmental organizations, special interest groups and local communities in decision-making of national policies related development and the preservation of genetic diversity.
3. Develop a coordinated mechanism as part of a regional effort to identify, catalogue and preserve local diversity.
4. Create conservation areas on private and public lands, coastal and marine areas for the preservation of this diversity.
5. Develop guidelines and regulations for use of plant genetic resources for aesthetic and commercial reasons outside the natural environment in which they occur.
6. Identify a body from an existing organization that would coordinate efforts to identify plant genetic resources and carry out cataloguing and preservation activities.
7. Training of personnel involved in the identification, cataloguing and preservation of genetic diversity.

CHAPTER 5
Proposals for a Global Plan of Action

The Bahamas is concerned about the participation of small states in the protection and preservation of genetic diversity at the global level. However, as many other small states it lacks the trained personnel and financial resources to implement a thorough inventory and conservation effort targeting organisms occurring in the various habitats.

The Bahamas like many developing countries is often faced with the dilemma of choosing between generating economic activity and conservation issues.

The Bahamas can contribute to global conservation efforts through several long and short term measures.

Short term proposals include:

1. Inventory of genetic resources.
2. Enactment of necessary legislation.
3. Promotion of greater public awareness and wider public participation in conservation efforts.
4. Expanded training of personnel involved in conservation activities.

Proposed long term activities are:

1. The further development and maintenance of permanent conservation sites.
2. To seek to foster a greater conservation consciousness within the population.

References

Correll D.S. and Correll H.B. (1982). *Flora of the Bahama Archipelago*. Vaduz: (J. Cramer) A.R. Cantner Varlag KC.