



DOMINICA'S REPORT ON THE STATE OF THE WORLD'S ANIMAL GENETIC RESOURCES

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Chapter 1

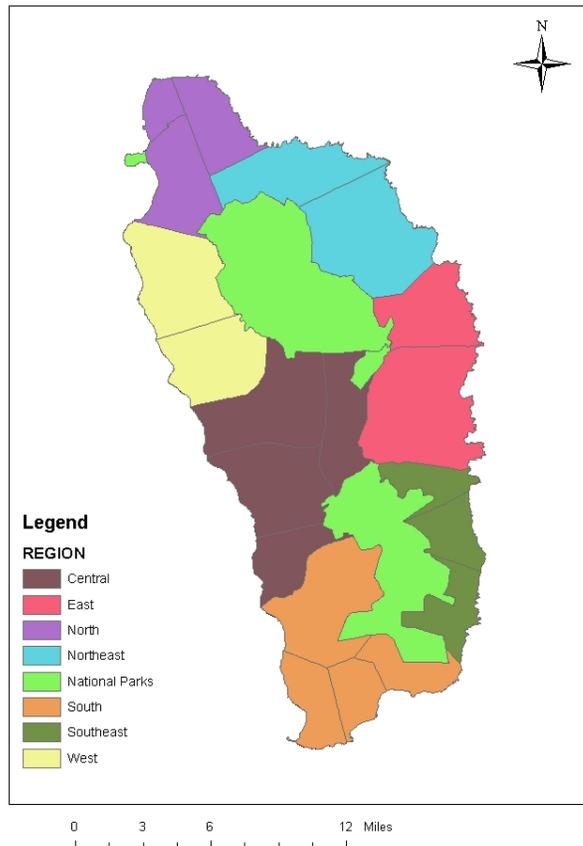
1.1 INTRODUCTION

The Commonwealth of Dominica is a Republic within the Commonwealth of Nations. The President is the head of state. The head of the government is the Prime Minister who appoints the cabinet which, in turn, is responsible to Parliament. The capital city is Roseau.

1.1.1 Size and Location

Dominica is part of the Lesser Antilles, and is located between the French island of Guadeloupe to the north and Martinique to the south at latitude 15° 20 north and longitude 61° 20 west. The country covers 750 km² making it the largest English speaking Eastern Caribbean island. Dominica lies within the hurricane and tropical storm belt, and as such hurricanes have devastated the island and the agricultural sector of the island in 1979, 1980, and 1989, destroying the fragile agricultural based economy. Despite major rehabilitation efforts, natural disasters of this kind remain a constant threat.

EXTENSION REGIONS DOMINICA



1.1.2 Climatic and geographical features

Dominica's high relief affects its climate which can be described as humid tropical maritime, with annual rainfall ranges from 250-300 inches/year in the interior to 50-70 inches per year in the coastal low lands. These factors contribute significantly to extremely lush (green vegetation and much biodiversity).

The country is divided into ten parishes and in terms of Agricultural Extension it is divided into seven regions. Most of the habitants live in the coastal areas, leaving the steeper, less accessible, marginal Lands for agricultural purposes. It is worth noting that the interior of the island is predominantly forest reserves, reducing further the land available for agricultural purposes.

1.1.3 Forest Types

Dominica's undisturbed forests are the most extensive in the eastern Caribbean. The vegetation consists of more than 1000 species of foreign plants and about sixty woody plants and tree species. Dominica contains 52 000 ha of natural forests, wood land and bush. There is an

impressive plant diversity of 155 families, 672 genera, and 1226 species of vascular plants and trees. The natural vegetation on the island consists of Swamp Forests, Dry Scrub Land, Littoral Wood Land, Deciduous Forests, Rain Forests, Montane Forests, and Elfin Wood Land. The total forest acreage is 130 thousand acres representing 2/3 of the total land area. Nine Thousand Two Hundred and Ten(9210) acres of this area has been demarcated as National Parks. The National Parks Legislation provides protection for the genetic resources within park zones.

1.1.4 The Economy

Country Profile

The Commonwealth of Dominica is situated between Guadeloupe to the North and Martinique, to the south, at approximately 15° North and 61° West, making the island the most northerly of the sub-regional Windward Islands grouping. Located in the middle of the Lesser Antilles, with a total land area of 750 km² (290 sq. miles), Dominica is the also the largest Windward Island. In 2001, the population was 71,373 with a population density of 94.7 persons per km². Dominica is the least populated Windward Island.

Agriculture in Dominica

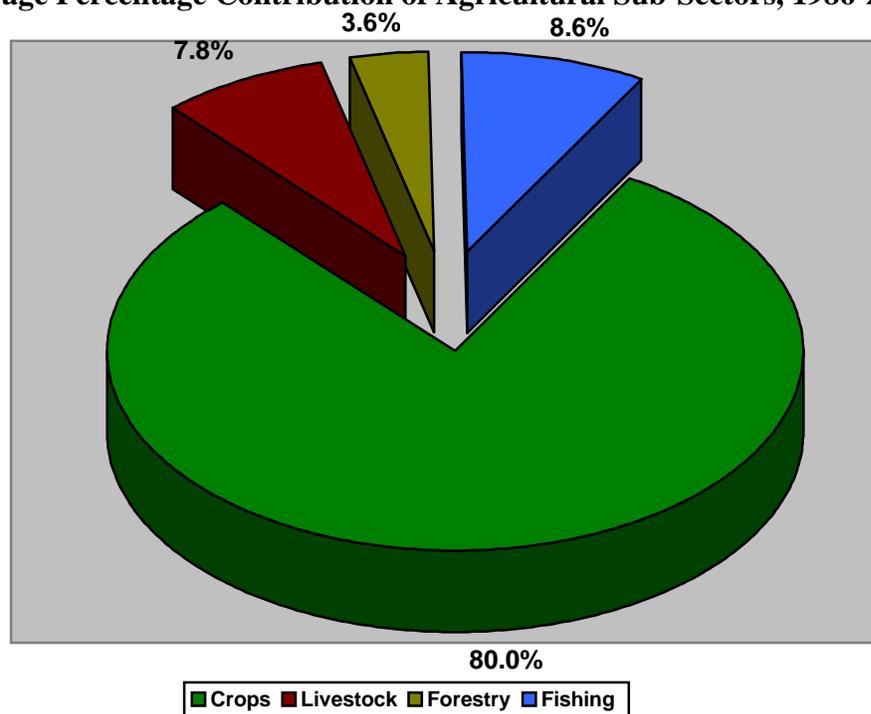
Sector Profile

The agricultural sector plays a major role in economic and rural development in the country. Acknowledgement of agriculture as one of the largest sub-sector contributor to the national economy is reflected in national policy objectives. These policies identify agriculture a major agent for rural transformation, the attainment of macro-economic stability, and sustainable development.

Until the year 2000 Dominica's economy was led by output from the agricultural sector. Gross agricultural output averaged 26.26% and 19.24% per annum of GDP between the periods 1986 to 1993 and 1994 to 2003 respectively, peaking at 29.96% and 22.94% in 1986 and 1996. Over the review period contribution from the other productive sectors, manufacturing and hotels and restaurants, remained well below that of agriculture, with averages of 7.0% and 2.6%. In spite of government policies providing incentives and investment opportunities in the tourism and manufacturing sub-sectors, their productive capacity has not been developed in any appreciable amount to complement and/or match agriculture's contribution.

Within the agricultural sector, crop production is of greatest economic importance as it is the primary foreign exchange earner in the sector. Crop production accounted for an average 80% of all agricultural production. The livestock, fisheries and forestry sub-sectors contribute very little to foreign exchange earnings, their economic significance being in their contribution made to food security, employment in rural communities, and in the case of fisheries and livestock, a vital source of protein for home consumption. The declining performance of the agricultural sector over the past decade has been the main cause for the weak performance of the overall economy over the same period.

Figure 1. Average Percentage Contribution of Agricultural Sub-Sectors, 1986-2003



Source (analysis of the economic value of agricultural trade preferences, Ruth Allport, FAO 2005)

1.1.5 Organization of farming systems

Most of the farming systems are basically at a subsistence level whereby the farming community farms for maintaining themselves and their families, excess farm outputs is sold locally (local market, supermarkets and households). The animal products derived at a national level are meat (poultry, beef, pork and to a lesser extent chevron), eggs, honey and milk (goat's milk sold basically to the health system and bovine used mostly at the farm's level).

Approximately 83% of Dominica's population lives in the rural areas which depends mainly on agriculture and fishing. Livestock only accounts for a meagre percentage of the employment sector. The sector is growing and would be of significant importance towards food security as well as contributing towards reducing the food import bill of meat and it's products.

Most of animal product produced locally are consumed locally except for small quantities sold to neighbouring Islands with high Dominican populations e.g Martinique and Guadeloupe. Dominica at present is self-sufficient in egg production. The importation of meat has increased steadily, this has therefore substituted the local production of beef, pork and poultry.

Most of our livestock farmers are private. At present the sector has two functioning livestock farmers groups (The Dominica Rabbit Breeders Association and the Beekeepers Association, and National Pig Producers Cooperative).

The average farm size in Dominica is between 1-10 acres, usually firmly operated and are primarily operated at a subsistence level. These farms are evenly distributed throughout the island without any ideal demarcation of farm size. The recent trends in livestock productions stems towards an increase in poultry production particularly towards broiler production due to current changes in market preference for locally produced products.

1.2 The State of Food Security and Rural Development

At present it can be clearly stated that Dominica has not achieved total food security, however the country has not encountered any food shortages, except during disasters eg Hurricanes. While Dominica produces most of its agricultural produce, the country still depends highly on imported goods particularly meat and meat products and manufactured goods , and this may impact negatively on the island's food supplies in the event that the suppliers are affected by natural or other disasters particularly hurricanes, wars, volcanic activity, pests and diseases (Black disasters in bananas, Foot and Mouth Disease(FMD), Classical Swine Fever(CSF), Avian Influenza in livestock) etc.

1.3 Population trends

The 1991 National Population and Housing census showed a revised final count of 71, 373 persons, a decline of 2,430 (3.3%) since the 1980 census. This drop has been largely due to emigration which has been a characteristic demographic feature of Dominica since 1960. The cities of Roseau and Portsmouth had populations of 15,863 and 4,644, respectively, with the remainder spread among the rural villages.

This trends in human population in Dominica have affected the demand for agricultural production which has increased over the years. These changes can be attributed to an increase in the urban population due to inner emigration from rural to urban areas as well an increase in stay over tourist arrivals. This however has placed a strain on an aging farming population and thus agricultural productivity. Over the last years rural poverty has increased thus increasing migration particularly from the rural areas to other countries in order to seek an improved standard of leaving.

1.4 Role of livestock

The major changes taking place in the demand for animal products in Dominica are the need for producers to meet international standards for food safety. This is being met by the development of local standards, that are based on international standards set by the international standard setting bodies for food safety through the establishment of a national Bureau of Standard. Over

the last decade notable shifts have occurred from subsistence farming to more commercialization in order to meet market demands and as a means of income generation.. The Animal Genetic Resources(AnGR) both local and adapted play an important role in meeting demands for food and agriculture since the market demands a product of specific quality which local breeds of livestock cannot meet.

Chapter 2. The State of Production Systems

2.1 Primary Animal Production Systems in Dominica

The various livestock production systems can be described as:

1.Semi-Commercial: These are high input farms with hired labour. Farm operations can be described as commercial but on small scales. These are more predominant of poultry and pig producers.

2.Subsistence: These farming systems produce primarily for farm/home consumption. Excess produce is sold at the local market, or in the community.

Most semi-commercial type farms are specific to poultry producers and to a lesser extent pig farmers. The subsistence farmer however usually produces animals of various species (small ruminants, poultry and pigs).

The recently imported breeds play a very important role in terms of meeting quality demand, however the adapted breeds are important in maintaining the genetic diversity on the island. Since the recently introduced breed are bred with local breeds they however adapt better to local climatic conditions. The adapted breeds out perform our local animals (productivity).

2.2 Organizational characteristics of each production system

Most of the livestock farms are privately owned, with a typical size of 1-10 acres and operate either as subsistence or semi-commercial. The government of Dominica also owns some public livestock farms, small units at the various agricultural stations and a multiplication unit (Central Livestock Farm). There a few farmers cooperatives mainly originated through Telefood special projects, of 5-10 farmers which are distributed all over the island. On island however exists a National Pig producers Cooperative which functions primarily as a marketing body for pig producers.

2.3 Reliance on inputs

The primary animal production system which is relatively self-sustaining are small and large ruminant farms, specifically the adapted breeds. These have very little foreign input requirements. The poultry production system depends entirely on external inputs (feed, stock,

Housing, etc.). In terms of pig production, foreign input requirements depend on the type of production system, for e.g., the adapted and recently introduced breeds of semi-commercial systems of production depend largely on foreign inputs whereas subsistence farming systems with local breeds are almost entirely dependent on local products/inputs.

2.4 Impact of risk factors:

The risk factors which are present in each of the primary animal production systems are mainly: natural disasters eg. hurricanes, droughts, exotic pests and diseases, access to capital, availability of labour, and the threat of war and Bio- terrorism. These risk factors has the ability to affect all production systems, but a higher threat would be posed to commercial systems that are almost total reliant on foreign inputs particularly pigs and poultry.

2.5 Animal Products

The most important animal products obtained are meat, egg, milk, hides, honey and manure. The above mentioned products are of strict economic importance to the producers. The importance of these products are not specific to any regions within the country neither for any segment of the population, though the rural persons are more dependant on Agriculture.

There is a market preference for locally produced meat. This trend is expected continue in the future particularly due to increased awareness of food safety concerns, health issues, as well as the threat of emerging diseases. A large proportion(95%) of animal products produced are sold for local consumption with the exception of the hides and a small proportion of the other products which are exported to neighbouring islands the manufacture of craft items.

2.6 Trends or Significant Changes occurred in the use and Management of Animals

It is clear that changes have occurred particularly in the area of poultry (broiler) and pig production based on an increase in the demand for quality products of international standards due to globalization, and increased awareness to food safety issues and health. These changes are significant, mention can be made of the market driven demand for pork of lower back fat, or increased slaughter weight of birds. These factors have influenced the introduction of new genetic resources for cross breeding programmes to meet the demands.

The Government of Dominica has strengthened on it's policies in an effort to produce products of higher quality through the introduction of the Bureau of Standards, the provision of technical support and the importation of genetic material.

These systems however are faced with major constraints:

- Access to Finance
- Land Tenure or owner
- High input costs/cost of production (feed)
- Land suitability and size

- Access to markets (lack of policies to address contract farming)

These constraints have a direct influence on the type of farming system that can be practiced on island with a definite link on the type of AnGR utilised. The means of addressing these constraints would be dependent on addressing some of the concerns mentioned above.

Chapter 3. The State of Genetic Diversity

3.1 State of Knowledge of your Country's AnGR

The records kept are limited and are not regularly analysed. These records compose of productive and reproductive information and are mainly kept at the government farm level. Very few farmers keep records, most of those who do are the commercial and semi-commercial farms. Information in terms of monitoring phenotypic traits is lacking, specifically after offspring has been distributed to the farmers. The performance of these locally adapted and recently introduced animals need to be monitored locally, and analysed periodically. Information needs to be collected on the status of breeds within each animal specie of importance for food and agricultural production in Dominica.

Most of the surveys that are carried out pertain to disease surveillance and are not specific to the general aspect of the breeds. In order to increase the ability to use and develop AnGR as well as to collect the necessary information, the need for further training of human resources in the field of animal genetics is necessary and definitely a priority. A trained and capable human resource would only allow for the monitoring of the status and trends and effectiveness of breeds of each specie as well as to prevent or reduce the risk of breeds being lost.

A national livestock information system capable of monitoring the status of breeds of each animal species specifically is not available at present but is definitely critical for monitoring trends and the changes occurring in the local AnGR.

3.2 For each species and primary production system

The extent of available comparative characterization information is limited to: productivity, quality traits, reproductive performance, pest and disease resistance, , and feed efficiency. These are done basically at the Government Station level and involve small and large ruminants and pigs. In the case of poultry production feed efficiency, egg production and market weights(broiler) is have begun to monitored more seriously on private farms.

This information would aid in monitoring the performance of the individual breed, and monitors the ability of specific breeds to adapt to local climatic conditions at the same time maintaining high productivity.

3.3 Assessment of Genetic Diversity

The breeds of each species that are being used by farmers in food and agricultural production are as follows:

Bovine: Jersey, Holstein, Creole, Brahman, Brangus, Red Poll

Ovine: Barbados Black Belly, Doper, Katadin, Dominican White

Caprine: Anglo-Nubian, Saanen, Nubian, Boer, Toggenburg

Porcine: Large white, Saddleback, Duroc, Land race, Elite, Creole Black

Rabbits: New Zealand White, California White, Flemish Giant, French Silver “Argente du Champagne”

Honey Bees: *Apis mellifera*

Of the breeds that are being used, those that are also being actively developed are:

Bovine: Jersey, Holstein and red Poll

Ovine: Barbados Black Belly

Caprine: Nubian, Saanen and Boer

Rabbits: New Zealand White and California White

Porcine: Large White, Duroc and Saddleback

Honey bees: *Apis mellifera*

Conservation work has to be carried out the Anglo-Nubian and Toggenburg (Caprine), the Brangus and Brahman (Bovine), Elite (Porcine), Doper, and Dominican white (ovine), Flemish Giant and French silver (rabbits)

The government owned Central Livestock Farm through a system of breeding and multiplication continues live conservation of most of the above mentioned species through a managed herd nuclei of each species. Through this system off-springs of pure bred animals are sold at subsidised prices to farmers. The farmer is then responsible to maintain the animal and the breed of the animal obtained with constant technical advice however, from the Ministry of Agriculture Extension staff.

Over the years we can note that most of the ovine species have been dominated by the Barbados Black Belly. In the case of porcine, breeds such as the Large white and Duroc have largely replaced the once dominant British Saddleback. In terms of Bovine, a relatively large nuclei has been well established over the past decade. These trends are affiliated to market trends and demands to produce a product of higher quality.

It is clear that the cross breeding of most of the exotic breeds with our indigenous breeds have not only increased the adaptability of the breed to local environmental conditions but has also produced a breed of higher productivity and marketability, and resistance to pests and diseases.

Though most of the breeds are uniformly distributed throughout the island, the climatic condition on the coastal areas have made it more suitable for producing Caprine specie. The Dominican white sheep which is at risk of being lost has somehow performed much better in the interior of the island with cooler temperatures and higher rainfall.

Of the wild relatives of domestic species which exists are those of the porcine specie, vaguely known as the “wild pig” found particularly in the northern forest range of the island. Attempts of conservation of these species is being pursued through the implementation of legislations by the Forestry, wildlife and Parks Division. These wild relatives do not contribute to breeding programmes for domestic species but though of low economic significance to food and agriculture, it is used in the northern parts of the island as wild meat. High uncontrolled populations of these feral species as experienced in the past pose a threat to the farmers as there is a tendency to destroy economically viable crop cultivations.

Other wild species which contribute to food and agriculture in Dominica are as follows:

1. Agouti (*Dasyprocta leporina*). Widespread over the island.



Manicou (*Didelphys marsupialis*) Widespread over the island



Crapaud (*Leptodactylus fallax*) Mostly, on west coast, southwest and northwest coast. A small population was introduced on the northeast coast



Black Crab(including all members of the Portunidea, Pseudothelphusidae, Gecarcinidae and Ocypodidae families)



Ramier or Red-necked Pigeon (*Columba squamosa*)



Shrimps (Crayfish) All members of the Atyidae and Palaemonidae families.

Iguana (*Iguana delicatissima*) Widespread. Hunted for its delicate meat in parts of Dominica (North east coast).



Apart from the contribution of these feral species to the food sector, these also form part of the vast diversity of the forest reserves. No efforts are currently being made to investigate these species as potential resources for integration into domestic animal production systems.

Chapter 4. The State of Utilization of AnGR

4.1 The State of Use of AnGR

Policy and legal instruments:

Section 61:02 of the Laws of the Commonwealth of Dominica regulates the importation of any exotic breed of animal into the island to safeguard the country against the introduction of any exotic pest or disease. At present through the management of a herd nuclei the government maintains recently introduced breeds of animals for distribution of offsprings to the livestock farmers.

The state of actual use

The above law is actively enforced through import regulations, administered by the Minister of Agriculture through the Veterinary Authority.

The use of adapted or local species will depend on the market demands, threats of pest and diseases, natural disasters, or increased demands brought about by increases in populations.

Policy and Legal Instruments

The policies and legal instruments which exists in the Commonwealth of Dominica restricts introduction of animals into the country. However, these existing import regulations are a means of protecting the country from exotic pests and diseases introduction through constant Pest Risk Analysis.

Internal Regulatory bodies such as the Dominica Bureau of Standard, Forestry and Wildlife Division, Environment Health and Animal Health as well as International Organizations such as the International organization for epizootics (OIE), World Trade Organization(WTO), World Health Organisation(WHO) have developed guidelines that are used for safeguarding our AnGR

The institutional mechanisms which exists within the Ministry of Agriculture to enable and support the use of AnGR channelled through the agricultural extension personnel, farmer training, farmer co-operative formation and operation.

Through a multiplication nuclei of improved foreign breeds of animals and the sale to farmers at subsidised prices are means that exists locally to support and promote the sharing of the benefits derived from the effective use and maintenance of our AnGR.

State of Use by Species

The improved use of AnGR is considered a primary element in Dominica's strategy for enhancing food security and agricultural production and productivity.

Most of the livestock products produced are consumed locally, while a limited quantity of products such as honey, hides, and smoked pork are exported to neighbouring islands.

The local production have not been able to meet the local demands hence the need for high import substitutes.

The various markets or different demands for animal products within the country influence the use of the AnGR. In the case of poultry production (broilers) only imported breeds satisfy the local demands, the indigenous breeds have lost popularity and are used as backyard production to satisfy only home consumption. Pork production is also greatly influenced by market preferences, hence the adapted breeds seem to be of higher quality than what is considered our indigenous breeds or "Dominican Black Pigs"

The small ruminants can be fed by using locally existing feed resources of high nutrition content (forages, legumes), although some levels of supplementation is required during the dry season.

Cultural and religious influences affect the use of AnGR locally. A small fragment of the population (Rastafarians) due to cultural reasons abstain from the consumption of certain types of meat. A small portion of the religious community due to spiritual beliefs will not consume meat or products of the porcine specie.

Locally adapted breeds are of significant importance to the contribution of food to the more rural communities. The demands being placed by the town folk necessitate the introduction of more productive breeds, though less adapted to our conditions, to be bred to local stock to obtain more efficient cross- breeds. This is true especially for small and large ruminants and pigs. The poultry industry is entirely dependent on the continuous introduction breeds to maintain the same high level of productivity that the farmers have grown to appreciate, but importantly the market demands high quality products.

Some breeds which exist locally are at risk of being lost due to the continuous crossbreeding of these breeds with recently introduced breeds. Examples of the above mentioned are: Toggenburg, Anglo-Nubian, Saanan, Doper (Caprine), Katadin (Ovine), Brahman (Cattle), and Flemish Giant, Californian and New Zealand Whites (Rabbits), and efforts must be made to maintain these breeds as pure as possible for conservation purposes.

The breeding structures that are commonly used in our country are: straight breeding, systematic crossbreeding, unstructured breeding. Straight breeding is commonly practiced at the government stations as a means of in situ conservation of the breed and on the more productive commercial and semi-commercial farms (pig producers). The most commonly utilised breeding structure is the systematic crossbreeding which is practiced both at the government farm level and private farms. This system is geared towards producing animals which can adapt to local climatic conditions as well as to enhance the productivity of local/indigenous breeds. A certain

level of undesirable/unstructured breeding is done whereby terminal crosses produced are not monitored and these animals sometimes end up as breeding animals.

The three breeding structures are not specific to any breed or specie type except in the case of poultry production where breeds are continuously being introduced.

Irrespective of the type of breeding system practiced at the private farm level, the government maintains a small nuclei of pure genetic material which produces continuous replacements for the farming community.

Production and Reproductive records are kept basically at the government farm for monitoring the more common productive and reproductive traits and to include pest and disease resistance. These are not specific to any breeding system, but the information gathered is not widely used in decision making concerning breed conservation.

The State of Capacity to Use AnGR, by Species

Nationally some level of performance records are kept to be used technology transfer to the farmers. We realise that certain aspects of biotechnology is critical for the development of our livestock sector, specifically in areas such as artificial insemination.

Historical data/records are used for cross breeding purposes (pigs and small ruminants)and the offspring are selected and disseminated to farmers.

The Ministry of Agriculture continues in its effort to assist farmers through the dissemination of improved breeding stock. This is done through a programme of assessing the farmers ability to utilise and manage the breeding stock, before the animal is sold to him. The Ministry has a sound human resource capability but it is limited in numbers and technical expertise in terms of animal genetic conservation, and needs assistance to allow it to ensure true and effective conservation of the breeds.

Trends and Future Use of AnGR, by Species

Trends in the use of AnGR have changed over the years and will definitely continue in the future. These changes can be attributed to exotic pests and diseases, globalization, market preferences, natural disasters, etc. This can be seen for example in our pig industry where consumer preferences have forced a shift to the production animals with lower back fat or the preference to consume locally produced meat instead of imported meats due to increases in food safety awareness. Within the last decade changes have occurred with regards to the composition of animal populations, such as the Large White, Landrace, and Duroc have dominated the locally established breeds such as the British Saddleback.

We can clearly state that the island is self-sufficient in egg production but broiler meat production has not met a characteristic increase in production to meet the local market demands. These factors are market driven, and are highly influenced by government policies, risk factors, opportunities for new products and niche markets.

The advancements in technologies and methodologies will affect the use of AnGR in Dominica. Advancements in feed, housing, animal health, etc. will only enhance efficiency and productivity. Other important issues such as international trade, food quality, benefit sharing, will have a positive effect on the use of the AnGRs available.

The State of Development of AnGR

Activities that are on the way or that are planned to enhance the value of our AnGR.

Programmes to:

- i) improve breeds that are already in the country:
 - increase the size of the nuclei herd on Government Stations (imported breeds and pure breeds)
 - Effective cross breeding programs for producing breeds of improved genetic traits (higher productivity as well as adaptability to local climatic conditions)
 - conservation as far as is possible of local and endemic animal resources.

There are no immediate plans in place to acquire new breeds that are **not** already available.

Policy and Legal Instruments

The policies and legislation which exist only support the development of most species or breeds nationally and improve production systems to meet international standards and demands in technology. These however are not species-specific.

The policies and legislation that enable and promote technologies that affect and support the genetic development of particular AnGR include *disease surveillance and control, animal housing and treatment/welfare, animal/product market standards and instruments*. These are done through the action of regulatory bodies who are kept abreast on developments occurring in trade, or emerging diseases in the global environment. Policies and legislation that support and promote the use of indigenous knowledge and practices relevant to the development of AnGR do not exist. However, in order to safe-guard against losing indigenous species but also of those that are indigenous to the region (Barbados Black Belly, Jamaican red Poll, Virgin Island White).

The State of Genetic Development, by Species

The breeds that are being used are only to supply the domestic markets. Based on the fact that demands exceed supply locally, the access to the export market has not been tested, although there exist huge prospects to penetrate niche markets, where large Dominican populations live. The variation amongst species is not clear.

The climatic conditions, the rugged terrain and abundant forage make it suitable for developing small ruminant production (Caprine and Ovine specie).

Although cultural and religious influences affect the use of the AnGR, these do not have a direct national impact on the development of AnGR.

A number of breeds are available that are currently making a significant contribution to food and agriculture in the country, particularly those of the Caprine specie, these however need a genetic conservation program. This is due to a lack of trained personnel as well as available funds for employing a strict genetic program.

Active breed improvement programmes are more specific to the government owned stations on all classes of livestock. These programs are being pursued with limited resources. The genetic stock are in turn distributed to selected farmers, most of which are crossbred.

For straight breeding programmes the productive and reproductive traits and adaptation traits are included in the breeding goals. These straight breeding programmes being operated particularly for large and small ruminants, and pigs at government farms are not quite sustainable, a system of genetic management needs to be employed in order to avoid the constant re-introduction of breeds.

State of Capacity for Development of AnGR, by Species

The tools used for the selection of male/female animals for straight breeding programmes operating in Dominica includes; phenotypic characteristics, individual performance, and predicted breeding values. This is principally done at the government level. Some level of support exists from collaborative organizations such as CARDI (Caribbean Agricultural research and development Institute), IICA (Institute for Cooperation on Agriculture) as well as other Non-Governmental Organizations.

The technical and extension services and training that are available within the country to specifically support the genetic development of AnGR are not specific to any specie, these

include sharing of information, workshops and Seminars, Method Demonstrations, subsidised inputs (breeding stock, pharmaceuticals, housing equipment, etc.) and animal health. Research capacity and areas specific to animal genetics needs improvement.

Trends and Future Development of AnGR, by Species

The performance records kept at the government stations are all geared towards improving Breed management. The farmers benefit from this recording scheme since it enables a program of breed selection by the farmer at no extra cost.

There are no immediate plans of importing any species and breeds that are not currently being used in Dominica, over the next decade. The immediate plans revolve around sustaining and stabilizing existing breeds.

Obstacles, Opportunities, and Needs for Use and Development of AnGR, by Species

Opportunities do exist locally and regionally for locally adapted breeds. In order that full advantage be taken the Ministry of Agriculture would however need to continue the maintenance of a genetic nucleus of pure bred animals to avoid the eventual lost of breeds. These opportunities exist specifically within the existing target niche market in the neighbouring French islands for the consumption of fresh pork and smoked pork from locally adapted breeds. This market also has an interest for the production of quality hides (pelted goat skin). There is an tremendous increase in the demand for locally produced meat (chevron and pork) particularly during festive seasons (Carnival, Christmas, World Creole Music Festival, weddings, etc.). During these seasons demand normally increase significantly. Therefore an efficient market strategy and program of increased production of animals of high genetic quality needs to be considered to target this market.

Due to the increase in emerging diseases and the threat posed by these diseases to our local livestock production, the importation of meat and meat products from high risk countries is of outmost significance and there exist a need to develop locally adapted breeds. This is all geared towards safeguarding the country and to maintain a certain level of food security.

A strategy to develop markets for products derived from traditional breeds has not been developed hence no niche market for these exist, only in the case of our Creole animals. Products that are derived form traditional breeds are normally produced at subsistence level for the farm and home consumption.

There are opportunities to use Locally Adapted AnGR to improve product quality in the area of poultry and pig production. The production of selected cuts and processed products as well the development of new agricultural products in areas such as the Honey Bee Industry (production of

by-products such as Royal Jelly, Propolis, Bees Wax, etc.) in rabbit production, the production and conservation of rabbit pelts for producing trinkets for a growing tourism industry. The use of offal for production of certain types of feed with the importation of additives. Other areas such as the production of biogas and pen manure derived from animal waste needs to be strengthened.

The priorities for additional characterization work that would enhance understanding of the state of AnGR for each species, and would provide a basis for improved use and development of these resources. This includes:

- conducting surveys
- monitoring and early warning systems
- evaluation of breeds and crosses for use in particular production systems
- molecular characterization
- economic valuation of breeds

Priorities for enhancing public understanding and awareness of the roles and values of AnGR and the need for sustainable development and conservation of these resources include:

- Further education of stakeholders in term of the use and development of AnGR
- Training of human resources (available staff) in areas of animal genetics.

These can only be fulfilled if staff is trained in order to disseminate the adequate information to the general farming public.

The development of AnGR specifically in the areas of dairy goat production, small ruminant production, rabbit production and backyard poultry production can be operated on a small scale level by women and youth, to reduce poverty and empower persons to produce there own food.

To ensure adequate development of AnGR, the need for improved laboratory facilities would be useful to enable the constant monitoring of changes in AnGR through the use of technologies such as Artificial Insemination, Molecular Biological Analysis, product sampling and testing, etc. These would assist in conserving locally adapted based on their production potential.

The country would definitely pursue in the long term the development of a genetic pool of breeds that are available regionally, such as, the Jamaican Red Poll, Jamaica Hope, The Virgin Island White, Barbados Black Belly, etc. This is geared towards protecting against the disappearance of the breeds. This should be a regional effort and can only be achieved through information sharing, forming linkages and networking. Efforts have already been made by regional institutions such as IICA to enhance regional co-operation in the management of ANGR in the area of small ruminant production and conservation.

There are no opportunities for sale or exchange of breeds that are indigenous to us, such as the Dominican white sheep, the Creole rabbit, goat and cattle, the black pig. These breeds however are at risk of being lost and are in great need of conservation.

5. The State of Conservation of AnGR

The conservation of AnGR practiced nationally (*in situ*) on government stations through the maintenance of a nucleus herd is generally practised for economic and socio-cultural satisfaction. The understanding of the roles and values of AnGR and indigenous breeds are not highly recognised by the farming community, however changes in environmental conditions and market preferences make it a priority area of concern.

There is a serious need for programmes to promote awareness and understanding of the roles and values of AnGR and the need to conserve them for future use and development. Conservation strategies and action plans for AnGR is seen as a pressing issue which needs to be addressed. The main reasons for not having a strategy are dependent on; lack of financial resources, lack of technology and technical capacity, and lack of trained human resources, and ignorance to the importance of conservation. These conservation programmes would be managed by the government pending the availability of funding for these programmes.

The private sector can play a larger role in conservation efforts if locally produced products are supported by these institutions through a buy local initiative.

Through an increase in regional networking and awareness there has been a slight increase in the levels of support for conservation programme over the past 10 years from both internal and external sources. The impacts that conservation programmes have had on agricultural production and food security include; increase output/efficiency, establishment of niche markets, as well as an increase appreciation for local products.

6. The State of Policy Development and Institutional Arrangements for AnGR

Animal Genetic Resources activities at present are organized and sponsored by a national government co-ordinating body with some involvement of NGO's and other regional institutions. These mechanisms facilitate the better use of AnGR and define conservation objectives.

Interactions between public and private organizations needs to be strengthened, although the government has continued in it's efforts to involve the private sector (farmers, breeders, commercial firms, etc.) in policy development of AnGR through public consultations.

The Government of Dominica in collaboration with International Fund for Agricultural Development(IFAD) and the Caribbean Development Bank(CDB) is in the process of constructing a new Central Livestock Farm geared towards research, breed conservation and the

multiplication and dissemination of breeds to farmers. This facility is expected to become the location of all AnGR conservation conducted locally.

The priorities for capacity building in the management of AnGR include statistical sampling and survey techniques; breed evaluations and characterizations; preservation techniques; geographic information systems (GIS); management of live populations; database management; animal breeding and genetics, and molecular genetics.

Legislation and policies related to the use and welfare of animals are not yet fully enforced, although legislation exist to prevent inhumane treatment of animals; this would have no negative effect on the development and conservation of AnGR. Legislations and policies relating to the use and release of Genetically Modified Organisms and intellectual property rights, however, do not exist, though discussions are being held and a new Biosafety Bill is being developed to be presented to Cabinet.

Dominica continues to have bilateral and multi-lateral arrangements with other governments, research institutions or others relating to research, training, exchange of information and materials, and conservation of AnGR. Mention can be made of regional efforts by CDB and IFAD to import genetic material into Dominica in 2002 for upgrading the existing genetic pool. The continuous effort of the DARWIN Initiative with collaborators such as the Zoological Society of London to conserve our local endemic frog (*Leptodactillus fallax*) from extinction by the Chytrid fungus. Other areas of support come from the Caribbean Amblyomma Program for protecting our ruminant population against the Tropical Bont Tick. Institutions such as the USDA, PAHO, FAO, CARICOM and others have also been forth-coming over the last years, in providing assistance in various forms to safeguard the country from the introduction of pests and diseases, the eradication of pests (Amblyomma tick), the conservation of indigenous and adapted species.

The Ministry of Agriculture with collaborative ministries, regional institutions such as CARDI, IICA, University of the West Indies as well as the abovementioned international organizations have over the years all been involved in AnGR research, education, training and policy development at some level or the other and are forth-coming for the continued education and development of the AnGR.

Our priorities for overcoming gaps in research capacity, education, and for enhancing training, policy development, and other institutional capacity would be:

1. Human Resource Development – further training in areas of animals genetic conservation
2. The Development of specialised research units on Government Farms
3. The conservation unit for developing endemic/indigenous species such as the Dominican White sheep
4. The need for Educational tools: data collection and management tools, etc.

DOMINICA'S PRIORITIES FOR ANIMAL GENETIC RESOURCES CONSERVATION

1. Human Resource Development specific to Animal Genetic Conservation and Development
2. Strengthening of policies and legislations to address the conservation of AnGR through the establishment of a National AnGR Committee.
3. Development of an action plan to address the conservation of endemic/indigenous Species (The Dominican White, Creole Goats, Dominican Black Pig, Creole Cattle and Rabbit).
4. The continuation of the conservation work stated by the Government of Dominica at its government owned farms on the breeds available
5. The strengthening of a system for monitoring and evaluating the phenotypic characteristics of our locally adapted breeds through the use of modernized technology
6. The introduction and conservation of a genetic pool of breeds endemic to the region such as the Virgin Island White, The Jamaican Red Poll, The Jamaican Hope, etc.
7. The development of mechanisms and facilities to promote the conservation of AnGR (laboratories, GIS systems, software, data collection tools, etc.) locally
- 8 The implementation of a Public Awareness Strategy for AnGR.
9. A Comparative Evaluation (phenotypic and genetic) of recently introduced breeds, locally adapted and endemic/indigenous AnGR.
10. The Development of National and Regional networking systems to address AnGR