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INTEGRATED PROFILE OF SANTO ANTÃO



ENVIRONMENT

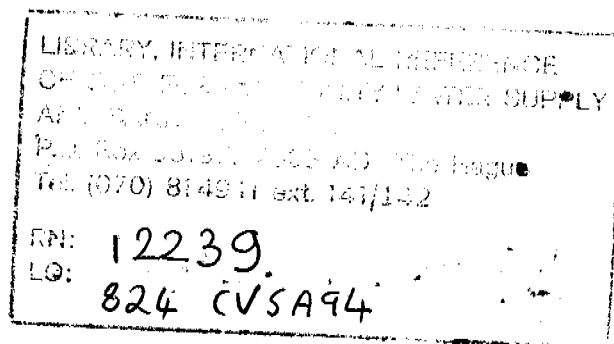
POVERTY

WOMEN

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Report prepared at the request of the Directorate-General for Development Cooperation (DGIS) of the Dutch Ministry for Foreign Affairs.



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*O mar transmitiu-nos a sua perseverança
Aprendemos com o vento a bailar na desgraça
As cabras ensinaram-nos a comer pedras
para não perecermos*

Somos os flagelados do Vento Leste!

*The sea delivered us its perseverance
And with the wind we learn to dance before misfortune
The goats teach us to eat stones
so that we shall not perish*

We are the chastised of the East Wind!

Ovídio Martins

Photos front cover

Above: The south-western part of the island (Planalto Norte)

Middle: Female headed household (near the head of Ribeira de Paúl)

Below: View on Fontainhas, near Ponta do Sol

Photos back cover

Above: Irrigated agriculture on steep slopes

Middle: Waiting for water in Vila de Porto Novo

Below: View on Paúl (Vila das Pombas)

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ABBREVIATIONS AND ACRONYMS

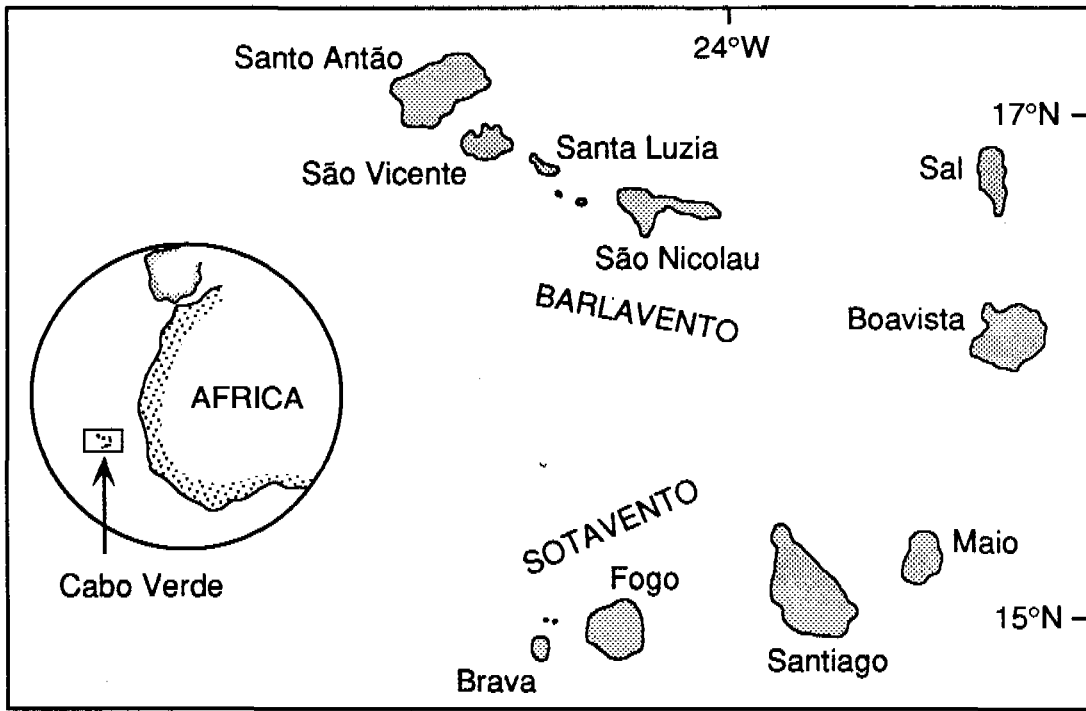
ASTM	:	Third World Solidarity Action (Action Solidarité Tiers Monde)
CCV	:	Cape Verde Conto (CCV = ECV 1,000)
CVCV	:	Cape Verde Red Cross
DGIS	:	Directorate-General for Development Cooperation of the Dutch Ministry for Foreign Affairs
DR	:	Regional Direction (Direção Geral)
ECV	:	Cape Verde Escudo
EEC	:	European Economic Community
EMPA	:	State Provisioning Enterprise (Empresa Pública de Abastecimento)
FAIF	:	Aid Fund for Family Initiatives (Fundo de Apoio às Iniciativas Familiares)
FAIMO	:	High Intensity Labour Gangs (Frentes de Alta Intensidade de Mão de Obra)
FDN	:	National Development Fund (Fundo de Desenvolvimento Nacional)
GDP	:	Gross Domestic Product
ICF	:	Institute of the Female Condition (Instituto da Condição Feminina)
ICM	:	Cape Verde Institute for Children (Instituto Caboverdiano de Menores)
ICS	:	Cape Verde Solidarity Institute (Instituto Caboverdiano de Solidariedade)
INIDA	:	National Institute for Agricultural Research and Development (Instituto Nacional de Investigação Agrária)
INIP	:	National Institute for Fishing Research (Instituto Nacional de Investigação da Pesca)
MIT	:	Ministry of Transport and Infrastructure (Ministério das Infraestruturas e dos Transportes)
MPAAR	:	Ministry of Fisheries, Agriculture and Rural Activity (Ministério das Pescas, Agricultura e Animação Rural)
NGO	:	Non-Governmental Organisation
OMCV	:	Cape Verde Women's Organisation (Organização das Mulheres de Cabo Verde)
PAASMAR	:	Rural Environment Water Supply and Sanitation Project (Projeto de Abastecimento de Água e Saneamento do Meio Rural)
PAPASA	:	Santo Antão Aid Project for Traditional Fishing (Projeto de Apoio à Pesca Artesanal de Santo Antão)
PMI-PF	:	Mother-Child Support and Family Planning Programme (Programma Materno-Infantil/Planeamento Familiar)
RIM	:	Rate of infant mortality
SARDEP	:	Santo Antão Rural Development Project
UNICEF	:	United Nations Children's Fund
US\$:	United States Dollar

ESCUDO/DOLLAR EXCHANGE RATES — Cape Verde Escudos (ECV) per US Dollar:

(1981) 48.69, (1982) 58.29, (1983) 71.69, (1984) 84.88, (1985) 91.63, (1986) 80.14, (1987) 72.47, (1988) 72.01, (1989) 77.98, (1990) 70.03, (1991) 72.30, (1993) 77.90

Sources: 1981-1990: The Economist Intelligence Unit (1992); 1991: *Africa South of the Sahara*, 1992 edition; 1993: exchange rate during the study (February - April 1993).

Figure 1.1 The Islands of the Republic of Cape Verde



1

INTRODUCTION

This 'integrated profile' of Santo Antão outlines the state of the environment, poverty and the position of women of the island. The initiative for this profile came from the Directorate-General for Development Cooperation (DGIS) of the Dutch Ministry for Foreign Affairs in the context of a programme of extensive bilateral cooperation between Cape Verde and the Netherlands. Since 1978 this programme has aided the development of the island of Santo Antão in particular.

The choice of the three central themes of this profile was inspired by the experience of the DGIS with respect to development operations in Africa, Asia and Latin America. Taking note that in many cases the environment, the poor and women not only suffer from the harmful effects of development projects, but also that the poor and the women are not able to take an active role in the making of decisions that affect their situation, the DGIS has recently directed its cooperation policies towards aiding these 'disadvantaged'.

A development profile is a relatively new tool used by Dutch aid cooperation programmes to identify priorities. This profile of Santo Antão represents a first attempt to highlight the island's problems by integrating aspects related to the environment, poverty and the position of women. Obviously the team entrusted with this experiment in integration could not benefit from a tried and tested methodology. As in the case of all first attempts, the

result is undoubtedly imperfect. However, it is hoped that this integrated study of poverty, the environment and the role of women gives an overview which can suggest ways forward for the island's regional development policies.

1 STRUCTURE OF THE REPORT

This profile of Santo Antão is divided into two main parts: descriptive and analytical.

The descriptive part presents data relating to the island's natural environment (Chapter 2), the human environment (Chapter 3) and the use of natural resources (Chapter 4).

The analytical part comprises:

- the identification of the problems faced by Santo Antão with regard to the environment (Chapter 5), poverty (Chapter 6), and the difficulties confronting women (Chapter 7);
- the evaluation of the effects that interventions (policies, aid and development projects and programmes) in the human and physical environments have on nature, poverty and the position of women (Chapter 8);
- the identification of the main conditions required to attempt to achieve balanced development for Santo Antão (Chapter 9). This identification results from the integrated analysis of the problems with respect to the environment, poverty, and the position of women.

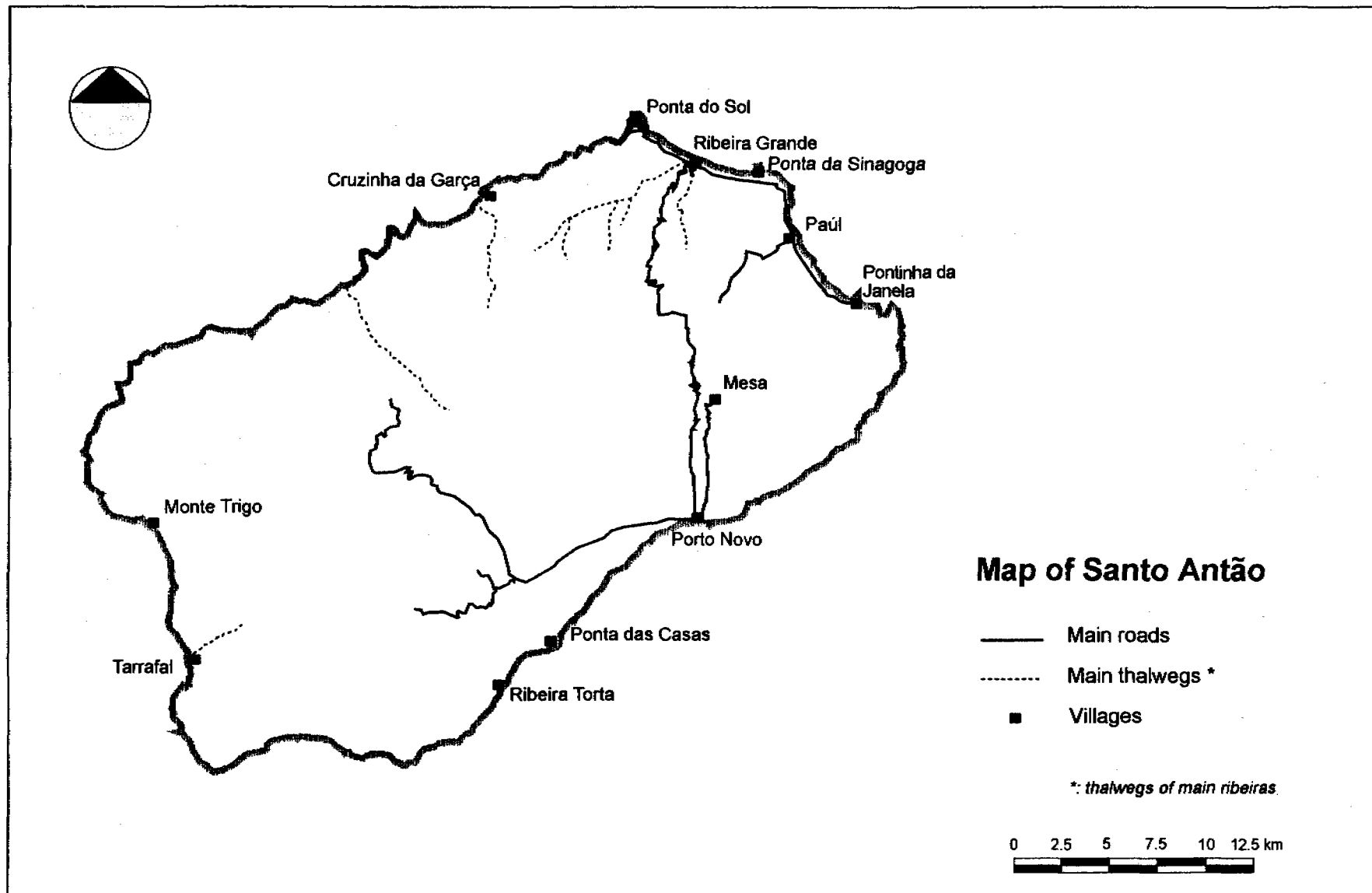


Figure 1.2 Map of Santo Antão. Source: Expertisecentrum GIS Larenstein.

2 METHODOLOGY

A 'new' methodology was devised in the preparation of this report, namely a combined effort with the authorities and local experts to produce an integrated study of the conditions on the island of Santo Antão. The study was conducted between 2 March and 22 April 1993 by a multi-disciplinary team. The actions undertaken during this period were as follows:

- preparation of the terms of reference for the study, in conjunction with representatives of the Santo Antão authorities, governmental and non-governmental organisations which administer the island's development, and the Embassy of the Netherlands. Problems in the fields of the environment, poverty and the position of women were itemized in order to allow the team to start its research;

- a brief review of living conditions on the island by field trips and interviews with some of the local population;
- the processing of existing bibliographic information on the topics of study;
- interviews with members of the island's authorities and with officials and experts of the state services, institutions and non-governmental organisations (NGOs);
- writing of the first draft of the profile;
- presentation to and discussion with the authorities, local officials, NGO representatives and the Embassy of the Netherlands of the draft report.

The final version of the draft report was prepared in the Netherlands, incorporating suggestions made during the final plenary meeting in Santo Antão, discussions held with DGIS representatives in the Netherlands and the comments of the Embassy of the Netherlands.

BOX 1.1

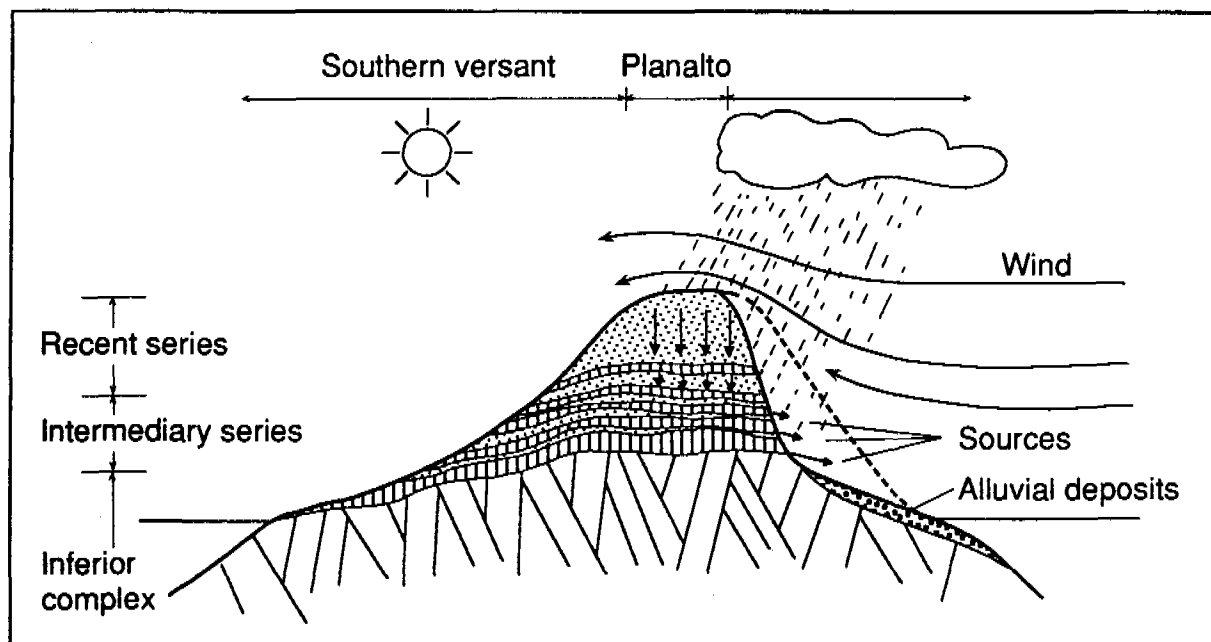
SANTO ANTÃO: BASIC STATISTICS

Santo Antão, with an area of 779 km², is the largest of the Windward islands and the second largest island in the Republic of Cape Verde (Fig. 1.1 and 1.2).

- **Population** : Men 22,363
Women 21,482
Total 43,845
- **Administrative Division** : Three *Conselhos* (municipalities) divided into seven *freguesias* (parishes).
Conselho de Ribeira Grande : Nossa Sra. do Rosário, S. Crucifixo, Nossa Sra. do Livramento and S. Pedro Apóstolo *freguesias*.
Conselho de Paúl : S. António das Pombas *freguesia*.
Conselho de Porto Novo : S. João Baptista and S. André *freguesias*.
- **Main Towns/Villages**
Conselho de Ribeira Grande : Vila da Ribeira Grande (population 2,550), Ponta do Sol (1,505)
Conselho de Paúl : Vila das Pombas (1,161)
Conselho de Porto Novo : Vila do Porto Novo (4,867)

DESCRIPTIVE PART

Figure 2.1 Schematic geological profile of Santo Antão



2 THE NATURAL ENVIRONMENT

1 GEOLOGY AND HYDROGEOLOGICAL ASPECTS

The Cape Verde Islands are of volcanic creation, as are the other islands of 'Macaronesia' such as the Canary Islands, the Azores, and Madeira. The island of Santo Antão is basically made up of three formations which correspond to three geological phases (Vailloux & Bourguet, 1974; KIT, 1982) the Inferior Complex (Miocene), the Intermediate Series (Pliocene) and the Recent Series (Quaternary) — see Fig. 2.1 and GIS Map 2.1.

Inferior Complex

The Inferior Complex formations constitute the geological base of the island — a highly altered pyroclastic nucleus which is relatively impermeable. The erosion of later formations has exposed this base in most of the main *ribeiras* of the northern slopes of the island (*ribeiras* are deep ravines cut into the original geological surface). This geological formation is characterised by innumerable intrusive barriers which appear as vertical basaltic walls in the countryside where the rest of the base material has eroded.

Intermediate Series

This geological formation was created by intense volcanic activity during which the Inferior Complex was covered by alternating layers of thick basaltic lava and volcanic ash. There is moderate fissuration

of the basaltic layers of the Intermediate Series; these layers comprise the main aquifers for infiltrated rainwater. Ground water flows with relative abundance where the Intermediate Series meets the Inferior Complex. Most of the productive springs and perennial streams are located where the division between the Inferior Complex and the Intermediate Series intersects with the beds of the *ribeiras*.

Recent Series

Later in the geological time scale, the deposits of lava became less dense and the layers of ash relatively thicker. At the beginning of the recent geological period great quantities of ash were deposited. It can be seen that the *Planalto* (central uplands or plateau), being relatively flat and highly permeable, constitute the principal area of water infiltration and supply of ground water. It is assumed that the movement of water in these formations is mainly vertical.

Alluvial deposits

Besides the volcanic deposits and their later erosion, there are other recent geomorphological phenomena which are of great relevance to the hydrology of the island. These are the alluvial deposits in the large *ribeiras*. During the last Ice age, sea level was some 40 metres lower than it is at present. The level of the beds of the large *ribeiras* were thus much lower than they are now. The rise in sea level, which continues

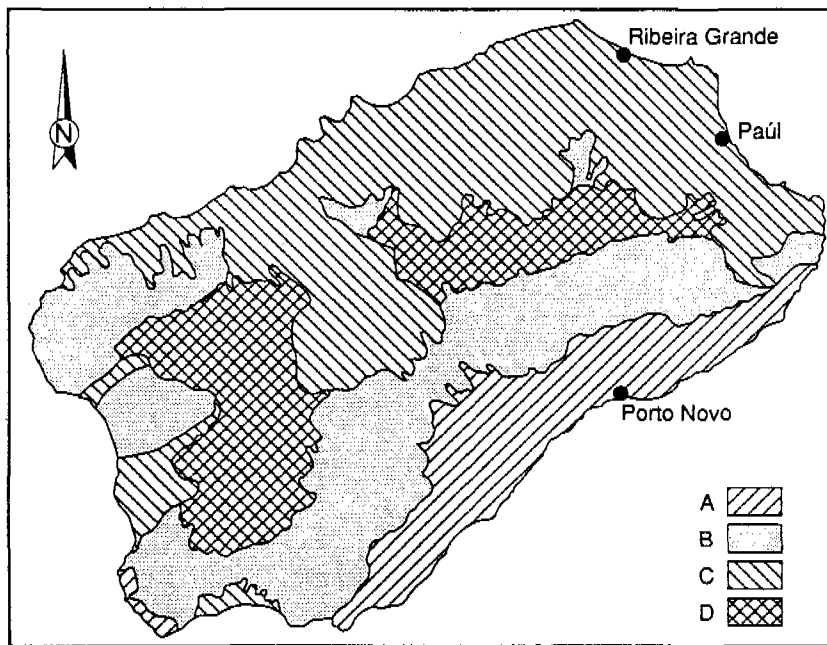


Figure 2.2 Division of the Santo Antão Island into four geomorphological zones. Modified after Constantinho (1978).

to this day, caused the beds of the *ribeiras* to become filled with alluvial deposits. These deposits are very permeable and act as significant aquifers from which water is extracted for irrigation.

2 GEOMORPHOLOGY

Santo Antão is the most mountainous island of the archipelago and the many steep slopes make access very difficult. A very wide variety of landscapes can be found in this small area due to the relief and the resultant microclimates. This variation can be divided into four major geomorphological regions (Constantino, 1978) — see also Fig. 2.2.

(A) Southern Coastal Plain Region

The southwest coast is a type of coastal plain. This region is arid and unproductive and thus sparsely populated (see Section 3.1).

(B) The Slopes of the South and Southwest

This region consists of steep slopes, although generally less severe than those of the northern region. The original surface is

more intact than in region (C) and the *ribeiras* are less deep, mainly because precipitation is perceptibly less.

(C) Region of Highly Dissected Slopes, Northern and Northeastern Slopes

This is the most steeply inclined region of the island and comprises one third of the total surface area. The original geological surface has almost completely disappeared due to erosion, leaving deep ravines separated by sharp ridges. The heads of the *ribeiras* are enclosed by cliffs rising up to 1,000 metres, marking the boundary with the central massif. Although the relief of this region makes it the least accessible, this is where over half the population lives. The reason for this is that most of the rain falls here, and there are also ground water sources which spring up in the beds of the *ribeiras*.

(D) The Central Massif or *Planalto* (plateau)

This region covers approximately one sixth of the area of the island and has an average altitude of 1,400 metres, including the highest point on the island, Topo de Coroa (1,979 metres). This area varies from flat to undulating and is divided at the centre

into the Planalto Leste (eastern plateau) and the Planalto Norte (northern plateau) by the Ribeira das Patas, which is probably the eroded remains of the former main crater. Much of the plateau is semi-arid, but still has a fairly dense population. This is the most important area of infiltration for the supply of the island's ground water. The soils are good but very susceptible to erosion. For this reason, forestry has been concentrated in this area since colonial times.

3 SOIL

The soil of Santo Antão is generally undeveloped and thin, even to the extent of being non-existent in some cases (Constantino, 1978). As a consequence of the interaction of topo-graphic and climatic factors and because of the sparse vegetation, the rate of erosion of the soil is often equal to

or greater than the rate of its formation. Most soil contains a high proportion of stones (from 25 - 80% pebbles and stones) and in arid regions erosion has left some soils with surfaces composed entirely of stones.

An exception is the soil of the plateau, where the rapid breakdown of volcanic ash and the gentle terrain have produced deep soil in some places. Another exception is the original geological surface which survives in some places on the northern slopes of the island at Corda and Costa Leste. There are also scattered areas of favourable soil conditions, for example in hollows where material from the hillsides has accumulated.

The soil composition is very varied, from clayish to sandy, which in the latter case results in problems of water retention capacity. Due to the volcanic-basaltic origin of the base material, the chemical fertility is generally quite good. It is a widespread

Figure 2.3 Schematic transect of a ribeira with irrigated and rain-fed contour terraces.

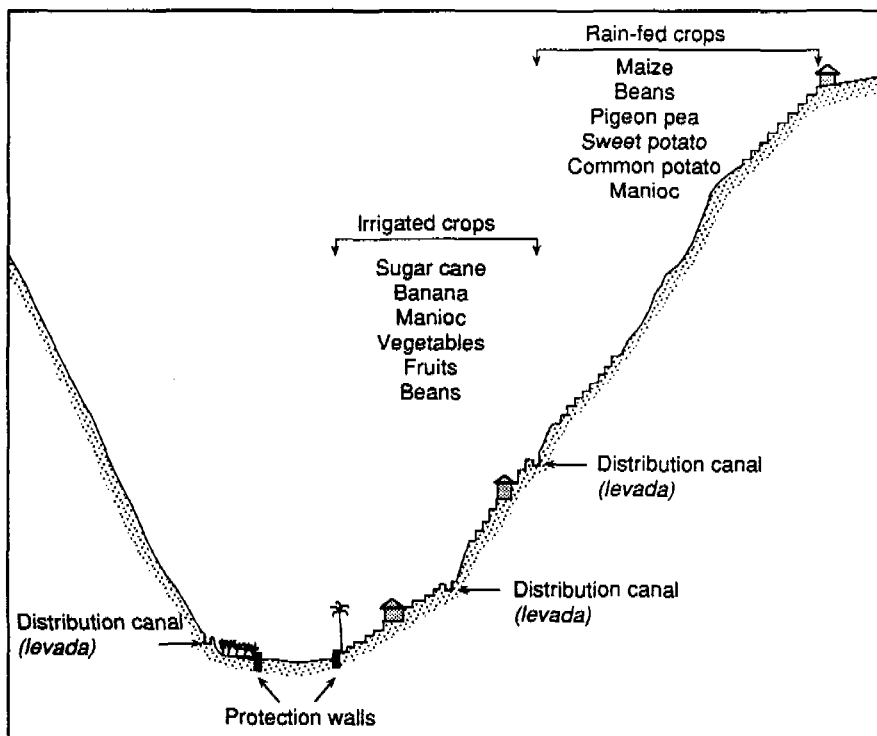


Table 2.1 Climate of Santo Antão: some indicative data (mean values). Source: INIA (1990a).

Station	Altitude (m)	Mean minimum temperature (°C)	Mean maximum temperature (°C)	Mean annual rainfall (mm)	Reference mean evaporation (mm/year)	Mean wind velocity (m/sec.)
Lombo de Santa	350	18.6	24.8	216	1,314	2.2
Lagoa	1,150	14.8	24.5	187	811	2.8

practice to incorporate organic material into the soil in irrigated areas, and also occasionally in rain-fed areas.

'Man-made' Soil

Due to the lack of well developed soil in those areas where climatic conditions or irrigation allow agriculture (north and northeast), the population of Santo Antão has played a crucial role in the formation of man-made soil that is probably without equal in the world. Of the land used for agriculture, 71% is situated by the coast, where gradients sometimes run vertical. To 'create' the soil on these slopes, the land is cleared of stones, which are used to construct the walls needed to form contour terraces. These terraces are flat where irrigation is practised or inclined where it is not. Approximately 60% of agricultural land was formed in this way (GEP, 1990). Another form of soil/land reclamation is protection against flooding of the *ribeiras* by constructing walls or enclosures along the banks so that these flat lands can be used for agriculture (Fig. 2.3).

4 CLIMATE

Average Values, Climatic Zones and Variations in space

Cape Verde has a sahelian climate, in which northeast trade winds predominate carrying cool dry air masses during most of the year. The mountainous relief of the

north and northeastern slopes causes occasional light rain and thus more favourable conditions. These same conditions lead to an arid climate on southern and western slopes due to the rain shadow effect.

From time to time the 'harmattan', a hot, dry wind from the Sahara reaches the island. Relative air humidity can drop from 80% to 10% in a few hours causing damage to irrigated and rain-fed crops alike.

The island is occasionally affected by humid equatorial winds which bring intense monsoon-type rain. Although quite unusual, these rains greatly increase the average annual rainfall. Hence not only average values should be examined (Tab. 2.1), but also weather variation, especially regarding rainfall.

Precipitation in the form of mist condensation significantly contributes to the total precipitation in the regions most exposed to the ascending winds of the northern slopes. No studies have been conducted to quantify this phenomenon or to establish its distribution. Its contribution is mainly dependent on altitude and density of vegetation and could even reach hundreds of millimetres annually in the older forest.

The island has three climatic zones: arid, semi-arid, and sub-humid (Fig. 2.4). There are many factors which make it difficult to precisely define the distribution of these zones, among them the great variety in location and time of the parameters which affect precipitation and evaporation, and the lack of meteorological data (there

Figure 2.4 Distribution of annual rainfall and climatic zones. Source: Constantinho (1978).

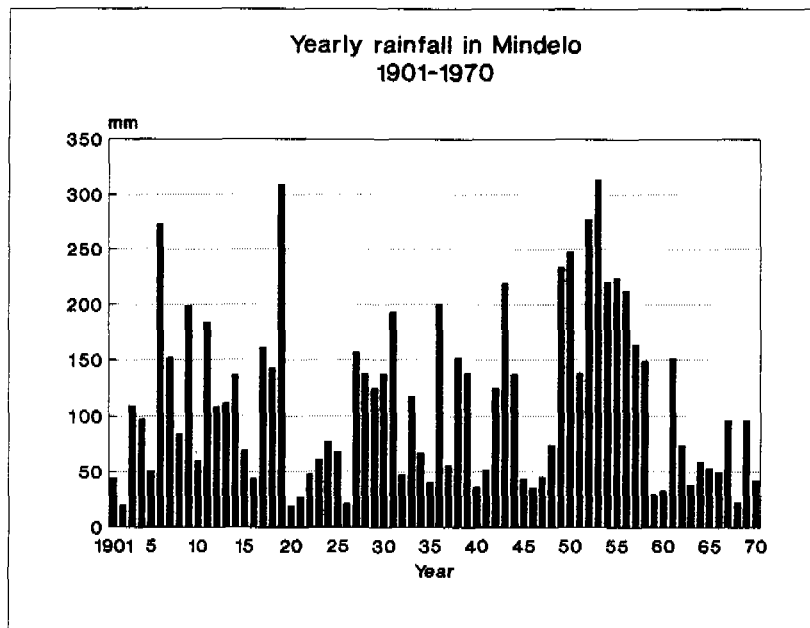
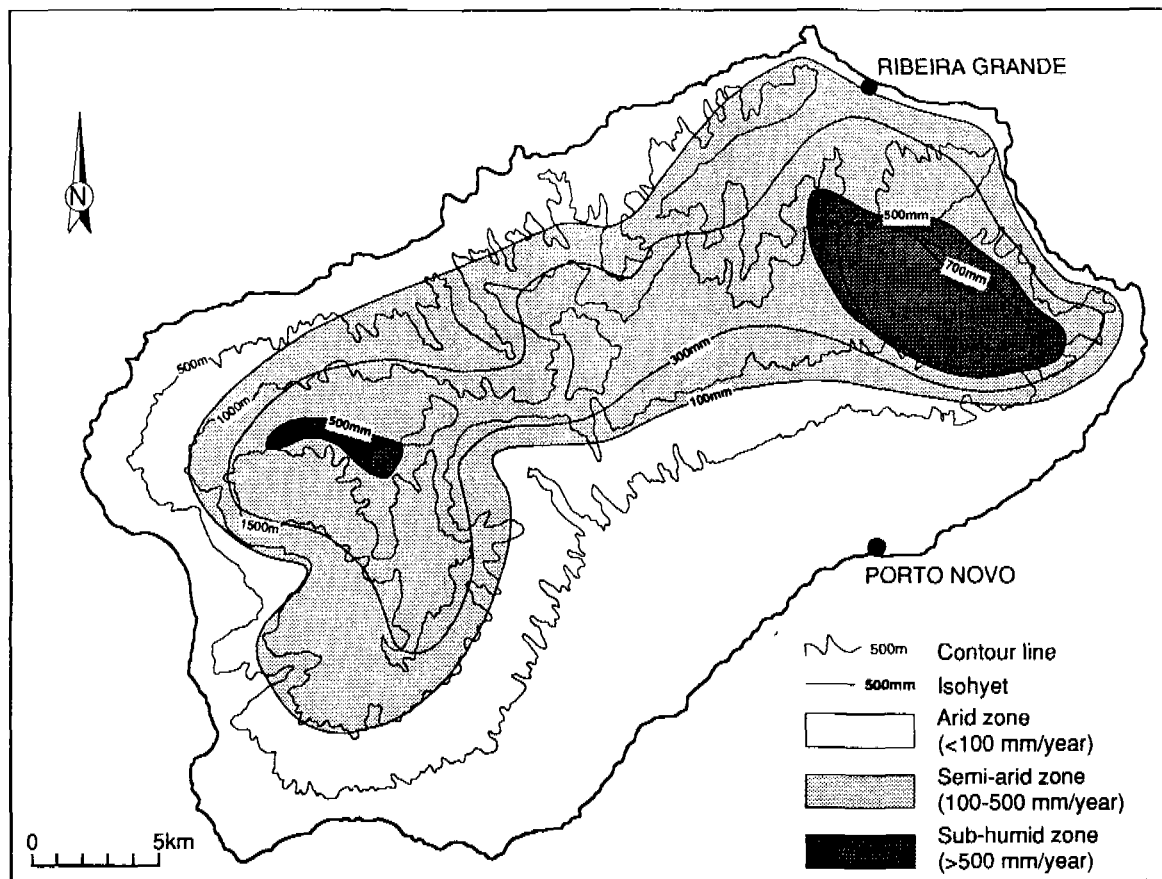
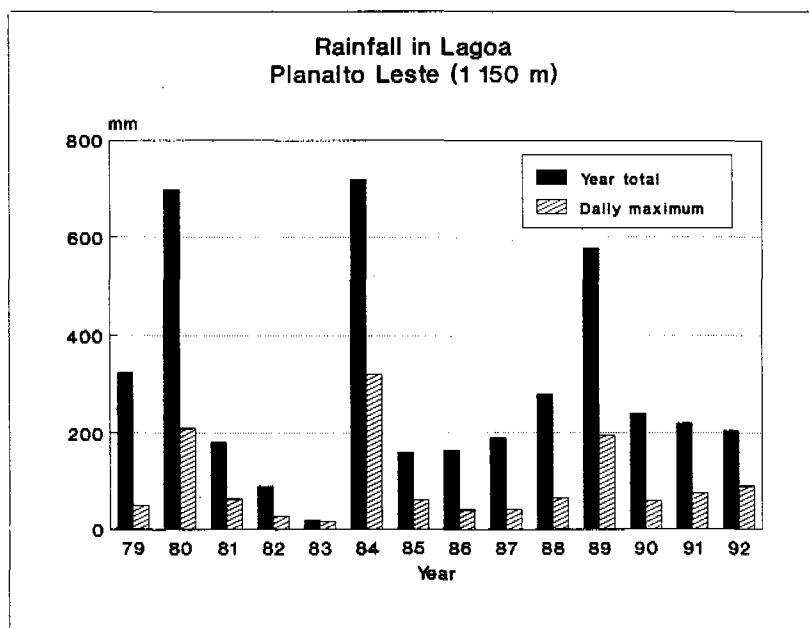


Figure 2.5 Annual rainfall in Mindelo between 1901 and 1970. After KIT (1982).

Figure 2.6 Annual rainfall and maximum rainfall in 24 hours in Lagoa (Planalto Leste, 1 150 m). After INIA (1990a).



are only two meteorological stations on Santo Antão).

Long-Term Variation

There are no extensive series of pluviometric data for Santo Antão that could be used to evaluate the long-term variation in rainfall. The rainfall recorded at Mindelo, on the neighbouring island of São Vicente, since the beginning of this century demonstrates the variation of the climate in Cape Verde (Fig. 2.5).

Data available from 1940-1971 for the average annual precipitation at 24 rain gauges on Santo Antão was compared with data from 1975-1985 (Bourguet, 1989). The average rainfall from 1975-1985 on the northeastern slopes of the island had dropped by 50% compared to the average for 1940-1971. The average decreased slightly on the southern slopes and on the plateau but not unequivocally. The result of this comparison emphasizes the seriousness of the drought which has affected the island since the mid-1970s and which continues to this day.

An obvious consequence of this long-term variation is that the intensity of the use

of resources for agriculture and stock rearing during prolonged periods of higher rainfall like the one during 1950s, easily becomes excessive when an attempt is made to maintain this intensity during subsequent periods of drought.

Rainfall Intensity

As is often the case in arid climates, much of the rain in Santo Antão falls in a short period of time (Fig. 2.6).

Rainfall often becomes a negative factor for the management of resources because there is not sufficient time for it to infiltrate in the soil, and instead of contributing to plant growth and the supply of ground water, it drains directly into the sea. It is not difficult to imagine the damage and devastating effects on agricultural land when the *ribeiras* flood. During the memorable deluge of 16-17 September 1984, 300 mm of rain was recorded in Lagoa (Planalto Leste). Other rain gauges recorded even greater amounts that day, up to 640 mm. This deluge caused extensive damage all over the island, estimated at over ECV 197,000,000, i.e. US\$ 2,323,000 (Sabino *et al.*, 1984) — see also Tab. 5.1.

It is estimated that only 10% of the total rainfall contributes to the supply of ground water.

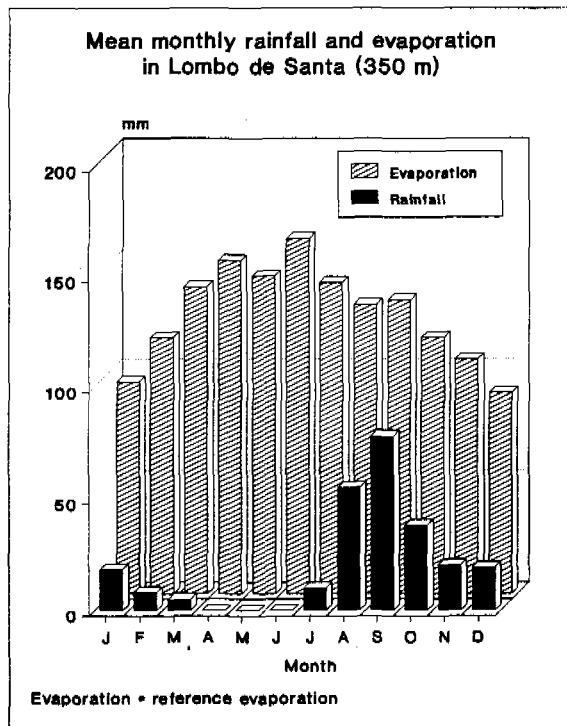
Seasons

Most of the rain falls between August and November. Occasional light rain may fall between December and March, but there is rarely any rain between April and July (Fig. 2.7).

5 WATER RESOURCES

Although good soil is quite scarce on Santo Antão, most people would agree that shortage of water is the main factor limiting the agricultural (crop farming and stock rearing) development of the island. It is not surprising therefore that many surveys have been conducted to seek out exploitable groundwater reserves.

Figure 2.7 Mean monthly rainfall and reference evaporation at the Lombo de Santa meteorologic station (350 m) between 1979 and 1992. After INIA (1990a).



Sources of Water

Surface water only appears in the *ribeiras* during the periods of greatest rainfall (Fig. 2.8). The rivers dry up a short time after the rain stops. Large quantities of water flow into the sea during, and up to a few weeks after, the intense rains.

The main sources of water for agricultural and domestic use are the limited flows which filter through the alluvial sediments of the beds of the *ribeiras* and the perennial springs of ground water at the heads of the *ribeiras*.

Water for irrigation is channelled from natural springs or extracted from the beds of the *ribeiras* by dams, boreholes, wells or galleries.

Availability of water

A hydrogeological survey completed in 1974 has served as a reference for many later studies (Vailloux & Bourguet, 1974). The survey considered that the maximum amount of exploitable water was 75,000 m³/day, of which 30,000 m³/day would be required for domestic use and irrigation. Of this 30,000 m³/day, the four main *ribeiras* in the northeast of the island (Ribeira Grande, Ribeira da Torre, Ribeira de Paúl and Ribeira da Janela - see Fig. 2.8) provide 20,000 m³/day.

Recent data from the monitoring of the island's major water extraction sites shows that at present approximately 28,000 m³/day of water is used during times of drought. There appears to be no analysis of existing data to evaluate the effects of drought on the behaviour of the aquifers. An analysis of this kind would be hindered by seasonal variations.

It has been established that large quantities of ground water — thousands of cubic metres (Bourguet, 1989) — flow into the sea without being utilised.

Exploitation of Additional Sources of Water

So far, projects for utilisation of water resources have mainly been confined to

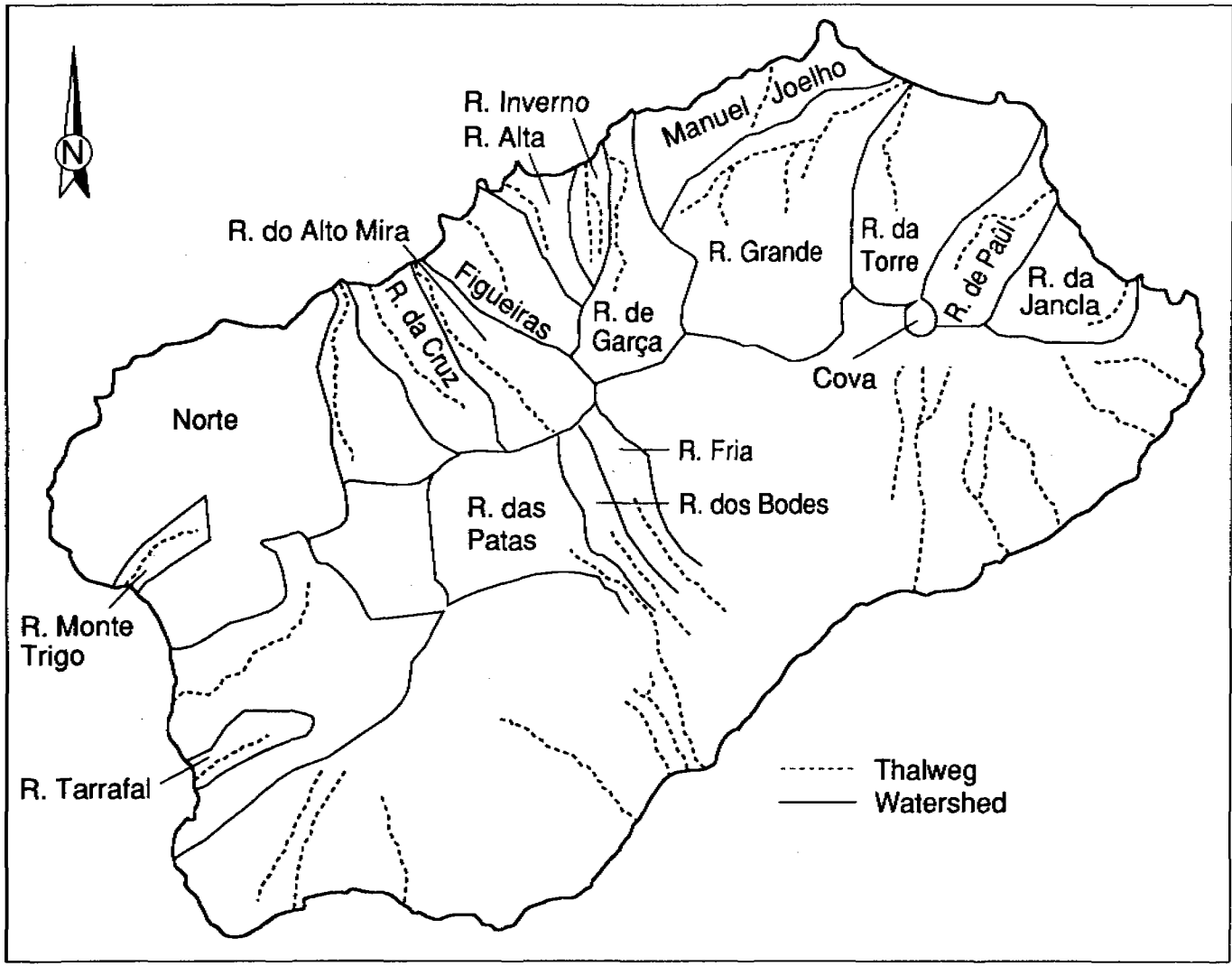


Figure 2.8 Thalwegs and watersheds of Santo Antão

restricted preliminary studies because of the high costs of exploiting ground water reserves and the high risk factor in exploration projects. A programme of geological and hydrogeological research is under way, involving the sinking of hundreds of boreholes and an appraisal of results. Few boreholes have been equipped with pumps to date for various reasons (low aquifer yield, brackish or poor quality water, very deep water table, lack of equipment).

There are four relevant alternatives for the development and exploitation of the ground water reserves:

- the extraction of ground water from boreholes fitted with mechanical pumps;
- boreholes/wells fitted with wind pumps;
- the construction of underground barriers in the beds of the *ribeiras* to collect water which flows through alluvial deposits into the sea;
- the construction of galleries to direct aquifer water.

To this list can be added:

- the catchment of flowing surface waters by constructing dams across courses of natural drainage (Pina, 1992b);
- the collection of precipitation in the form of mist (see Section 2.4), although the technical and economic feasibility of this is uncertain.

Due to the wide variety of conditions, it would be difficult to conduct a comparative analysis of the economic and environmental sustainability of each type of development and its effects on poverty. However, this appears important to enable the optimal prioritization of the methods involved.

6. FLORA

Compared to the other Macaronesian archipelagos such as the Canary Islands or Madeira, the flora of Cape Verde is relatively poor: it comprises 659 plant species (Stuart & Adams, 1990). By way of comparison, Madeira has 950 species. This relative paucity can mostly be explained by

the isolation of the Cape Verde Islands, the effect of volcanic phenomena, the shortage of water and human intervention (Brochmann & Rustan, 1987; Chevalier, 1935; Van Melle & Delgado, 1990).

The archipelago is effectively isolated from the African continent by 500 kilometres of ocean, up to 1,000 metres deep. An illustration of this isolation is the paucity of Senegalese elements in Cape Verdean flora. Thus the plant stock of the islands primarily results from the transport of seeds by birds, insects, sea currents and the wind (Chevalier, 1935; Van Melle & Delgado, 1990).

In some parts of the western islands, including Santo Antão, vegetation has often been destroyed by phenomena of volcanic origin such as fire, lava flow, ash deposits, etc.

A further constraint on the formation of a lush flora is the shortage of water. Seeds reaching Cape Verde encounter conditions which are unfavourable to plant colonisation and apart from some upland areas, there are few suitable sites as arid and semi-arid environments dominate the landscape.

Humans, and the animals that they have introduced, have had a significant effect on the flora. The clearing of land for agricultural development, the collection of firewood — and timber — and overgrazing have all contributed to the degeneration of natural flora and the destruction of plant cover (Chevalier, 1935; Stuart & Adams, 1990). Vegetation has been destroyed in some areas, existing plant associations overturned and the processes of plant succession affected. Humans have also introduced new species (crops, weeds associated with crops, etc.), some of which have spread very quickly, due in particular to the island's goats. These new species have modified the initial flora by mixing with, and replacing native plants (Chevalier, 1935).

Changes in flora have doubtless been accentuated by erosion and the deterioration of the climate (Chevalier, 1935).

These different factors explain the low level of endemism which typifies the archipelago. There are in fact 92 endemic species and sub-species (Chevalier, 1935; Stuart & Adams, 1990) — this represents approximately 14% of the total flora, compared with over 25% for the Canary Islands (Lobin & Zika, 1987).

The Flora of Santo Antão

The original vegetation of Santo Antão is unknown. However, it is certain that when the Portuguese discovered the Cape Verde Islands (Chevalier, 1935) the high valleys were quite densely wooded by trees and shrubs — *Dracaena draco* (dragon tree), *Sideroxylon marmulano*, *Ficus gnaphalocarpa* and *F. capensis* (Van Melle & Delgado, 1990), *Echium hypertropicum* and *E. stenosphon* and *Euphorbia tuckeyana*. The destruction of these forests and their replacement by crops is doubtless linked to the moist, black soil, rich in organic material (Chevalier, 1935), which had formed in the wooded areas. Whatever comprised the original flora, it was destroyed by centuries of overgrazing, collection of firewood, and clearing for agriculture.

The flora of the island comprises 577 species at present, that is to say 87.5% of Cape Verde's total number of flora species. The ligneous species, forest or fruit, number 358 (i.e. over 60% of the flora); 199 of which were introduced between 1952 - 1984 in Planalto Leste, the region where efforts at reafforestation were concentrated (Van Melle, 1991).

Flora Elements

The flora is composed of three types of elements:

- Mediterranean or atlantic island elements. These are the oldest; they come from the other macaronesian archipelagos (e.g. *Elionurus royleanus*).
- Ethiopian or tropical African elements (e.g. the jujube *Ziziphus mauritiana*).

- Elements introduced by humans — crops, weeds, forest species, ornamental plants. Among the many species introduced are sisal *Agave sisalana*, physic nut tree *Jatropha curcas*, coconut palm, mango, coffee, Pigeon pea *Cajanus cajan*, cassava, *Lantana camara*, one of the ornamental plants now spreading spontaneously, and — indispensable for the preparation of the national dish, 'cachupa' — maize and beans from America.

Plant Associations and Vegetation Zones

It is difficult to describe the plant associations which typify the different zones on Santo Antão. On the one hand all the plant formations are very open. On the other hand, the dynamic nature of the climate, accentuated by the poor development of plant cover, intense erosion, the speed with which the mother rock is broken down and the disruptive activities of humans, prevent pioneer formations establishing and evolving to a balance (climax) via the phenomenon of plant succession. Plant communities are subjected to constant change and do not progress beyond the pioneer community stage.

The relief, exposure to winds (prevailing from the northeast together with a dry mountain wind on south and southeast slopes) and altitude are the major factors in determining the availability of water (precipitation and atmospheric water vapour). Four main zones of vegetation can be distinguished (Box 2.1), characterised by the predominance of species with high water requirements (hygrophytes), those with medium water requirements (mesophytes) or those able to survive in dry conditions (xerophytes). The occurrence of mesophytes capable of adapting to various conditions of humidity (eg. *Sarcostemma daltonii*) and the presence of a variety of microclimates and micro-habitats leads to the incursion here and there of one zone of vegetation into another. Nevertheless, the

classification in Box 2.1 is generally easy to recognise in situ, moreover there exists a certain similarity with the major climatic zones previously mentioned.

In addition to the existence of these four distinct zones, the mountainous relief of the island and the influence of winds and altitude create many microclimates and sometimes very localised habitats. Plant communities very rich in endemic species have developed around some springs, areas of ground water seepage and damp caves. For example, there are associations of *Campanula jacobea*, *Wahlenbergia lobelioides*, *Aeonium gorgoneum*, *Umbilicus schmidii*, *Launea picridioides* (a rare species) and *Sonchus daltonii* found here and there in the mountains of the humid region. Similarly, the plant associations in the areas of water seepage of the coastal cliffs in the north-

east, for example in the Ponta do Sol area, include many endemic species such as *Limonium braunii*, *Campylanthus spathulatus*, *Paronychia illecebroides*, *Conyza pannosa*, *Polycarpea gayi*, etc.

Endemic Species

The relationship between humidity and the presence of endemic species in Santo Antão is well illustrated by these latter examples. Nearly three quarters of Cape Verde's endemic species cannot tolerate arid or extremely arid conditions. (Fig. 2.9). As Santo Antão is one of Cape Verde's most humid islands, it is hardly surprising that over 70% of the archipelago's endemic species are found there (Tab. 2.2). Of the 50 endemic species identified on Santo Antão (Appendix B), eight are unique to the island and eleven are rare. This latter group includes *Gossypium capitis-viridis*, an extremely rare xerophyte (Brochmann & Rustan, 1987).

Table 2.2 Number of endemic species in the Cape Verde Islands. After Brochmann & Rustan (1987) and Lobin (pers. com., 1993).

Island	Number of endemics	Endemics specific to the island
Santo Antão	50	8
São Vicente	32	0
Santa Luzia	10	0
São Nicolau	43	4
Sal	12	2 (?)
Boa Vista	12	0
Maio	7	0
Santiago	37	2
Fogo	40	3
Brava	24	1
Total number of island-specific endemics		between 18 and 20

7 FAUNA

Terrestrial Fauna

All the mammals on Santo Antão — donkeys, oxen, goats, pigs, rats and mice — were introduced by humans either for economic reasons or by accident (Chevalier, 1935; IUCN-Iedencontact, 1992).

The only vertebrates in the original terrestrial fauna were tortoises and lizards. The tortoises have now disappeared (Chevalier, 1935). Lizards are the only remaining reptiles on Santo Antão. However, lack of information means that it is not known which of the 20 endemic species of Cape Verde (IUCN-Iedencontact, 1992) are present on the island.

Insect life has been little researched and the information available dates back to the beginning of the twentieth century. The original fauna would have comprised mostly Palaearctic and Macaronesian elements, but numerous species introduced later probably modified the entomological fauna consider-

BOX 2.1

VEGETATION ZONES ON SANTO ANTÃO

Sub-Humid Zone

The upland areas of the northeast (above 600-800 m.) and the upper parts of the northeast *ribeiras* benefit from night-time cloud cover ('lateral' precipitation, lower rate of evaporation) and constitute a separate vegetation zone. The natural vegetation includes species which have high water requirement (hygrophytes), examples of which are the endemic *Tolpis farinulosa* (Brochmann & Rustan, 1987) and *Bubonium smithii*. There are also species with lower water requirement (mesophytes) most of which are shrubs. Among the typical mesophytes in this area are *Artemisia gorgonum*, *Euphorbia tuckeyana*, *Sideroxylon marmulano*, *Furcraea foetida*, *Lantana camara*, *Lavandula dentata* and *Tagetes patula*.

In the most humid region, above 1200 m. (Planalto Leste, near Aguas das Caldeiras, Pico da Cruz and Pero Diaz), reforestation work started in the 1950s has created a mixed forest of conifers (*Pinus* spp., *Cupressus* spp.) and broad-leaved trees (*Acacia* spp., *Eucalyptus* spp. and *Grevillea robusta*); (Van der Zee *et al.*, 1982; PDSA, 1991) see GIS Map 2.2.

Outside the forest, the natural vegetation is sparse or confined to steep or rocky areas. The rest of the land is taken up by crops, in the uplands as well as on the slopes of the *ribeiras*. *Euphorbia tuckeyana*, *Sideroxylon marmulano*, and *Artemisia gorgonum* are found on the highest parts of the heads of the *ribeiras*, where the land is considered unsuitable for agriculture.

Semi-Arid Zone

The semi-arid zone includes the north coast (up to 150-300 m.), the lower parts of the northeast basin slopes, the northeast coast from 100-800 m., all of the central part of the island from 600-1,200 m. and the southwest above 1,500 m.

In the middle sections of the *ribeiras*, the lower parts of the slopes and the floors of the valleys there are isolated trees (*Mangifera indica*, *Tamarindus indica*, *Ficus* spp., etc.) as well as a few rare dragon trees *Dracaena draco*, relics of the low-lying forest which probably covered this area in the past. Near the agricultural land that dominates this part of the *ribeiras* (or near land that has been lying fallow for some years), annual or ephemeral grasses are the predominant vegetation. Some of these grasses are of some value for animal grazing — *Rynchelitrum* spp., *Panicum* spp., *Setaria* spp., *Eragrostis* spp., etc. (Constantino, 1978).

Sarcostemma daltonii covers most of the rocky outcrops which overhang the *ribeiras*. This endemic species dominates the countryside in the northern semi-arid zone, from sea level up to about 1,600 m.

Elsewhere, grasses are the predominant vegetation, e.g. *Heteropogon contortus*, *Eragrostis* spp., *Aristida* spp. and *Cenchrus* spp. The latter two are of low grazing value. *Campylanthus spathulatus* is an endemic species adapted to the semi-arid marine slopes of the north of Santo Antão (Brochmann & Rustan, 1987). Some hardy shrubs introduced by humans to parts of the interior have survived by adapting to the climatic conditions and shallow soils, e.g. *Jatropha curcas*, *Nicotiana glauca* and *Parkinsonia aculeata*. Here and there, other trees and shrubs have benefited from deeper soils: *Ricinus communis*, *Ziziphus mauritiana*, *Paidherbia albida*, *Ficus gnaphalocarpa* and *Tamarindus indica*. For several years, a programme of reforestation (mainly with *Acacia* spp.) has been carried out in the west of the Planalto Leste with results varying greatly from year to year, depending on precipitation.

BOX 2.1 - continued

Arid Zone

The land is arid in the south and southwest of the island. Further away from the interior, trees and shrubs disappear and the herbaceous formations become clearer. *Heteropogon contortus* and *Eragrostis* spp. give way to formations predominant in *Aristida* spp. and *Cenchrus* spp. The endemic species *Forsskaolea procrudifolia*, capable of resisting drought, is found in this region.

In years of drought the difference between this zone and the desert zone is not very clear. During rainy years an impression is given of life returning to the region by an ephemeral plant cover. Unfortunately the climatic conditions have had a harmful effect on the regenerative capacity of the vegetation: the stock of seeds and the organic content of the soil are considerably impoverished. There would have to be a succession of rainy years and strict control of grazing for the vegetation to regenerate in this zone, two conditions which are particularly difficult to comply with given Santo Antão's socio-economic and ecological circumstances.

Desert Zone

This zone consists of the southeast coastal plain and the southern slopes of the island. Vegetation is nonexistent in this rocky landscape, giving it a 'lunar' aspect.

See also GIS Map 2.3.

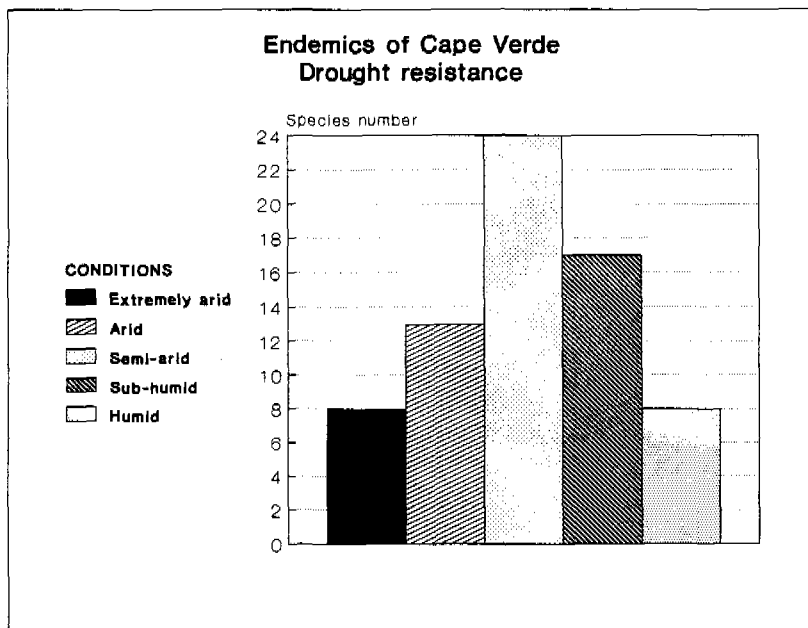


Figure 2.9 Drought resistance of Cape-Verde endemic species. Source: Brochmann & Rustan (1987).

ably. (The best known species are those which attack crops). In view of the probable relationship between insects and the endemic flora, this change is not insignificant (IUCN-ledencontact, 1992).

Avifauna

Birds are probably the most remarkable elements of Santo Antão's fauna. Research currently being undertaken will probably confirm the endemic nature of some species, considered until now as Palaearctic sub-species of little interest in terms of biological diversity (see Tab. 2.3). Notable of the species present is the Cape Verde red kite *Milvus fasciicauda*, the only known habitat of which is the upland region of Santo Antão (Alto Mira, head of Ribeira de Paúl). The cagarra *Calonectris edwardsii* is threatened despite the legal protection afforded it on the island of Raso. It also nests on the coasts of Santo Antão. The Gon-Gon or Cape Verde petrel *Pterodroma (mollis) feae*, is an endemic species in Cape Verde. It only nests on four islands of the archipelago.

The island is also a wintering ground for migratory Palaearctic birds such as the black kite, *Milvus migrans*.

Aquatic Fauna

Due to the droughts which afflict Santo Antão, it is not surprising that the freshwater aquatic fauna is extremely poor. The island's permanent rivers, the Ribeira de Paúl and the Ribeira de Janela, are merely narrow streams that no longer reach the sea. Drought, the use of water for irrigation and needs of the population, and overfishing — indicated from 1935 (Chevalier, 1935) — have led to the disappearance of freshwater shrimps *Palaemon chevalieri* (an endemic species found in Ribeira de Paúl) and *P. jamaicensis vollenhoveni*. Freshwater molluscs, if still in existence, have not been discovered.

The marine fauna includes four species of turtles which are protected internationally (Convention on International Trade in

Endangered Species of Wild Fauna and Flora) as well as nationally (Decree No. 97/87, Article 17). These are the green turtle *Chelonia mydas*, the loggerhead turtle *Caretta caretta*, the hawksbill turtle *Eretmochelys imbricata* and the leatherback turtle *Dermochelys coriacea* (Miller, 1989; Bonn Convention 1987). The presence of a fifth species, the ridley turtle *Lepidochelys olivacea*, in the waters around Santo Antão can neither be confirmed nor denied. Santo Antão has almost no sand beaches and for this reason cannot play an important role in the reproduction cycle of these turtles (egg laying). Catches by fishermen are not unusual however. This indicates that Santo Antão may be important in the protection of these endangered species — in fact turtles stay close to their egg-laying sites (Chevalier, 1935).

The only information about the specific composition of the ichthyologic stock comes from the catches of fishermen along the shores or near to the landing points. These catches contain about fifty demersal species and coastal pelagic species. *Thunus albacares* (Yellowfin tuna), *Acanthocybium solandri* (Wahoo) and *Decapterus macarellus* ('cavala') make up the great majority of Santo Antão catches (Magermans, 1992). The skipjack tuna *Katsuwonus pelamis* is only found in the waters of Cape Verde for a short period (July - November) and constitutes a small part of the catches. The total biomass of Cape Verdean aquatic fauna is estimated at 100,000 tonnes (not including tuna). As three quarters of this biomass is concentrated around the islands of Sal, Boavista and Maio, Santo Antão's resources may be relatively low (CNUCED, 1992) — see Section 8 below.

The natural coastal pools of some low, rocky areas (e.g. the Synagoga rocky platform) form genuine aquariums. It is known that these pools are the habitat of many small fish, but little is known of them, probably because of their lack of value for fishing and human nutrition.

8. FISHING RESOURCES

For many development planners and agencies, Cape Verde's economic promise lies in its significant potential in fishing resources. However, fishing output in the last ten years has remained at 1982-83 levels of about 12,000 tonnes per annum. There has been no satisfactory explanation for this phenomenon. Yearly catches from Santo Antão total about 800 tonnes (Santa Rita Vieira, 1985).

Many studies, including several expeditions, have been undertaken to establish the potential of the seas around the islands. Sustainable catch estimates range from 25,000 to 101,000 tonnes nationally (KIT, 1982). The minimum production potential for the fishing areas of Santo Antão must be around 2,000 tonnes per year.

However, estimates for potential catches based on global calculation methods are not confirmed by actual catches, whether practi-

cal or experimental. The explanation lies in technical factors which seem difficult to overcome. One of these is the lack of sandy, trawlable shelves of sufficient extension. Another problem is the fishing on an industrial scale of the species with most potential, the skipjack tuna. The migratory movements of this species only allow fishing for two months of the year, so returns on investment in a tuna fleet would be low. This, perhaps is one reason why traditional fishing still accounts for 75% of catches.

Moreover, exercising control over exploitation of continental shelf waters by foreign fishing vessels is problematic. It seems likely that significant quantities of fish are caught in an uncontrolled manner.

Potential increases in production by traditional fishermen are greatly limited by restricted access to landing points and adverse sea conditions during most of the year. Taking into account the existing infrastructure and boats, ca. 100 days a year are suitable for fishing by traditional methods.

Table 2.3 Endemic species and sub-species of birds occurring in Santo Antão: habitat and status. After Hazevoet (1991; pers. com., 1993).

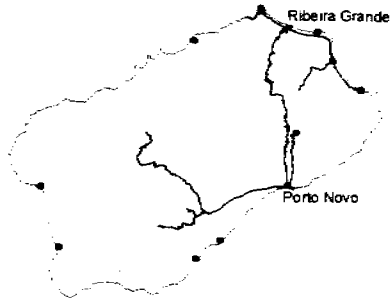
Species	Common name	Endemism	Habitat	Status
<i>Buteo buteo bennernani</i>	Cape Verde Buzzard	Cape Verde	Mountainous areas	Rare; in need of protection
<i>Calonectris (diomedea) edwardsii</i>	Cagarra	Cape Verde	Coast of Santo Antão (and Raso and Branco islands)	Protected on Raso; in need of protection on Santo Antão
<i>Falco peregrinus madens</i>	Cape Verde Peregrine	Cape Verde	Mountainous areas	In need of protection
<i>Pterodroma feae</i>	Gon-Gon (Cape Verde Petrel)	Cape Verde	High altitude areas (breeding) and coast	Urgent protection need
<i>Puffinus assimilis boydi</i>	Cape Verde Little Shearwater	Cape Verde	Breeding: mountainous areas and coast	In need of protection
<i>Milvus (milvus) fasciicauda</i>	Cape Verde Red Kite	Santo Antão	Mountainous areas of Santo Antão	Urgent protection need

GIS MAPS










- 1 Geological map of Santo Antônio
- 2 Map of the Santo Antônio forest (Planalto leste)
- 3 Vegetation map of Santo Antônio
- 4 Leaf area index map

Geological map of Santo Antão

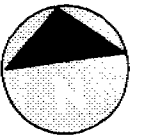
Map of the island



Geology

-  Ancient injection complexes
-  Intermediate volcanic Series
-  Recent alluvial deposits
-  Ancient terraces
-  Brecciated conglomerates
-  Older complex (Basement)
-  Recent volcanic mudflows
-  Recent deposits
-  Puzzolanas, pyroclastics and associated mudflows

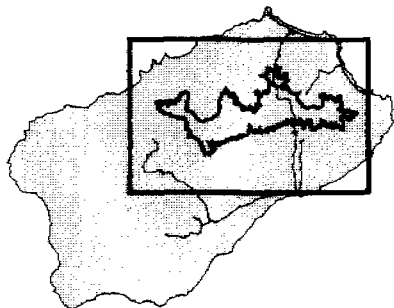
0 2.5 5 7.5 10 12.5 km








Source: Etude hydrogéologique, France.

Map of the Santo Antão forest (Planalto leste)

Map of the island

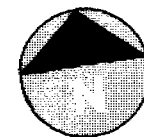
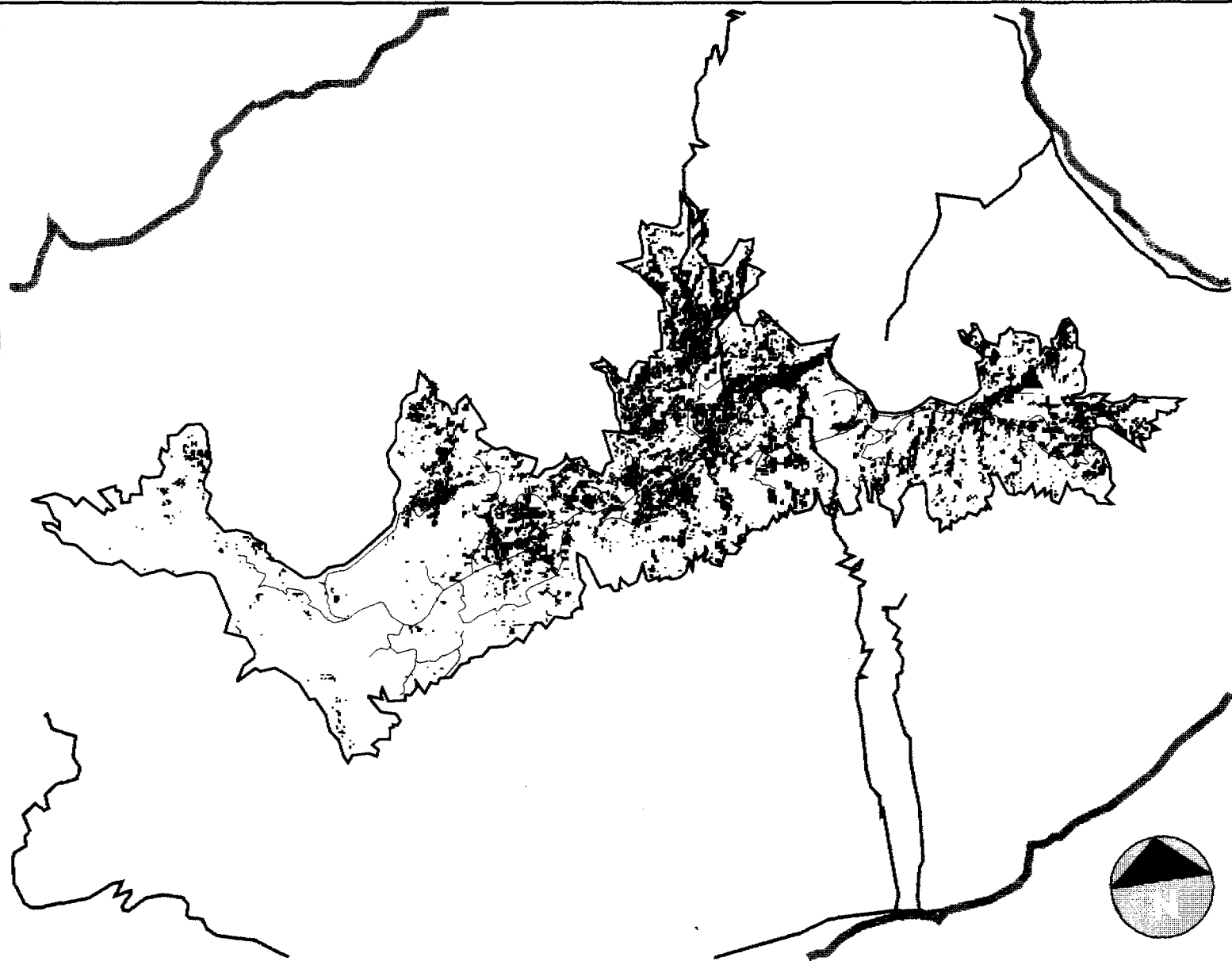


Forest

-  Pinus/cypres
-  Acacia
-  Other
-  Main road
-  Secondary road / way

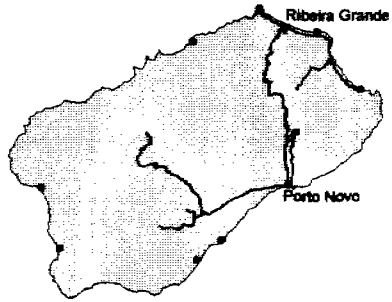
Source: Landsat TM, 5 Novembre 1987

0 1 2 3 4 5 km



Vegetation map of Santo Antão

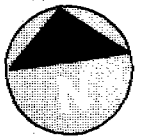
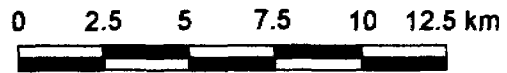
Map of the island



Vegetation

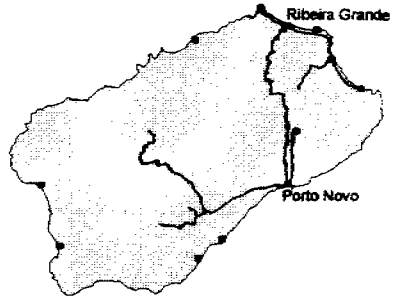
-  Irrigated crops (cane/banana)
-  Rainfed agriculture
-  Natural vegetation
-  Forest
-  Bare land

Source: Landsat TM, 5 Novembre 1987



Leaf area index map




Map of the island



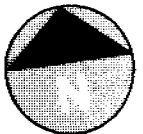
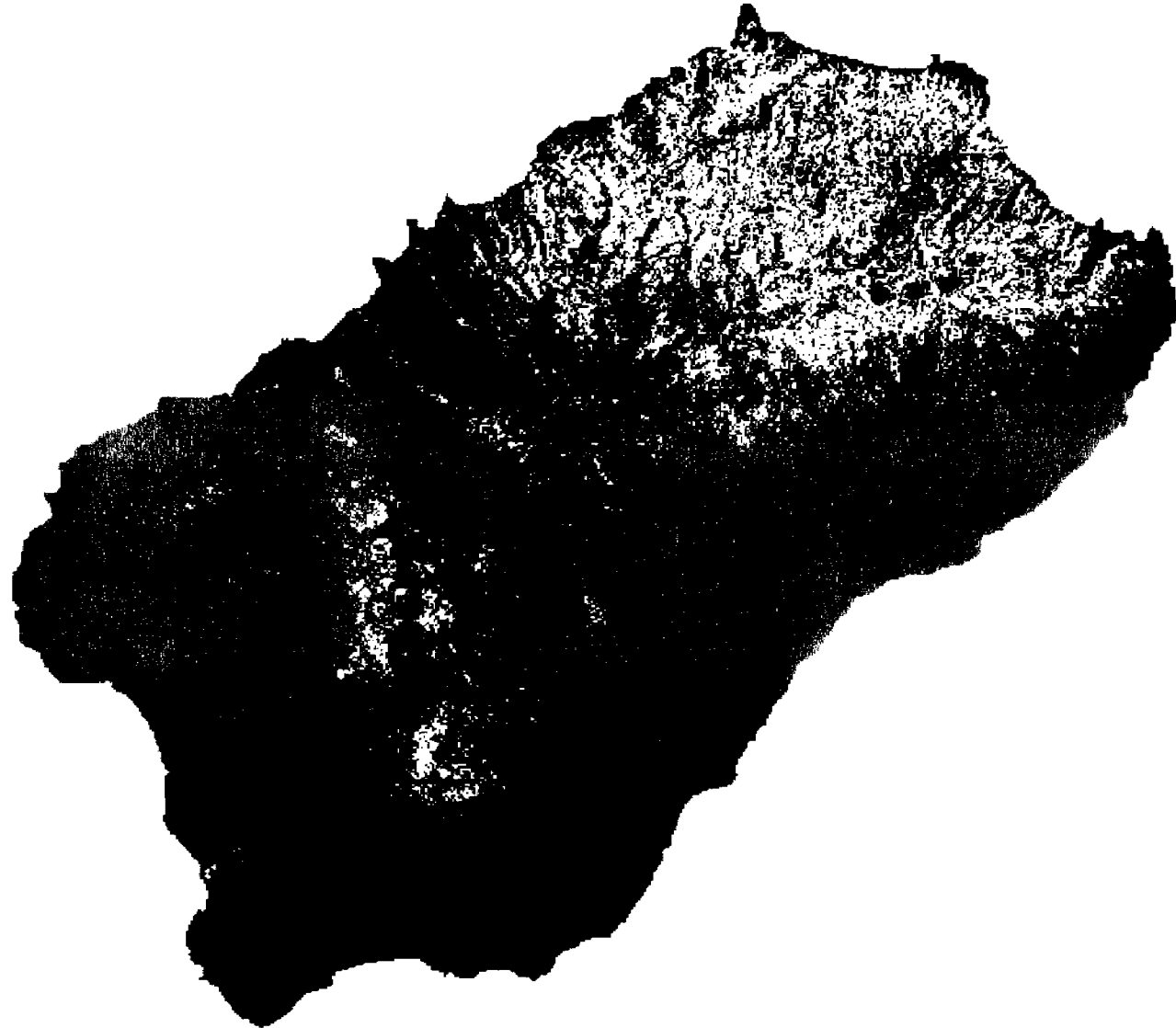
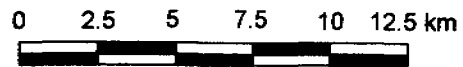
Leaf Area Index

$$\text{L.A.I.} = \frac{\text{Total leaf area}}{\text{Land area}}$$

L.A.I. = Leaf Area Index

-  0 - 0.1 No / little vegetation
-  0.1 - 1 Partially vegetated
-  > 1 Full vegetal cover

Source: Landsat TM, 5 Novembre 1987



BOX 3.1

SOME HISTORICAL FEATURES OF CAPE VERDE

The Cape Verde Islands were uninhabited until discovered by the Portuguese in 1460. The Cape Verdean economy developed on the basis of supplying ships travelling between Europe and the Americas or Asia, and also on the slave trade between Africa and the New World. The natural resources of the three most fertile islands, Santiago, Santo Antão and Fogo, were mainly used for export production of wheat, wine, sugar, cotton, *urzela* (natural dye made from moss), castor oil, coffee and bananas. The history of Cape Verde is punctuated by repeated famine, caused by severe and prolonged droughts which devastated the population. Between the droughts there were relatively rainy periods during which the population would recover.

In 1975, Cape Verde declared independence and a 15 year period of single party rule began. The first pluralist elections were held in 1989.

Table 3.1 Evolution of the Santo Antão population (1960-1990). After DGE (1990), Sctet Agri (1985) and PDSA (1991).

Year	1960	1970	1980			1990		
			Total	♂ (%)	♀ (%)	Total	♂	♀
Concelho								
Ribeira Grande	17,246	23,197	22,102	48.5	51.5	20,851	10,583 50.8%	10,268 49.2%
Paúl	6,024	8,026	7,983	49.2	50.8	8,121	4 196 51.7%	3 925 48.3%
Porto Novo	10,683	13,593	13,236	48.9	51.1	14,873	7 584 51.0%	7 289 49.0%
Santo Antão	33,953	44, 916	43,321	48.8	51.2	43,845	22 363 51.0%	21 482 49.0%

3 THE HUMAN ENVIRONMENT

1 DEMOGRAPHY

Like the other islands of Cape Verde, Santo Antão has experienced demographic variations during its history (Fig. 3.1 and Tab. 3.1) which are closely related to environmental factors. Droughts, especially when prolonged, have inflicted famine and death on the population. Cycles of famine have repeatedly reduced the island's population by almost half -the maximum level that could be sustained by the available resources. At the beginning of this century, the authorities began to take measures to end this decimation by means of emigration to other Portuguese colonies in Africa, namely São Tomé e Príncipe, Angola and

Mozambique. From 1941-70, 57,000 Cape Verdeans were forcibly removed to the south, 3,185 of whom came from Santo Antão (Carreira, 1983). From 1960 to 1970 favourable climatic conditions lead to an increase in population of nearly 11,000, but later this changed to decline and stagnation (Tab. 3.1).

According to the latest census (1990), the current population of Santo Antão is 43,845 (Tab. 3.1), representing 13% of the population of Cape Verde (DGE, 1992). A characteristic of this population is the high proportion of young people. The age group 0-14 years represents about 44% of the total population (Fig. 3.3). The dynamics of the population is being affected by this high

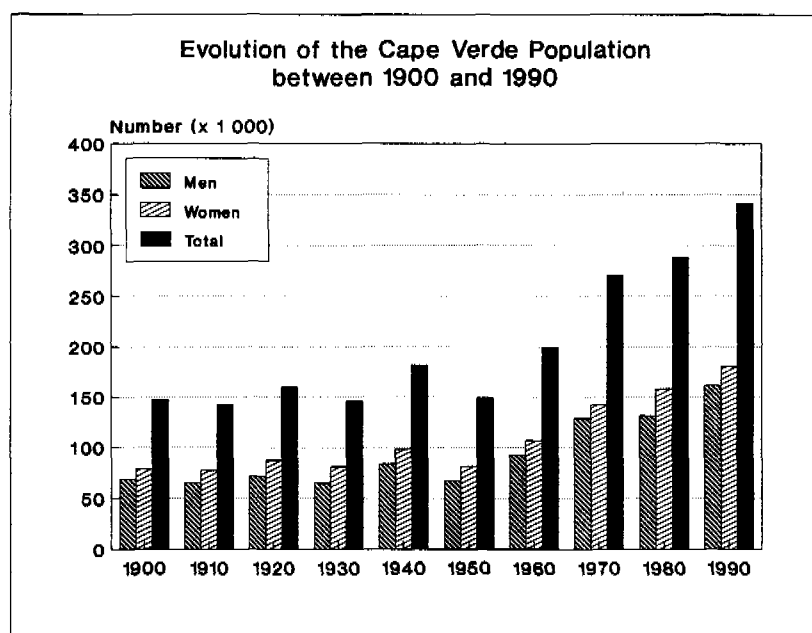


Figure 3.1 Evolution of the Cape Verdean population between 1900 and 1990. Sources: 1980 population and housing census, and DGE (1990)

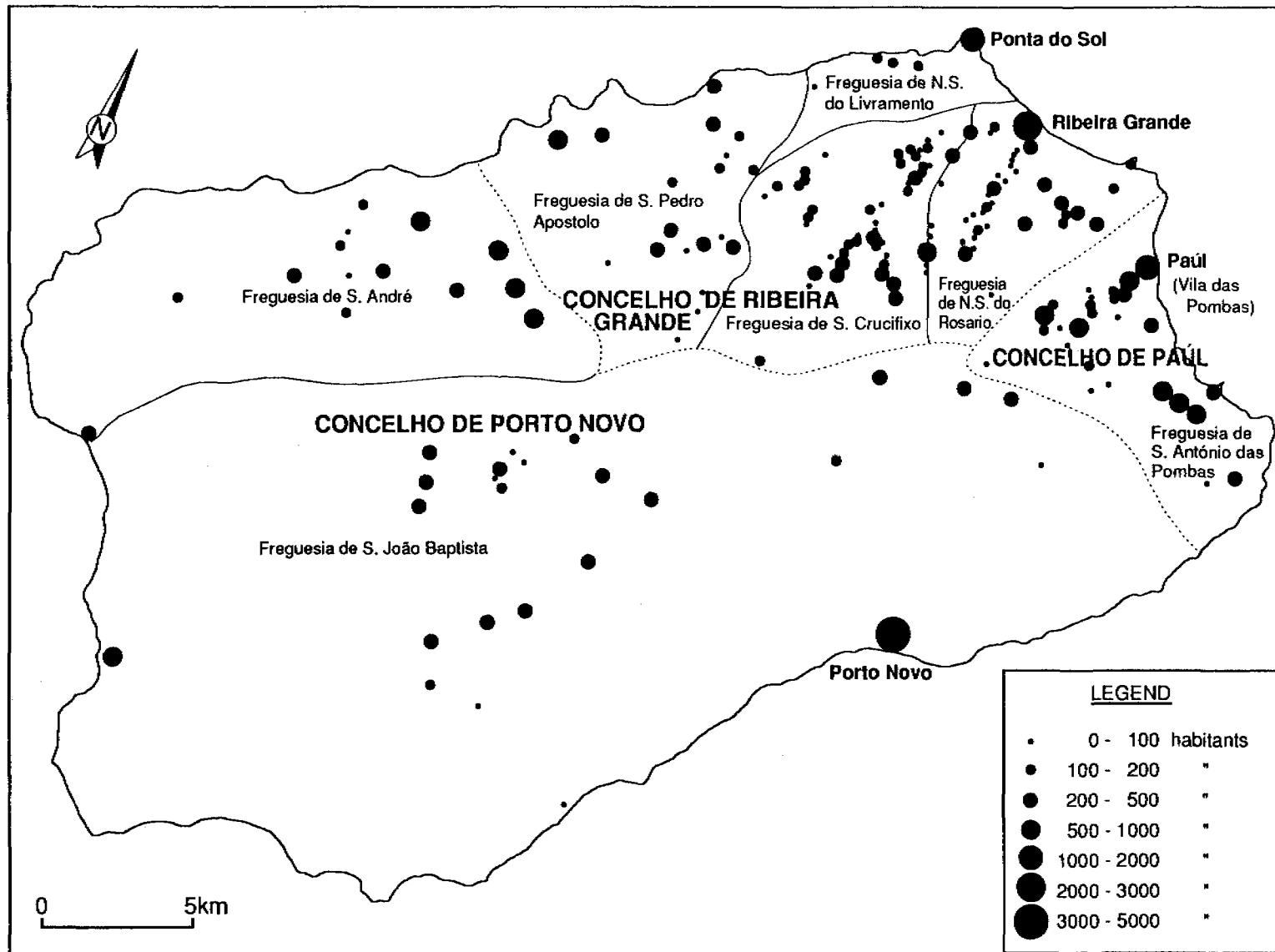


Figure 3.2 Geographic distribution of the Santo Antão population. After DGE (1990).

BOX 3.2

RURAL AREAS, URBAN AREAS AND URBAN CENTRES ON SANTO ANTÃO

Following current international criteria, the whole of Santo Antão could be classified as a rural area. The *vilas* - Santo Antão's 'urban centres' - are described as secondary urban centres in Cape Verde. They are small settlements: Vila do Porto Novo has 4,867 inhabitants; Vila da Ribeira, 2,550; Vila da Ponto do Sol, 1,505 and Vila das Pombas (Paúl), 1,161 (DGE, 1992). If only the basic statistics are considered, they could be thought of as villages. In reality, nearly a quarter of the population - 23% (see Tab. 3.2) - lives in these *vilas*. Although they do not correspond to the definitions of urban centres used in other parts of the world, they often have the same characteristics. The *vilas* are effectively the administrative, economic and cultural centres of the island. In this profile of Santo Antão, they are designated 'urban centres', 'semi-urban centres' or 'urban areas'.

ratio of children; in the short term there will be population growth, and simultaneously an increase in the proportion of women of child-bearing age. Moreover, in contrast to the rest of Cape Verde, Santo Antão has experienced a slight decrease in the rate of females (from 51% of the population in 1980 to 49% in 1990) - Tab. 3.1.

Population Density and Distribution

The average population density of Santo Antão is 56 inhabitants per km², but is unevenly distributed. The majority of the

population (66%) is concentrated in 40% of the island, namely in the *Concelhos* of Ribeira Grande (over 125 inhabitants per km²) and Paúl (over 147 inhabitants per km²) — where the conditions are most favourable for developing agriculture; the climate is better and there is more water. In Concelho de Porto Novo there are only approximately 27 inhabitants per km² (Appendix C/Table 1).

Santo Antão is typified by its rural population (approximately 80%), see Tab. 3.2 and Box 3.2. The settlements are very

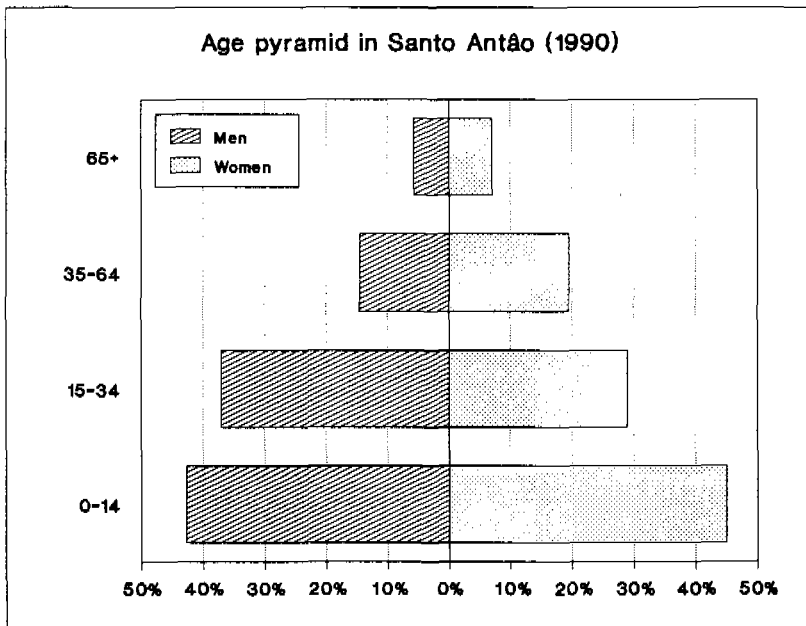


Figure 3.3 Age pyramid of the Santo Antão population. After DGE (1990).

dispersed, and few are of over 500 inhabitants. Along the *ribeiras*, the small communities are of 50 to 500 people (Fig. 3.2). The urban population of Concelho de Porto Novo represents 33% of the total in this *Concelho* (according to the population censuses of 1980 and 1990, Porto Novo experienced an annual rate of growth of about 2.2%). However, the relative proportion of urban population is much lower in Concelho de Paúl (14%) and Concelho de Ribeira Grande (19%), see Tab. 3.2. In these *Concelhos* there are more opportu-

ities for work and the agricultural yield is greater, in spite of the severe droughts, see Tab. 3.2.

Rural Exodus and Emigration

The high rate of urbanisation in Concelho de Porto Novo, compared to the other *Concelhos* (Tab. 3.2), can be explained by the combination of rural exodus (Fig. 3.4) and emigration. Due to persistent droughts and lack of economic alternatives, people move to Vila do Porto Novo and then to other islands of Cape Verde (especially

Table 3.2 Urban and rural population of Santo Antão. After DGE (1990).

Population	Ribeira Grande	Paúl	Porto Novo	Santo Antão	
Urban					
♂	1,990	600	2,377	4,967 (♂: 49.26%)	<i>Urban population of the island:</i>
♀	2,065	561	2,490	5,116 (♀: 50.74%)	
Total	4,055	1,161	4,867	10,083	
<i>Urban population of the concelho</i>	19.45%	14.30%	32.72%	---	
Rural					
♂	8,593	3,596	5,207	17,396 (♂: 51.52%)	<i>Rural population of the island:</i>
♀	8,203	3,364	4,799	16,366 (♀: 48.47%)	
Total	16,796	6,960	10,006	33,762	
<i>Rural population of the concelho</i>	80.55%	85.70%	67.28%	---	
Total of the concelho (and % of the total island population)	20,851 (47.56%)	8,121 (18.52%)	14,873 (33.92%)	43,845	100%

neighbouring São Vicente) or abroad in search of paid work (Tab. 3.3).

The number of emigrants from Cape Verde is nearly twice the number still resident in the country (*Africa South of the Sahara*, 1992 edition). (The State decrees that all people of Cape Verdean origin and their descendants have the right to nationality, even if they have accepted foreign nationality. They also have the right to vote.) Emigration is a traditional phenomenon on Santo Antão; people have often chosen to leave their place of origin to escape the devastation of famine and drought or to seek improved work opportunities. According to Carreira (1983), 195,639 Cape Verdeans emigrated from 1912 to 1973; of this total, some 13,059 (7%) were from Santo Antão. It should be noted however, that the origins of only 66,256 of these people were verified (20% of this total came from Santo Antão), and hence the number of emigrants from Santo Antão could be higher than indicated. This

is confirmed in the case of emigration in the year 1952 (Fig. 3.5).

Emigration from the country has declined in recent years. Though 273 people left in 1983, the figure was only 42 in 1987 (DGE - Directorate-General of Statistics). The preferred destination of emigration from Santo Antão is now to other islands of Cape Verde, especially São Vicente.

As to the proportion of the sexes, given that until recently there have always been more women than men in the population, the inversion of the male/female ratio in the last decade (Tab 3.1) seems to indicate that emigration has been higher among women.

2 SOCIAL AND CULTURAL ASPECTS

Ethnic Composition

Cape Verdeans are a mixture of Portuguese colonists and the African slaves brought by

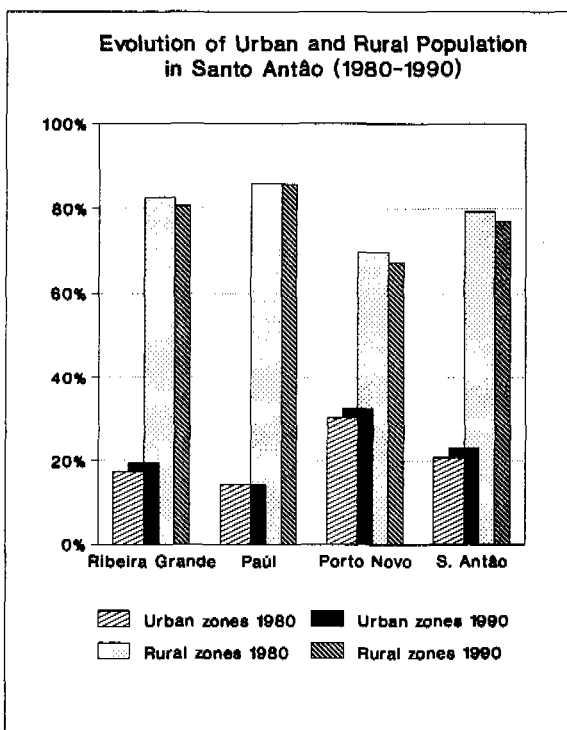


Figure 3.4 Evolution of the population in rural and urban areas of Santo Antão between 1980 and 1990. After DGE (1990) and data from the 1980 population and housing census.

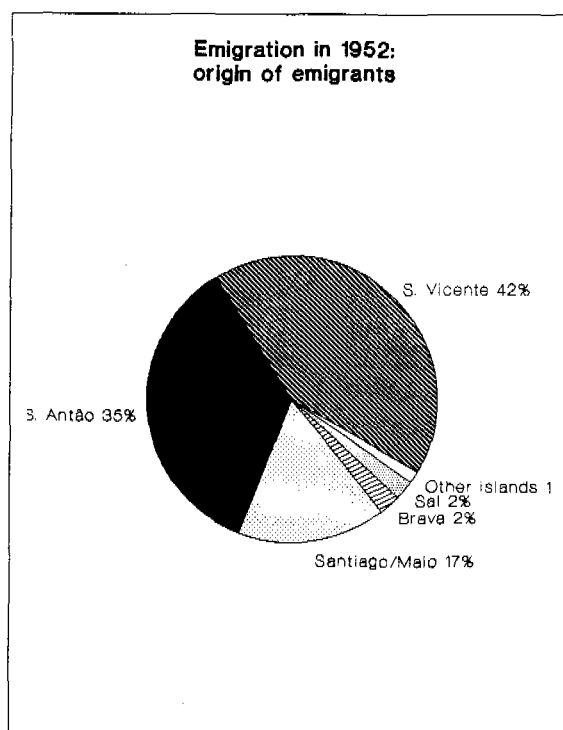


Figure 3.5 Emigration in 1952: Origin of the emigrants. After Carreira (1983)

Table 3.3 Evolution of the population in Santo Antão and São Vicente between 1980 and 1990. After DGE (1990, 1992) and the 1980 population and housing census.

Islands and concelhos	1980	1990	Difference	
			number	%
SANTO ANTÃO	43,321	43,845	+ 524	+ 1.21%
Ribeira Grande	22,102	20,851	- 1,251	- 5.66%
Paúl	7,983	8,121	+ 138	+ 1.73%
Porto Novo	13,236	14,873	+ 1,637	+ 12.37%
SÃO VICENTE	41,594	51,277	+ 9,683	+ 23.28%

them, especially from West Africa. The ethnic distribution is 71% mestizo, 28% black and 1% white. Their culture — music, religious festivals, feasts, etc. — have African, European and American influences.

Language

The official and written language is Portuguese, but Cape Verdeans prefer to speak Crioulo, the national language which developed from the blending of Portuguese with African languages from the Guinea coast. The country's literature mostly describes, in a very poetic way, the problems of drought and famine, emigration and homesickness.

Religion

Cape Verde is a secular state. Catholicism is the dominant religion and has maintained a certain peaceful co-existence with the state, although at times, it has taken an opposite stand, for example against passing the law of abortion. Other religions exist in the country, for example Jehovah's Witnesses and Adventists of the Church of Nazareth are quite active on Santo Antão.

There are also local beliefs which influence people's behaviour and ways of thinking.

Family Structure

The family is the most important point of reference for most people on Santo Antão.

The family structure favours the nuclear family system. The usual system is patrilineal and patrilocal. The head of household is, in theory, a man. However, necessities or realities often dictate otherwise and the family is then centred around the mother. Children live with the mother, even if they have children of their own, until they manage to set up a separate household. There are many extended households in which three or more generations live together. Grandparents and grandchildren often contribute to family life by helping out. Households generally consist of several people, but few adults. Each household has on average 5.2 members (App.C/Tab.2), but this average rises to 5.7 in the case of households headed by women, and 6 for households headed by a FAIMO worker (High Intensity Labour Gangs); PDSA (1991). The fertility rate is 5.4 children per adult female (Alcantara Silva & Wind, 1993).

Social and economic responsibility at the heart of the household should be shared by parents but in fact is the domain of the woman. Public life outside the home belongs to men. However, it is common to hear the refrain "the man decides and the woman does as he says", indicating a certain dependency among many women.

Many households in Santo Antão are headed by women, even though in a smaller proportion than on other islands; estimates

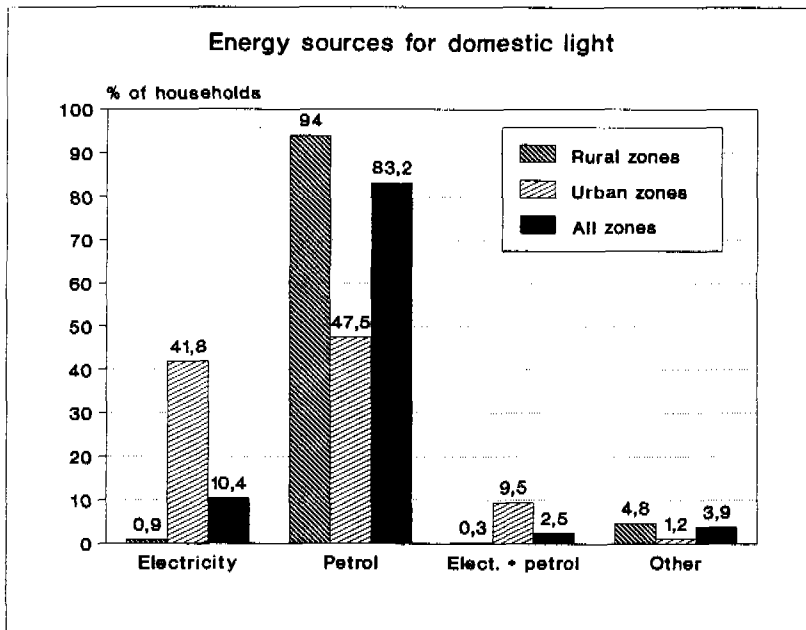


Figure 3.6 Energy sources for domestic lighting in rural and urban areas of Santo Antão. After DGE (1992).

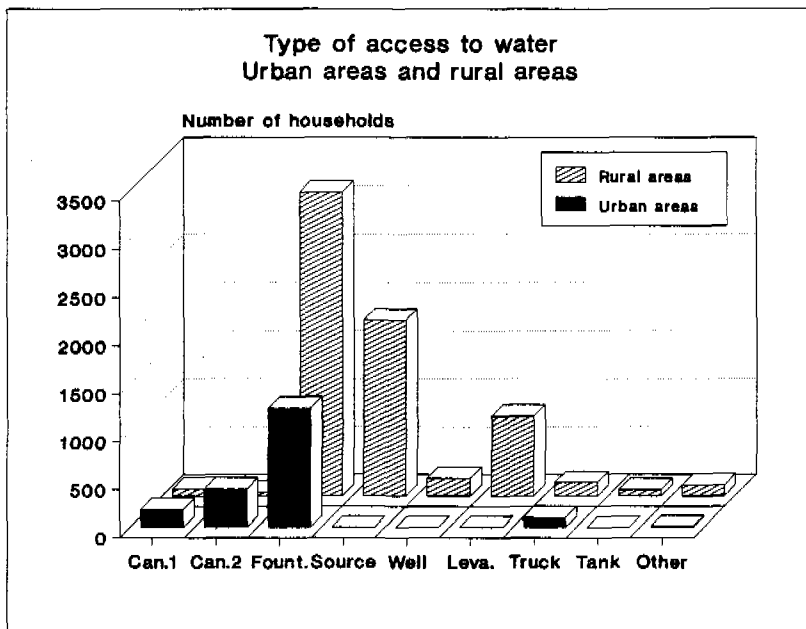


Figure 3.7 Types of access to water in rural and urban areas. *Can.1: internal pipe; Can.2: external pipe; Font.: public fountain; Source: spring; Leva.: levada (irrigation canal); Truck: water truck.* After DGE (1990).

vary. In the agricultural sector, women represent 18% of heads of farm holdings (GEP, 1990). It is difficult to estimate the total number of female-headed families; taking into account different sources, it can only be said that the rate varies between 20% and 36% (see Box 7.1). However, 27% of women with children are 'single mothers'. In general, single mothers are young women who have one or more

children, but live with their parents. They do not have fixed partners, and if they do have a relationship with a man, then they do not live together.

Housing, Sanitation, and Supply of Water and Electricity

The housing situation is precarious. An average house is constructed of stone and clay, has two small rooms and sometimes a

small toilet in the garden. Official figures show that an average of 5.2 persons live in each house of this type.

Few families live in houses supplied with electricity. An uninterrupted electricity supply is only available in Vila da Ribeira Grande and Ponto do Sol. Only slightly over 10% of families use electric light exclusively (DGE, 1990). To light their houses, 94% of the families in rural areas use oil lamps — a fire hazard and injurious to health (Fig. 3.6).

One of the most limited resources on the island, drinking water, is available to 83% of families in urban areas and 56% in rural areas (DGE, 1990). Santo Antão in general has water supply difficulties and a significant proportion of the population (over 30%) takes its supply directly from streams and springs (App.C/Tab.3), particularly in rural areas (Fig. 3.7).

Settlements are dispersed in rural areas and this adversely affects the provision of basic services. However, PAASMR (Project for the Supply of Water and Sanitation to Rural Areas) has the target of covering 20% of the water and sanitation needs of the population, especially in rural areas.

In upland areas, ground water generally lies very deep, out of reach of boreholes. The *Concelhos* provide a highly subsidised service of water supply using tanker lorries (water trucks). An increasing number of houses in upland areas are now fitted with water tanks.

Basic sanitation is a serious problem on Santo Antão as the urban centres do not have public sewage systems. Refuse is also a serious problem.

3 EDUCATION

Education System

The education system in Santo Antão comprises three levels: Basic Elementary Education (EBE, 4 years of compulsory education for children aged 6-14), Complementary Basic Education (EBC, 2 years) and

Secondary Education (ES, 3 years). In the 1993-94 school year, Basic Integrated Education (EBI) will be introduced and the period of compulsory schooling will increase to 6 years.

Pre-school education (kindergartens) are organised by national and foreign governmental and non-governmental organisations, namely: Cape Verde Solidarity Organisation (ICS), Cape Verde Red Cross (CVCV), Cape Verde Women's Organisation (OMCV), Cape Verde Organisation for Children (ICM) and BØRNEfonden (a Danish NGO).

EBE is characterised by a net schooling rate of 97% of the school-age population (Tables 3.4 and 3.5), despite difficulties due to the dispersion of a predominantly rural population and by the mountainous relief of Santo Antão. As regards EBC (Tables 3.4 and 3.6), schooling rate is poor, because of late enrolment, high level of repeats and problems of access to schools located in urban and semi-urban centres.

Increasing pressure on the education system due to the legitimate demand for higher standards of teaching and training for children, led to the opening of the secondary school in Concelho de Ribeira Grande in 1989, and a further secondary school in the Concelho de Porto Novo. The latter has not yet been recognised by the Ministry of Education and is administered by the *Concelho* council. Before the establishment of Secondary Education on Santo Antão (Tab. 3.7), pupils completing EBC would have to travel (e.g. to São Vicente) to continue their studies. Now however, after finishing the third year of general studies they still must move to secondary schools in Praia, São Vicente or Sal, in order to go on to complementary studies (sixth and seventh years), and further take the baccalaureate in Praia or enter 'preparatory phase' to apply for a scholarship for a university place abroad.

Year	EBE		EBC	
	Santo Antão	Cape Verde	Santo Antão	Cape Verde
1980/81	76.6%	80.5%	4.0%	11.3%
1985/86	79.9%	87.4%	10.3%	19.1%
1988/89	97.4%	93.4%	16.1%	31.9%

Table 3.4 Net schooling rate as a percentage of the population in age of attending school, in Santo Antão and at the national level. Source: estimations GEP/Ministry of Education.

Concelho	Number of pupils	Gender		Number of teachers	Repetition rate
		♂	♀		
Ribeira Grande	3,167	1,651	1,516	128	25.5%
Paúl	1,324	682	642	45	
Porto Novo	2,528	1,204	1,324	111	
Total	7,019	3,537	3,482	284	

Table 3.5 Situation of the EBE in Santo Antão. Source: Ministry of Education.

Concelho	Number of pupils	Number of classes	Number of classrooms	Number of teachers
Ribeira Grande	1,027	35	-	12
Paúl	391	21	-	7
Porto Novo	602	10	-	24
Total	2,020	66	19	43

Table 3.6 Situation of the EBC in Santo Antão. Sources: PDSA (1991) and Ministry of Education.

Students	Number
1 st year General Course	284
2 nd year General Course	256
3 rd year General Course	176
Total of students	716
Total of teachers	30

Table 3.7 Number of students and teachers in the secondary education system in Santo Antão. Source: Ministry of Education.

Conditions of the Three Levels of Education

With regard to the classrooms available (App.C/Tab.4 and 5), some state classrooms are in poor condition and rented or loaned classrooms do not offer the required standards.

In general terms, after a post-independence expansion in EBE, the number of pupils has stabilised. The number of pupils on the island has even tended to decline — 7,809 in 1982-83 (PDSA, 1991) to 7,019 now (Tab. 3.5). The increase in the schooling rate from 1980-81 to 1988-89 originated from (PDSA, 1991):

- the enrolment of children under 7 years of age;
- the decrease in repeaters (rate of 37% in 1985-86 and 26% in 1988-89).

The demand with regard to EBE is met by the system in terms of the network of schools and the number of teachers, but the small ratio of qualified teachers is one of the most notable constraints (6% in 1983-84; 12% in 1991-92) — see Tab. 3.8. Approximately 12% of pupils entering EBE do not complete the period of compulsory basic education (Ministry of Education).

In spite of the rapid growth in the number of pupils in EBC, a growth that goes along with the migration of the population to the secondary urban centres, and the improvement of the educational level — the EBE-EBC transition rate was 45% in 1988-89 (PDSA, 1991) — the extent of

EBC coverage is extremely low (Tab. 3.4). At the beginning of the 1980s there were 12 classrooms available for 15 EBC classes, today there are 19 classrooms for 66 classes (Tab. 3.6). The island's ratio of pupils per class is 31. The implementation of EBC teacher training courses from 1982 has led to an increase in the rate of qualified teachers from 0% in 1980-81 to 26% in 1988-89 (App.C/Tab.6). The passing rate — despite an obvious improvement: 40% in 1982-83 to 73% in 1988-89 (App.C/Tab.7) — illustrates low efficiency at this level of teaching, a consequence of the low level of qualification of teachers among other factors. The qualitative improvement in socio-economic assistance has undoubtedly had an effect on the drop-out rate. This averaged 6% in 1988-89; 2% in the Concelho de Paúl, 8% in the Concelho de Porto Novo and 7% in Concelho de Ribeira Grande (source: Ministry of Education).

It is not possible to analyze the data for Secondary Education because it has only recently been implemented.

Levels of Educational Achievement and Illiteracy

Tab. 3.9 shows the low level of educational achievement of the population: 53% of those of 4 years of age and over only have preparatory primary education (EBE + EBC). The illiteracy rate is also high: 40% of the population of age 4 and over and 43% of those aged 15 and over (Appendix

Table 3.8 EBE: Rate of qualified teachers. After Alcantara Silva & Wind (1993) and data from the Ministry of Education.

Year	77/78	83/84	87/88	88/89	91/92
Concelho					
Ribeira Grande	6.6%	--	8.3%	--	15.9%
Paúl	2.9%	--	3.3%	--	7.7%
Porto Novo	0.0%	--	2.3%	--	8.5%
Santo Antão	--	5.7%	--	8.4%	12%

In São Vicente, the rate of qualified teachers was 37% in 1990-91. In 1989, this rate was 18.8% at the national level.

Table 3.9 Population of 4 years and older according to the level of instruction in Santo Antão. After DGE (1990).

Level of instruction	♂		♀		Total	
	Number	%	Number	%	Number	%
Literacy programme	729	3.77%	579	3.12%	1,308	3.45%
Primary	11,336	58.66%	8,698	46.94%	20,034	52.92%
Secondary (general/technical)	460	2.38%	357	1.93%	817	2.15%
Secondary (complementary)	112	0.58%	80	0.43%	192	0.51%
Post-secondary	50	0.23%	17	0.09%	67	0.17%
None	6,639	34.35%	8,801	47.49%	15,440	40.8%
Total	19,326	100%	18,532	100%	37,858	100%

C/Tab.8). Illiteracy seems to be an even greater problem among females: 47% of those aged 4 and over and 53% aged 15 and over. The illiteracy rate increases with age: 28% in the age range of 15-34 years,

79% in the range 35-64 years and 85% for women aged 65 and over (Fig. 3.8 and App.C/Tab. 8). In 1980, the number of illiterate adults (aged 15 and over) in Santo Antão was 14,080, which represented a rate

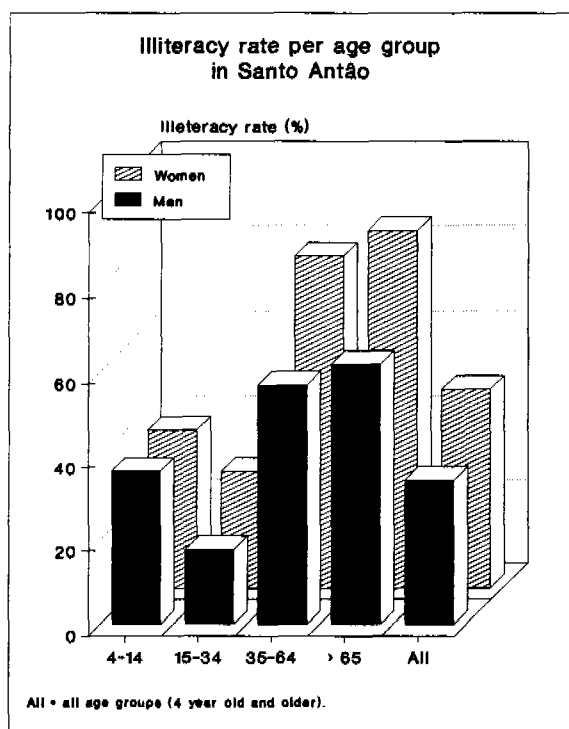


Figure 3.8 Illiteracy rate according to age and gender in Santo Antão. After DGE (1990).

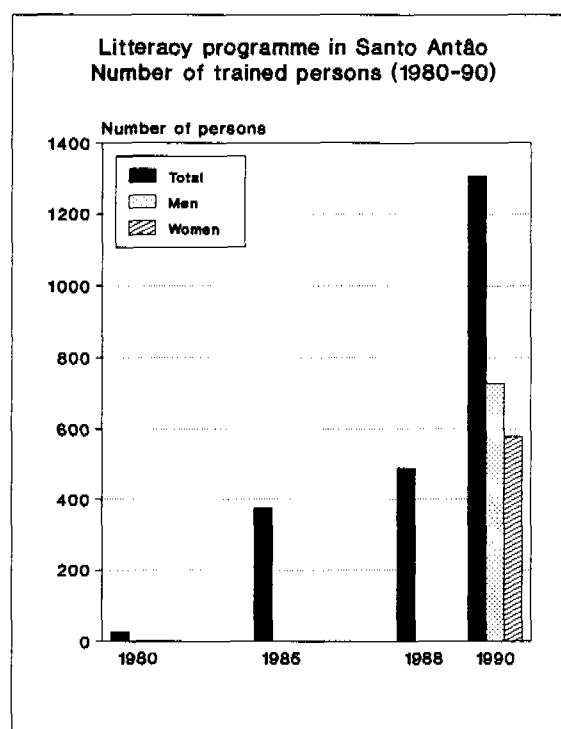


Figure 3.9 Number of people who have been taught to read and write in Santo Antão between 1980 et 1990. After DGE (1990) and data from the Ministry of Education.

BOX 3.3

CHILD NUTRITION IN CAPE VERDE

The nutritional condition of the infant population in Cape Verde is generally satisfactory. Only 3% of children aged 0-6 years suffer from "acute undernourishment" and 11% are considered to be of broad "intervention group" status. The development of Cape Verdean children in terms of height is held back by frequent illness, especially diarrhoea.

Cape Verdean children examined by PMI-PF representatives generally increase weight in the first six months of life. From the age of six months to the end of the second year, weight is substantially lower than in a reference population. This is due to the relative retarded development of most babies born weighing more than 2.5 kg.

of 64%. This proportion fell to 51% in 1985 and 43% in 1990 (App.C/Tab.9) as a result of literacy programmes for adults. However, the illiteracy rate fell faster among males than females. Of the 1,813 persons enrolled on literacy programmes in 1989, approximately 77% successfully completed the course. The rate of growth of literate people has increased in the last decade (Fig. 3.9). This phenomenon is probably linked to the increase of literacy teachers around 1985 (App.C/Tab.10).

4 HEALTH

Health Conditions

Life expectancy in Cape Verde in 1990 was 62.4 years for men and 64.7 for women. The general mortality rate per 1,000 in Santo Antão decreased from 9.3 in 1975 to 7.6 in 1988 (De Boer, 1991). The infant mortality rate per 1,000 decreased from 90 in 1975 to 42 in 1988. Diarrhoea, acute respiratory ailments, enteritis, etc. are the main causes of death in the 0-1 year and 1-4 years age groups (PDSA, 1991). (There was only one case of maternal mortality in 1991). Health indicators show that access to water and basic sanitation affect the health of the population, especially that of children under 5 years of age. The infant mortality rate in Santo Antão is comparable to that of countries such as Syria, Paraguay, Jordan

and Mexico, where GNP is approximately twice that of Cape Verde. The fall in infant mortality was most obvious in Concelho de Paúl (per 1,000 from 134 in 1974-76 to 55.8 in 1984-86) and Concelho de Porto Novo (per 1,000 from 120.3 to 61.5). Infant mortality also decreased notably in Concelho de Ribeira Grande where it dropped from 75.1 per 1,000 to 53.2 per 1,000 (App.C/Tab.11). These decreases may be due to the very low levels or absence of tropical disease (such as malaria, etc.), and good coverage by vaccination programmes, which rose from 74% in 1988 to 80% in 1992 (Health Ministry).

The diet of Cape Verdean families, particularly in rural areas, is maize based and largely lacks foods rich in protein and vitamins; i.e. fruit and vegetables. Starch and animal fat provide the required calories — entailing a deficiency in vitamins and proteins, resulting in arrested general psycho-motor development in children (Weber, 1989). Between 15 and 20% of pre-school age children and 5% of pre-adolescent children are below ideal height and weight; approximately 15% of children under 8 years old on the island suffer from chronic undernourishment and 5% from acute undernourishment (De Boer, 1991; KIT, 1991) — see also Box 3.3. This is contradicted by the preliminary findings of a study that the FAO is conducting on the nutritional conditions in the Cape Verde

islands — although the situation in Santo Antão has not been investigated yet. This study indicates that Cape Verdean children have a good level of nutrition (personal communication, FAO, Praia, April 1993).

Mother-Child Support and Family Planning

The PMI-PF (Mother-Child Support/Family Planning) programme is part of a joint programme run by the Ministry of Health and the Social Affairs Service (see Section 5). There are PMI-PF surgeries in each *Concelho*, which function in conjunction with the Social Affairs Service.

The PMI-PF is a national programme which has the objectives of improving the health of mothers and children, reducing maternal and infant mortality and illness and ensuring family welfare. It also assists in attempts to overcome the constraints that population growth entail for the socio-economic development of the country. The objective of the Family Planning service is to enable couples and individuals to choose, in a free and responsible way, the size of their family and the intervals between the birth of their children. The aims are to reduce the number of:

- pregnancies in women under 20 years old and over 35 years old,
- pregnancies within 2 years of the previous one,

Table 3.10 Santo Antão health infrastructure. Source: Ministry of Health.

Local basic health care units	11
Health care posts	6
Health centres	2
Regional hospital	1
Mother-child support/Family planning centre (PMI/PF) ¹	1

¹: Each health centre also includes a PMI-PF unit, which brings the total number of PMI/PF units in Santo Antão to 3.

- unwanted pregnancies,
- births to mothers with more than 4 children,
- sufferers of sexually transmitted diseases,
- infertile/sterile couples and individuals.

PMI-PF activities seem to have contributed to a reduction in the average number of children per family and infant mortality. The average fertility rate of women was 6 to 7 children during the last decade, whereas it is now 5.4 (Alcantara Silva & Wind, 1993).

Structure of Health Provision on Santo Antão

Tables 3.10 and 3.11 give an indication of the structures for health provision on Santo Antão.

The lack of qualified staff is a great problem. From Tab. 3.11, it can be seen that there is one doctor for every 8,769 and one nurse for every 2,436 inhabitants. Of nearly 10,000 people in *Concelho de Ribeira Grande* who depend on local basic health care units, some 5,500 would have to walk for over an hour to receive first aid. For the island as a whole, approximately 38% of the people walk for over an hour for consultations and 24% walk over two hours (PDSA, 1991).

Part of the health service which is not included in the official statistics is the assistance given by non-professional midwives during childbirth. They receive training and UNICEF offers each midwife

Table 3.11 Staff of the Santo Antão health facilities. Source: Ministry of Health.

Doctors	5
Nurses	18
Laboratory assistants	3
Pharmacist assistants	2

Table 3.12 Number of persons assisted by the Social Affairs Service. Source: Social Affairs Service.

Concelho	Elderly persons	Incapacitated persons	Children	Families
Ribeira Grande	741	800	662	275
Paúl	285	250	1,200	200
Porto Novo	606	?	914	515
Santo Antão	1,632	> 1,050	2,776	990

Main products	sugar cane, dried vegetables, banana, maize, cassava and dried fish
Main export products	services, banana and fish
Importations	about 90% of the total national consumption

Table 3.13 Main features of the national economy.

Economic sectors & activities	% of the active population	% of men and women	
		♂	♀
Agriculture, forestry, hunting and fisheries	21.66%	89.3%	10.7%
Extractive industries	0.14%	87.0%	13.0%
Processing industries	2.20%	69.9%	30.1%
Electricity, gas, water	0.15%	88.0%	12.0%
Construction	37.47%	74.1%	25.9%
Trade, restaurants, hotels	4.05%	46.5%	53.5%
Transports, storage, communications	2.60%	94.1%	5.9%
Banks and other financial institutions	0.14%	63.6%	36.4%
Social services (collective and individual)	10.45%	48.2%	51.8%
Poorly defined activities	21.14%	60.6%	39.4%
TOTAL	100%	71.2%	28.8%

Table 3.14 The active population (≥ 10 years old) of Santo Antão in the different economic sectors and activities. After DGE (1990).

an equipment-case for use before and after birth. The traditional medicine of Santo Antão also includes treatment and home remedies from traditional healers. Much use is made of herbal medicine in the form of teas, baths and inhalation to treat colds, fevers, diarrhoea, headaches, etc.

5 SOCIAL WELFARE SERVICES

The Social Affairs Service is a State organisation which aims to assist the most vulnerable individuals and families (Tab. 3.12). The most vulnerable are considered to be the elderly over 65, the disabled and sick, the most needy families (fixed income less than ECV 50 per person per day) and malnourished children under 6 years of age. Aid consists of ECV 500 per month for the elderly and sick. Monthly distribution of provisions are made to families (10 litres of maize, 2 litres of beans, 0.5 litre of oil, 0.5 kg of sugar and 3 kg of soybean flour). The World Food Programme distributes provisions for children.

The World Food Programme also supplies food through some kindergartens and to pupils in Basic Education.

The Social Affairs Service also runs the PMI-PF (Mother-Child Support/Family Planning) programme in conjunction with the Ministry of Health (see Section 4).

6 ECONOMIC SITUATION

6.1 National Economy

The relative contribution of each sector of activity to the GDP in 1989 was as follows:

- Primary Sector
(crop farming, stock raising and fishing) 18.8%
- Secondary Sector (industry) 16.6%
- Tertiary Sector (services) 58.4%
- Indirect Taxes 6.2%

The economy of Cape Verde has recorded significant growth since 1975. From 1980

to 1989 the annual rate of growth of GDP was 5.8% and the annual growth of GDP per capita was 3.2% (*Africa South of the Sahara*, 1992 edition). In 1988, GDP per capita was US\$ 680. The rate of growth of GDP in 1990 was 2.3%. This growth has allowed an improvement in the meeting of basic needs. Per capita consumption rose by 2.1% annually.

The energy industry sector recorded exceptional growth of 15.6% per annum. From 1982 to 1988, the rate of growth of agricultural production was slightly above the rates of growth of the population (2.5%) and requirements for basic food produce (2.2%). Production in the fishing sector, which plays a vital role in the nutrition of the population, decreased (*Africa South of the Sahara*, 1992 edition).

Agriculture is one of the major sectors of the economy, but despite efforts undertaken, production remains poor and the country is greatly dependent on imports of consumer goods and supplies (see also Tab. 3.13).

Cape Verde's external debt was US\$ 150 million in 1990. In the same year, imports of goods and services amounted to US\$ 152 million, exports of goods and services were US\$ 115, and remittances from emigrants neared US\$ 47 million (*World Bank's World Debt Tables*, 1992-93).

There are three obstacles to socio-economic development in Cape Verde: the scarcity of natural resources, the unfavourable climate for agriculture and the limited internal market.

6.2 The Economy of Santo Antão

Despite being one of the major islands of Cape Verde and having significant potential in terms of water resources, Santo Antão only contributes 8.7% of its GDP. Crop farming is dominant with 23.8% of output, and the island contributes 15.5% of stock raising production. However, the island of Santiago contributes 56.6% of crop farming

Table 3.15 Indicative value of yearly contributions to the Santo Antão economy: mean value of some contributions during the 1986-1989 period. After PDSA (1991) and several other sources.

Origin of the contribution	Value (US\$)
National Development Fund (FDN) ¹	4,363,000
Bank of Cape Verde	366,000
Total national contributions	4,729,000 44.4%¹
The Netherlands	3,602,000
Italy	1,487,000
USAID	124,000
Finland/UNICEF	698,000
Total foreign contributions	5,911,000 55.6%
Total²	10,640,000 100%

¹: The sale of food aid that is donated by the international community constitutes the main income of the FDN.

²: This list of contributions is not exhaustive. As an indication, the EEC contributed US\$ 7 500,000 in 1990, and the BØRNEfonden contributed US\$ 850,000 in 1992.

Furthermore, the remittances of emigrants amounted to US\$ 1 497 000 per year during the 1986-89 period.

Table 3.16 Active population of Santo Antão (≥ 10 years old). After DGE (1990).

Part of the population	Total		Men		Women	
	Number	%	Number	%	Number	%
Active population	16,197 ¹	100	11,528	71.2	4,669	28.8
Employed	11,655 ⁵	72 ²	7,000	60.0 ³	4,655	40.0 ³
Unemployed	4,542	28 ²	2,847	62.6 ⁴	1,695	37.4 ⁴

NOTES

1: That is to say about 37% of the total population of Santo Antão (43 845), and 54% of the population aged 10 and more.

2: In % of the active population (≥ 10 years old).

3: In % of the employed population.

4: In % of the unemployed population.

5: This figure includes the workers of the FAIMO (estimation: ± 5 500 persons in 1990) and those of the informal construction sector (estimation: 500 persons in 1990).

output and 51.9% of stock raising (DGP, 1990). Santo Antão's GDP per capita is only US\$ 170 (DGIS, 1992a). The main activities of Santo Antão's economically active population are construction (i.e. FAIMO) and agriculture (including stock raising, forestry and fishing) (Tab. 3.14).

Expenditure and Financial Resources

Annual costs for the wages of health, education, municipal administration and MPAR (Ministry of Agriculture) employees are US\$ 1,368,000 (DGIS/DAF-WF, 1992). In 1990, expenditure on health was US\$ 197,602 (ECV 13,832,197) and on education US\$ 102,414 (ECV 7,169,000) (see also App.C/Tab.12 and 13). Expenditure on FAIMO is estimated at US\$ 542,857 per month (ECV 38,000,000) (Alcantara Silva & Wind, 1993) — that is to say US\$ 4.3 million to US\$ 5.4 million per annum. (The annual period of work for FAIMO varies from year to year, from 8 to 10 months).

Taking into account the great economic fragility of Santo Antão, external aid has played a fundamental role in tackling the problems encountered by its inhabitants. Nationally, external aid has risen to US\$ 93 million, of which 48% is technical aid, 37% financial aid and 15% food aid (The Economist Intelligence Unit, 1992). This external aid has been vital to Santo Antão. Several foreign governmental and non-governmental organisations contribute this aid, as shown by Tab. 3.15.

Remittances from emigrants also exert a considerable influence, particularly for women, and are regarded as "a decisive factor for the economy of the island" (PDSA, 1991). For example, 37% of the farm holdings headed by women and 18% of those headed by men declare that they receive money from relatives abroad (GEP, 1991). From 1986 to 1989, remittances from emigrants averaged ECV 113,233,000 (US\$ 1,497,000) per annum, financing nearly one third of imports (PDSA, 1991).

The GDP is basically sustained by these transfers from abroad.

6.3 Employment

Employment data for Santo Antão is incomplete and inaccurate. However, the data from the most recent studies indicates that the low growth in jobs presents a serious constraint for the people of the island.

It should be noted that there is no information on the informal economy, in which women play a significant role.

The unemployment rate rose from 19% in 1980 (PDSA, 1991) to 28% in 1990 (Tab. 3.16), compared to the estimated national unemployment rate at the time of 26%. The lack of employment is particularly severe among women (36% of the economically active female population is unemployed) and in Concelho de Porto Novo (39% of the economically active population of the *Concelho*, 51% of women) — see Tab. 3.17. The high rate of unemployment in this *Concelho* can be partly explained as being due to poor environmental conditions and migration to Vila do Porto Novo, see Tab. 3.3. It is worth noting that 34% (5,500 persons) of the economically active population, i.e. 47% of those in work, are only employed on a temporary basis (Tab. 3.16). Thus the maximum proportion of the economically active population in permanent employment is 38%. However, according to a recent study of the employment situation (SARDEP, 1993), the situation may be worse. The study notes that 54% of people interviewed were unemployed and that 95% of these had at least the four years of compulsory basic education. Of the unemployed, 62% have no trade, 21% were unskilled and only 7% had a vocational qualification. It should be emphasized that in the absence of a private sector capable of intervening efficiently in the employment market, the overwhelming majority of people are employed in state sponsored sectors, especially construction.

FAIMO (High Intensity Labour Gangs, known as 'work gangs') is an inheritance from the past, when a proportion of the population was involved in arduous struggle

for survival (against harsh droughts). The Portuguese resorted to FAIMO in an attempt to create jobs and prevent natural disasters. With the independence of Cape Verde in 1975, the government maintained the work gangs which were designated as aid organisations by international food aid programmes. The initial objectives of FAIMO were to lessen social inequality and reduce unemployment. On Santo Antão 41% of the economically active population is dependent on FAIMO; 28% of these are women (Tab. 3.18). FAIMO operates on average for 8-10 months a year and for 7-8 hours each day. Despite being gruelling labour and offering only limited wages — ECV 180 per day (US\$ 2.3), ECV 4,680 per month (US\$ 60) — FAIMO is a source of income for an estimated 25,000 people who directly or indirectly rely on this type of work (De Pina & Silva, 1992). This

represents approximately 60% of the population of Santo Antão.

In spite of the significant flow of emigrants from Santo Antão to European countries in the 1960s, there was a considerable population increase. However this was not accompanied by economic development and expansion in the labour market to absorb the economically active population. The persistent droughts combined with a limited capacity for the creation of new jobs caused migration to the island's urban centres, Vila do Porto Novo in particular. Later many emigrated to Mindelo and its surroundings. The last two censuses suggest that the flow of internal migration was from Ribeira Grande to Porto Novo and then to São Vicente (Tab. 3.3). The fact that the male/female ratio has inverted during the last decade (Tab. 3.1) and that this inversion occurred mainly in rural areas (Tab.

Zones	% of unemployed in the active population		
	♂	♀	♂ + ♀
Urban areas			
Ribeira Grande	20.4	26.1	22.7
Paúl	24.0	19.8	22.9
Porto Novo	36.9	43.1	39.1
<i>Total</i>	<i>28.5</i>	<i>33.5</i>	<i>30.3</i>
Rural areas			
Ribeira Grande	17.9	27.4	20.4
Paúl	22.8	29.7	24.4
Porto Novo	33.3	54.3	39.5
<i>Total</i>	<i>23.7</i>	<i>37.4</i>	<i>27.4</i>
Concelhos			
Ribeira Grande	18.4	27.0	20.9
Paúl	22.9	28.1	24.2
Porto Novo	34.3	50.5	39.4
Total Santo Antão	24.7	36.3	28.0

Table 3.17 Unemployment rate according to concelhos, areas and gender. After DGE (1990).

Table 3.18 Situation of the FAIMO in Santo Antão. Source: DR-MPAR, DR-MIT, Municipal Assemblies.

Concelho	Number of FAIMO workers				Active population (number)	% of the active population	% of men and women	
	MPAR	MIT	Municipalities	Total			♂	♀
Ribeira Grande	2,036	432	400	2,868	7,632	38	72.9	27.1
Porto Novo	1,257	921	300	2,478	5,784	43	72.3	27.7
Paúl	474	333	432	1,239	2,781	45	71.0	29.0
Total	3,767	1,686	1,132	6,585	16,197	41	72.3	27.7

3.2), suggests that young women have left rural areas to seek work away from the island, often as housemaids.

7 ADMINISTRATIVE STRUCTURE

The Republic of Cape Verde became independent in 1975. Administratively, the country consists of 15 *Concelhos* (municipalities). The two largest islands have more than one *Concelho*: Santiago has four and Santo Antão three (see Box 1.1). The *Concelhos* are divided into *freguesias* (parishes) in an administrative system inherited from colonial times. The base unit for administrative division of the *Concelhos* is the administrative agency.

Municipal administration underwent various changes and many measures were taken to promote a radical reform of the colonial structures. Most significantly, Cape Verde recently held autonomous elections (1991). The following features were introduced:

- creation of the position of President of Parliament,
- election by direct vote and secret ballot of the President of Parliament and of municipal organs (every four years),

- restructuring of administrative services staff, etc.

In accordance with the existing Cape Verdean policy of decentralisation, Decree No. 52-A/90 of 5 July 1990 widens the competence of municipal administration, notably in the fields of planning, sanitation and basic health, education, environment, local socio-economic development, public participation, etc. The autonomy of municipal administration is limited by three factors however: a shortage of trained staff (Tab. 3.19) which enforces dependency on central administration; financial dependency; and regulatory dependency. In the case of Santo Antão this autonomy is further weakened by the division into three *Concelhos* entailing the dispersal of administration of scarce human and financial resources and materials.

An inter-municipality project is currently under way aimed at improving cooperation in the development processes of the island as a whole. An Association of Municipalities formed by the three Councils (municipal assemblies) is represented by the presidents of these councils; they act as representatives of the executive power. The Chair of the Association will alternate and there will be a collegial body with legislative powers and also an assembly of coun-

Level of education	♂	♀	Total	% (♂ + ♀)
Total human resources	449	51	500	100.0
Illiterates	113	10	123	25.0
EBE (completed)	190	17	207	41.5
EBE (not completed)	49	2	51	10.2
EBC (completed)	20	7	27	5.4
EBC (not completed)	2	0	2	> 0.0
Secondary (completed)	5	6	11	2.3
Secondary (not completed)	1	0	1	> 0.0
University	4	0	4	0.6

Table 3.19
Education level
in the municipal
administration.
Source: PDSA
(1991).

cillors who will approve the statute and regulations of the association.

8 COMMUNICATIONS

Access to the island is by boat, once a day from São Vicente (except Sundays) to the port of Porto Novo, and by air, three times a week to the airport at Ponto do Sol. There are also a series of smaller ports which facilitate inter-island transport.

There is a road network of which approximately 115 km is paved and 123 km unpaved but motorable. There are other non-motorable roads which cover half the island. The construction of these roads was completed under very difficult conditions

and at high cost because of the island's mountainous relief. Many areas can only be accessed by foot.

Transport on the island is by car, boat or foot. Public transport is provided by taxis and a private transport company; prices are set by the Councils.

Automatic telephone exchanges have been built at Ribeira Grande and Porto Novo. The island has 300 subscribers and 10 external lines. There are also two installations for communication outside the island via connections on São Vicente (PDSA, 1991).

There is no television service on the island because the central antenna is damaged.

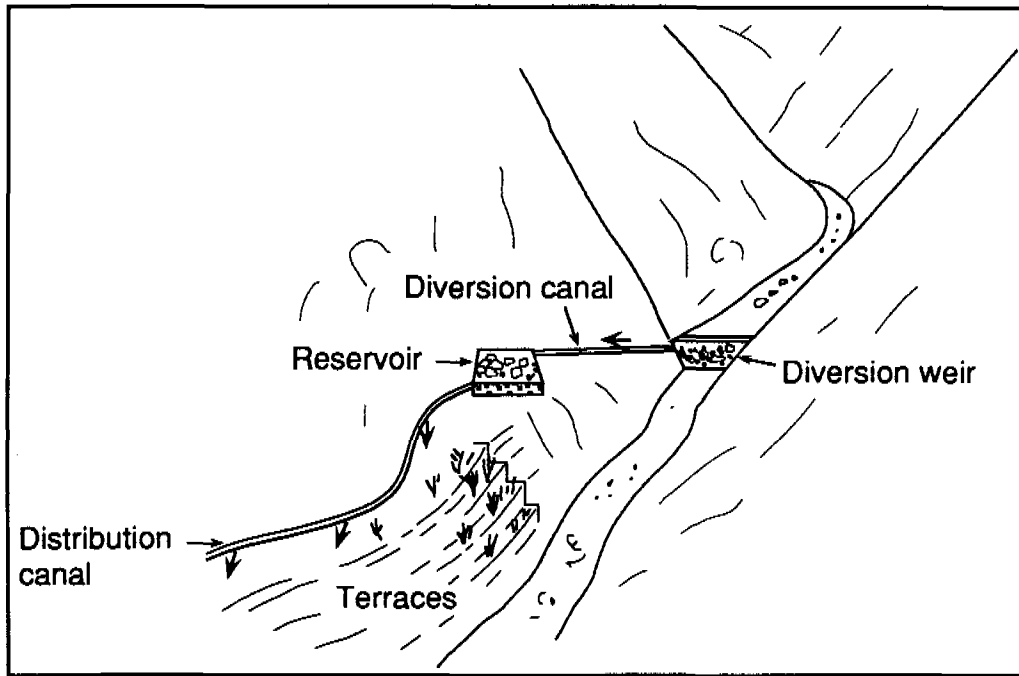


Figure 4.1 Sketch of a typical irrigation system. Source: Haagsma (1991).

Urban centre	Porto Novo	Paúl	Ribeira Grande	Ponta do Sol
Daily consumption in litres per capita	59	241	90	35

Table 4.1 Water consumption for domestic use in urban areas. Prepared from various sources.

4 USE OF NATURAL RESOURCES

1 USE OF WATER RESOURCES

Domestic use

Approximately 6% of collected water, i.e. 1,800 m³/day, is used domestically (Tab. 4.1) or in stock rearing. The remaining amount, 28,000 m³/day, is used for crop farming.

Except in the irrigated region of the island, availability of water for domestic use is a major problem for the towns of Porto Novo (the largest urban centre with 4,867 inhabitants) and Ponta do Sol (1,505 inhabitants), as well as in the rural areas. In the irrigated areas and the urban centres of Ribeira Grande and Paúl the problems are of water quality and poor resource management.

This critical situation has arisen in Vila do Porto Novo because of its rapid growth in the last 15 years and the shortage of water in the area. The *vila* is supplied by boreholes fitted with pumps. The quality of the water produced is not always good; some boreholes have had to be abandoned because of unacceptable levels of salts caused by the intrusion of seawater. The fitting of pumps to some already evaluated boreholes will ease problems in the short term. However, water supply potential in the medium and long term will play an important part in the urban centre's capacity to absorb the rural population.

Irrigation systems

Irrigation is effected by the use of traditional open canals called *levadas* (Fig. 4.1),

many of which are lined with concrete. A network of several independent *levadas* irrigates a *ribeira*. Reservoirs at the head of each *levada* retain the water from the small springs and are emptied when there is sufficient water to irrigate a plot of land. The management and distribution of water is in the hands of the farmers themselves. A supervisor is delegated by an organisation of those involved to oversee the collection of water in the reservoirs and its distribution. The rules applicable to distribution of water and the management of the irrigation systems are the responsibility of the owners and result from traditions which, to a certain degree, are different for each *levada*. However, methods of management can vary greatly from one *levada* to another (Alkemade, 1990).

Available water and irrigated area

The cultivatable area is approximately 1,000 hectares (GEP, 1990) of which some 850 hectares are used. It is estimated that there is a stable water flow of 28,000 m³/day for these 850 hectares, which is equivalent to a gross average quota of 33 m³/ha/day. However, the average evapotranspiration potential of sugar cane under Santo Antão conditions is estimated at 40 m³/ha/day. For the total area of sugar cane cultivated, this amounts to a daily evapotranspiration of 26,000 m³ (Section 2.4).

The efficiency of water use in the irrigation of a plot of land was estimated at between 4% and 40% (Fernstra, 1981,

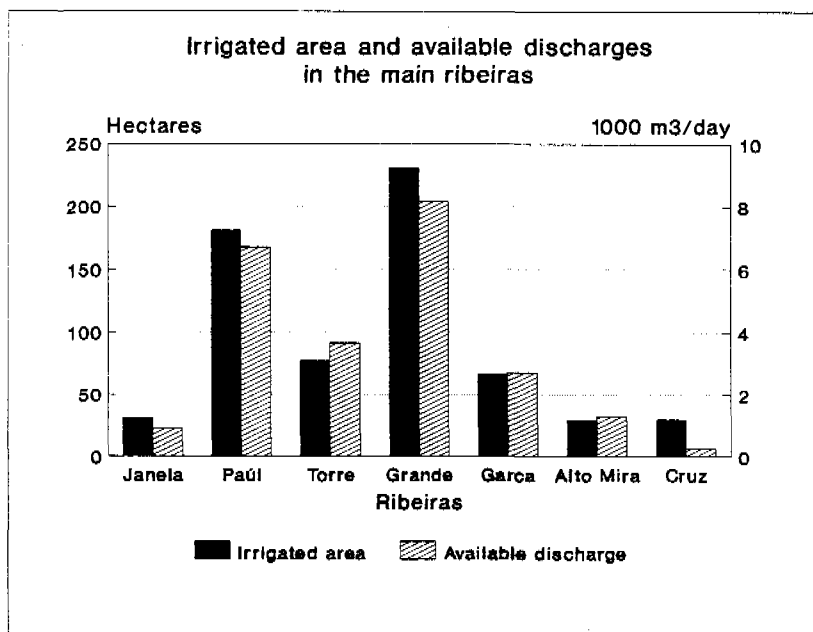


Figure 4.2 Irrigated area and available discharges in the main ribeiras. On the figure, the coincidence of the irrigated area bar with the discharge bar would mean that the mean availability of water in the ribeira under consideration amounts to 40 m³/ha, which corresponds to the water needs of sugar cane. The figure therefore shows that the water needs of this crop are met only in the Ribeira da Torre, Ribeira Garça and Ribeira de Alto Mira. The lack of water that is felt by farmers (including in the three aforementioned ribeiras) is the result of a poor irrigation efficiency and long irrigation intervals. Based on various sources.

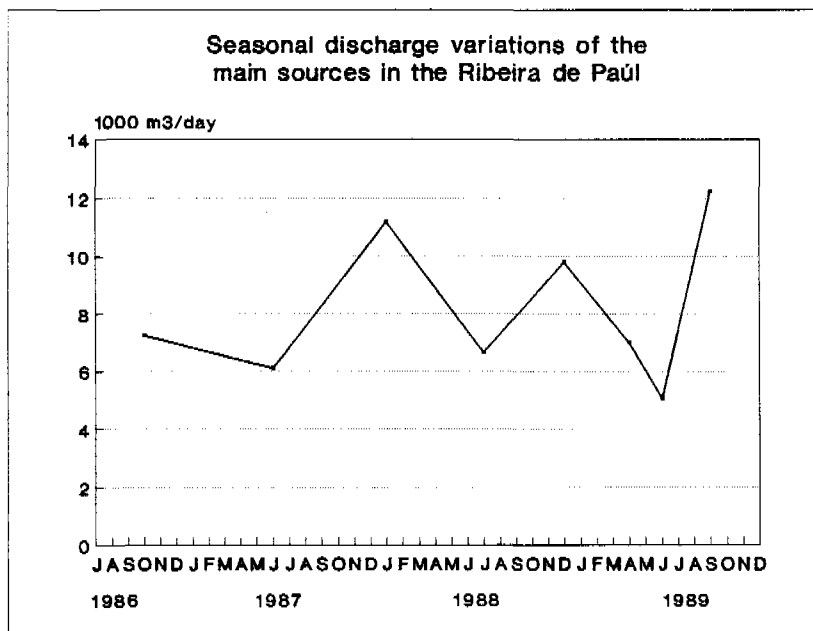


Figure 4.3 Seasonal discharge variations of the main sources in the Ribeira de Paúl.

Table 4.2 Irrigation intervals in Santo Antão. Source: GPE (1990).

Interval	1 to 7 days	8 to 14 days	15 to 30 days	31 to 60 days	More than 60 days	Total
Area (ha)	18	21	361	401	220	1020
% of the total	2%	2%	35%	39%	22%	100%

quoted by Blink *et al.*, 1987). However, the efficiency of irrigation water in hydrological basins is considered to be fairly high; in the *ribeiras* the hydrological systems are of a closed nature. Any excess water applied to individual plots adds to the ground water in the beds of the *ribeiras*. This water is retained by catchments downstream in the system (KIT, 1982; Haagsma, 1991). For this reason, the studies mentioned conclude that it would be inadvisable to attempt to improve the undeniably low irrigation efficiency of land, except in the plots nearest to the sea where excess water is already irrecoverable.

Water availability for the area irrigated, varies from *ribeira* to *ribeira* (Fig. 4.2).

Seasonal variation

The values given in Fig. 4.2 correspond to the minimum water flow at the end of the drought of 1988. These values may double one or two months after the rains (Fig. 4.3).

Surprisingly, agriculture does not take advantage of the seasonal variation and consequently there is a great waste of water during times of maximum availability.

Intervals between irrigation

Long intervals between irrigation add to the problems of the availability of water and seasonal variation.

Over 60% of the area is irrigated at intervals of 30 days or more, and 22% is irrigated at intervals of 61 days or more (Tab. 4.2). This factor seriously limits the potential for crop diversification. Only 4% of land is suitable for the efficient cultivation of vegetables (irrigated at intervals of 15 days or less). This problem arises from the widespread cultivation of sugar cane.

The problem of lengthy intervals between irrigation is explained by the fact that most of the organisations controlling irrigation have failed to account for increasingly dry climatic conditions since the 1960s. The rules of water distribution from the *levadas* often allow landowners to irrigate their plots until the soil is waterlogged. Large quantities of water, from 230 mm to 360 mm each time (Alkemade, 1990), are used in this way. The result is low irrigation efficiency (the water retention capacity at root level does not exceed 100 mm). When the intervals are not fixed,

Table 4.3 Land use in Santo Antão. After PDSA (1991) and Haagsma (1991).

Land use	Surface area (ha)		%
Irrigated agriculture	881		1.1
Rain-fed agriculture	1,983		2.6
Aleatory rain-fed agriculture	1,201		1.5
Forest (Planalto Leste)	1,614		2.1
Range lands (and integrated forestry-pastoralism systems)	72,221	40% ¹	37.1
Wastelands		60% ¹	55.6
Total	77,900		100.0

¹: Estimation based on Haagsma (1991).

irrigation tends to take place too often and the sources of water are exhausted.

The extremely long intervals between irrigation are very inconvenient for all those concerned, but would be relatively easy to change. The failure to do this seems to result from a lack of co-ordination and agreement, possibly caused by conflict on water distribution.

2 LAND USE

2.1 Different forms of land use

Tab. 4.3 and Fig. 4.4 show the data on land use.

The division between extensive grazing land and unused land is difficult to define and varies with time and location. Localised rain can quickly transform an arid area into a green pasture where animals from other areas are brought to graze. However, in a few months the land returns to its normal desert condition.

The land used for rain-fed agriculture also varies, although in a more limited way.

'Aleatory' rain-fed agriculture comprises those areas which are only productive during a relatively wet year, thus years can

pass without a harvest. This category accounts for a large proportion of cultivated land.

In the short term, irrigated land (see GIS Map 2.3) seems to be stable. In the long term however, it varies considerably as can be seen by the large extensions of abandoned irrigation terraces in Ponta do Sol, Cruzinha and many other places.

2.2 Land distribution

The total number of agricultural holdings is estimated at 5,176 (GEP, 1990), divided into irrigated and rain-fed holdings as shown by Tab. 4.4. It is possible to calculate from Tables 4.3 and 4.4 that the average area of each holding, i.e. of land held by each farming family, is 0.79 hectares. 48% of holdings have irrigated land (average: 0.35 ha/holding) and 95% have rain-fed land (average: 0.65 ha/holding). There is no further data on land distribution amongst the 5,176 farming families. However, there is some information available on specific areas which allow at least a partial insight into the problems that landowners face. In Ribeira de Duque, a small branch of Ribeira Grande, a quarter of the land-

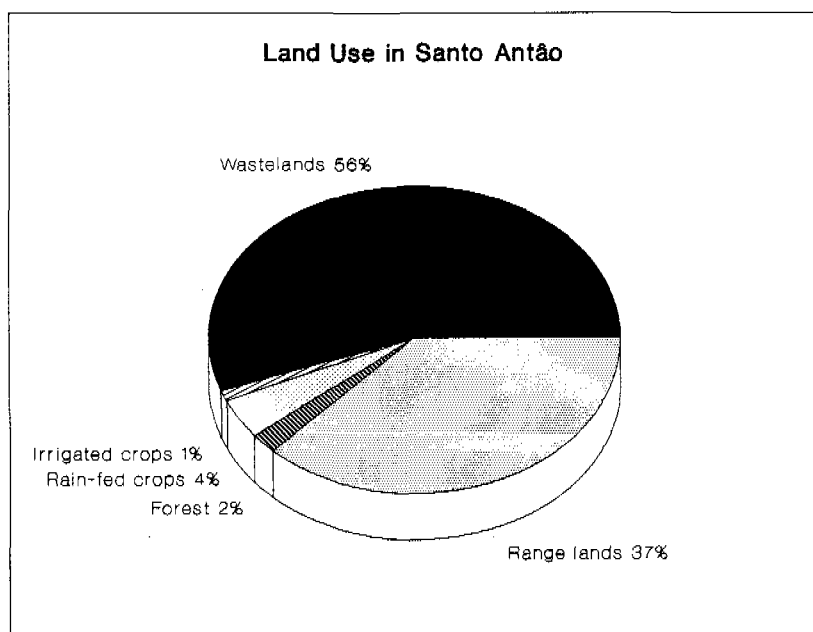


Figure 4.4 Land uses in percentage. After PDSA (1991) and Haagsma (1991).

Table 4.4 Relative importance of the different types of agriculture. Source: GEP (1990).

Type of agriculture on the farm	Exclusively rain-fed	Rain-fed + irrigated	Exclusively irrigated
% of holdings (N = 5 176)	52%	43%	5%

Table 4.5 Distribution of irrigated land holdings in the Ribeira de Duque according to their size. Source: Haagsma (1991).

Size class	Total irrigated area		Mean size of land holdings (ha)
	ha	%	
Lower quarter (18 owners)	0.47	4	0.03
Lower medium quarter (19 owners)	1.22	9	0.06
Higher medium quarter (18 owners)	2.59	20	0.14
Higher quarter (18 owners)	8.82	67	0.49
Total	13.10	100	0.18

owners possess two-thirds of the irrigated land area (Tab. 4.5).

Of the 2,500 properties with irrigated plots, many probably only contain a meagre few hundred square metres of irrigated land.

Traditionally land was fairly unequally distributed, although not as severely as in other islands (Santiago and Fogo) where 'plantations' formed the principal agricultural unit. Up until the 1960s, the cultivatable land in many *ribeiras* used to belong to a single family. In the 1970s and 1980s these properties were divided and many plots were sold. The current structure of land ownership is characterised by smallholdings, although in some *ribeiras* there are vestiges of the greater concentration of property of former times. The division of land into smallholdings continues because of the general practice in the poorer sections of society to divide inherited land between all children, both sons and daughters. Moreover, if the number of rural families in Santo Antão — 6,451 according to DGE figures (1992) — is compared with

the number of farm holdings, it can be deduced that 1,275 rural families are landless. (This figure could be higher because some 'urban' families own agricultural land).

An indication of current land ownership patterns is given by the fact that 33% of farming families do not own any cultivatable land and consequently have to farm land they do not own (Tab. 4.6). Sharecropping is the most common method (Tab. 4.7), a verbal agreement is made based on the payment of part of the yield, often 50% or more, to the landowner.

The consequence of these partnerships is the restriction of investment of money or labour in the land. Many farmers give the reason of a lack of direct access when failing to carry out anti-erosion measures, maintain land in good condition, plant trees or construct or improve housing. This problem is greatest in Ribeira de Paúl where only 43% of irrigated land and 40% of rain-fed land is cultivated directly by the owners, compared with 59% and 56% respectively for the island as a whole.

Table 4.6 Farms of Santo Antão according to the land tenure. Source: GEP (1990).

The land is:	Exclusively worked by the owner	Partially worked by the owner	Share-cropped or leased
% of holdings (N = 5 176)	44%	24%	33%

Table 4.7 Land tenure in rain-fed and irrigated agriculture. Source: GEP (1990).

Land tenure	Farmed by the owner	Share-cropping	Leasing	Other
% of the total irrigated area	59%	25%	7%	9%
% of the total rain-fed area	56%	34%	3%	7%

An agrarian reform law was passed by central government in 1982, but was the object of much resistance in Santo Antão. Only a few holdings have been affected since the enactment of the law and its implementation is not currently pursued with much vigour (PDSA, 1991).

The lack of a register of land use and ownership is a serious hinderance to the development of a land management policy or even to the gathering of reliable data in this respect. A project to draw up a register is in preparation and should improve the situation.

2.3 Rain-fed agriculture

Agriculture on Santo Antão in general and the cultivation of rain-fed land in particular is characterised by a minimal use of external (purchased) inputs together with the very intensive use of labour. Much time is taken up by the construction and maintenance of terraces and other structures to allow cultivation of land that would otherwise be unsuitable.

Two factors severely limit the potential for agriculture on rain-fed land: 1) the

amount of rain, and 2) the water retention capacity of the soil. As annual rainfall is often concentrated into a few days, a deep soil with good physical characteristics is necessary for the success of agriculture. Land with deep soil which is sufficiently flat to absorb intense rain is rare on Santo Antão.

Methods of soil and water conservation

Arable land cultivated without irrigation is generally in humid or sub-humid areas. In many places the soil characteristics have to be improved by the removal of stones and the construction of contour terraces before agriculture is possible. The terraces formed have a double function: (1) the retention of rainwater for crops, and (2) the protection of the soil from erosion.

Most of the existing cultivated contour terraces were constructed by the farmers themselves before independence. After 1977, the state took the initiative and many new contour terraces were constructed by FAIMO. Over 200 hectares of contour terraces were built from 1977 to 1989 (Haagsma, 1990). The construction and maintenance of contour terraces entails a

great investment in labour. An estimate of 5,150 man days/hectare for construction has been made, equivalent to 9,066 US\$/ha (Eppink & Kloosterboer, 1989).

In aleatory rain-fed agriculture, the labour investment is normally lower, but still considerable in some places. A typical way of improving the soil in semi-arid areas is the removal of surface stones to construct small rain-collecting basins, known as *mini-caldeiras*, in which maize can be grown if there is rain.

Crops

The staple crop on rain-fed land is maize (Fig.4.5). Some authors consider this crop, introduced by the Portuguese, to be unsuitable, and advocate its substitution with millet and sorghum (KIT, 1982). Trials appear to disprove this theory and demonstrate that local varieties of maize are more resistant to adverse climatic conditions than millet or sorghum, although the details of these tests are not available (Haagsma, 1990).

When climatic conditions are suitable for rain-fed agriculture in humid and sub-humid areas, a wide variety of different crops are planted. Maize is usually grown

in association with pigeon-pea and several types of annual beans. Here and there perennials such as apple tree and other fruit trees are cultivated. The most humid areas are suitable for sweet potato, cassava and common potato which are often grown in association with maize and vegetables.

Yield and destination of production

The levels of productivity are shown in Tab. 4.8.

Years may pass before there is a notable harvest on rain-fed land, even in sub-humid areas. For example, much of the rain-fed land has been sown for the last three years in succession with virtually no return. The only benefit has been the corn husks used as forage.

Of the yield that there is, almost all is destined for self-consumption. In 1987-88 (a relatively rainy year), only 2% of farm holdings sold maize and 3% sold beans — two of the major crops from rain-fed land (GEP, 1990). More than half of the rain-fed farm holdings in that year had to buy seeds, indicating that farming rain-fed land probably absorbs financial resources from other sectors (emigration, revenues from FAIMO).

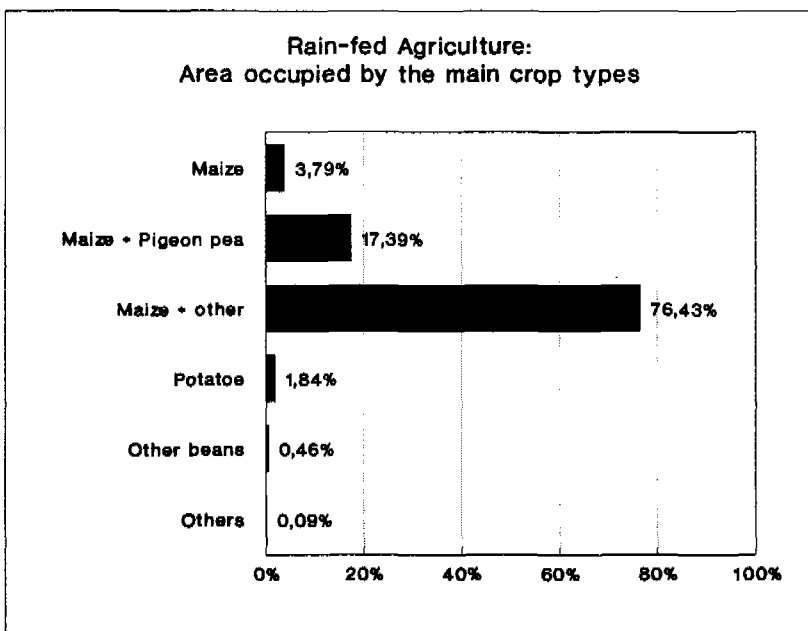


Figure 4.5 Area occupied by the main rain-fed crops. After GEP (1990).

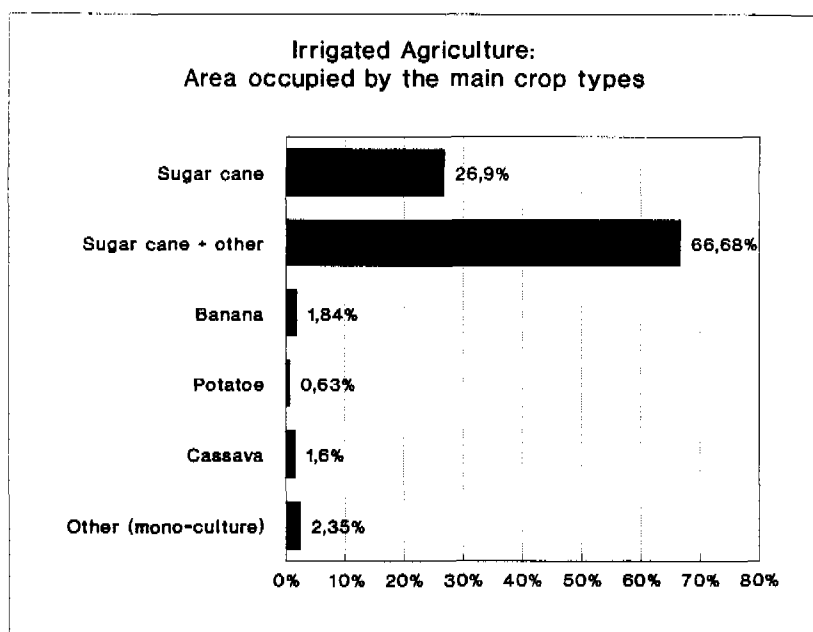


Figure 4.6 Area occupied by the main irrigated crops. After GEP (1990).

Agricultural calendar

Farming activity on rain-fed land is concentrated between the months of August and December. Maize, the main crop, is sown before or after the first rains (broadcast). The practice of sowing before the rains carries a risk of losing the seeds if the rains do not come. However it does afford certain advantages for farmers; for instance, the first rains of the season can be used for agriculture, crops are less susceptible to disease, and labour can be invested in other, gainful activities after the start of the rains (forestation work with the FAIMO).

The cultivation season can be extended in the most humid areas until March or April using winter crops. There are no labour requirements for rain-fed land in other months of the year.

In a few flat areas, a form of agriculture which takes advantage of water running off adjacent slopes is practised, allowing a crop to be sown with a reduced risk of failure. This technique is internationally known as 'runoff agriculture' and may present an opportunity for agricultural development in arid and semi-arid areas of the island (Haagsma, 1990).

2.4 Irrigated agriculture

Crops

The most important irrigated crops are sugar cane and banana (Fig. 4.6). On a smaller scale, cassava, common potato, yam, vegetables, citrus fruit and coffee are also cultivated. There are always fruit trees in the irrigated areas, the most common being mango and papaya trees.

Sugar cane occupies 76% of the irrigated area and accounts for 71% of the value of production (Tab. 4.9). It is cultivated almost solely for conversion into

Table 4.8 Yields of rain-fed crops. Source: PDSA (1991).

Crop	Production (tonnes)	Yield (kg/ha)
Maize	600	120
Beans	100	200
Pigeon pea	200	200
Manioc	90	3,000
Sweet potato	80	2,000
Common potato	37.5	2,500

grogue, a traditional alcoholic drink produced in 128 traditional presses (Uchoa, 1992). A small proportion of the sugar cane crop is made into syrup. There are various reasons for the farmers' preference for *grogue* production, one of which is the long intervals between irrigation. Sugar cane adapts relatively well to these breaks in irrigation because it reduces its metabolic rate when water is scarce without affecting yield. Other reasons are sugar cane's high resistance to disease and the ease of sale, storage and transport of *grogue* as well as its attractive price.

A current problem is the illegal addition of imported sugar to cane syrup in order to increase the alcohol content of *grogue*. This practice is very badly received by the producers as the market price of *grogue* is

lowered by increased production. The quality 'image' of Santo Antão *grogue* is also prejudiced (Uchoa, 1992). Given such an obvious common interest there is a conspicuous lack of organisation among sugar cane producers to confront this serious problem.

Bananas require more water and cultivation is limited to areas of abundance, namely Ribeira da Torre. Bananas from this area were shipped to Portugal until the 1960s.

The common potato was an important crop in most of the *ribeiras* up until the 1980s when a pest called Santo Antão millipede (*Spinotarsus caboverdus*) began to spread over the island. There are still some isolated areas where this pest has not proliferated and potatoes are still cultivated.

CROP		1987	1991
Maize	<i>Zea mays</i>	○	○
Sugar cane	<i>Saccharum officinarum</i>	○	○
Beans/peas	<i>Phaseolus vulgaris</i> , <i>P. lunatus</i> , <i>Dolichos lablab</i> , <i>Vigna unguiculata</i>	○	◐
Sweet potato	<i>Ipomea batatas</i>	○	■
Common potato	<i>Solanum tubersum</i>	■	■
Manioc	<i>Manihot esculenta</i>	○	◐
Cabbage	<i>Brassica</i> spp.	◐	○
Garlic	<i>Allium sativum</i>	◐	◐
Onion	<i>Allium cepa</i>	◐	◐
Tomato	<i>Lycopersicon esculentum</i>	◐	◐
Cucurbitaceae		◐	◐
Carrot	<i>Daucus carota</i>	○	◐

Table 4.9 Damages caused to crops by the Santo Antão millipede *Spinotarsus caboverdus*. After Neves & Viereck (1987) and PDSA (1991).

Damage level

■ = important

◐ = insignificant to medium

■ = medium to important

○ = insignificant

Table 4.10 Production and yields of the irrigated agriculture (commercialized products). Source: PDSA (1991).

Crop	Area (ha)	Yield per ha	Total production	Price (ECV)	Value of the production (CCV)
Sugar cane	650	1,700. l	1,105,000.l	200 ECV/l	221,000
Tubers	105	15. T	1,575. T	30 ECV/kg	47,250
Banana	45	30. T	1,350. T	20 ECV/kg	27,000
Vegetables	30	18. T	540. T	25 ECV/kg	13,500
Miscellaneous	26	0.4 T	10.4 T	40 ECV/kg	416
Total	856	-	-	-	309,166 (US\$ 4,122,000)

l: litres (of *grogue*) T: tonnes

Table 4.11 Composition of the Santo Antão livestock (number of heads). Source: PDSA (1991).

Population of:	Cattle	Goats	Sheep	Horses	Donkeys	Pigs	Mules	Poultry
Concelho								
Porto Novo	271	11,143	29	34	961	2,411	260	8,606
Ribeira Grande	292	6,228	12	12	467	2,912	291	13,128
Paúl	231	1,916	15	22	142	832	66	4,358
Total	794	19,287	56	68	1,570	6,155	617	26,092

On most holdings, cassava, yam, vegetables and fruits are associated with other crops and are used for self-consumption.

Vegetables occupy less than 4% of the irrigated area (GEP, 1990). Most of the production is sold in the town of Mindelo. Increases in production are restricted by the irrigation intervals, disease and market demand.

Calendar

The calendar of irrigated agriculture is mainly determined by Decree Law No. 132/87, Article 3 of which designates the period of 1 January to 31 May each year for the distillation of sugar cane spirit. This means that the period of greatest water demand for sugar cane cultivation is from April to November (shortly before harvest

irrigation is decreased to allow the stems to mature). There are two technical problems related to this law: (1) the sugar cane often flowers before the harvest period, reducing output, and (2) the period of lowest demand for irrigation water coincides with the season of greatest availability from springs. As 75% of irrigated land is used for the cultivation of sugar cane, this represents a significant waste of a scarce resource.

Yields

Tab. 4.10 shows the productivity and yield of irrigated agriculture. Yields fall far short of potential even taking into account the scarcity of water. The average production of 1,700 litres of *grogue* per hectare is equivalent to 20 tonnes of sugar cane.

2.5 Stock raising

The rearing of animals plays an important role in agriculture and even in the economy of non-agricultural families. Because of the lack of sufficient grazing lands, it would be expected that complementary feeding of animals with imported feed (second quality maize, bran, beet pulp) would be considerable, but this is not the case. The 'popular' nature of stock raising significantly impedes modernisation of the activity (selection of suitable breeds, balanced management of grazing lands) and productivity is low. In areas where it is difficult to obtain water for human consumption, particularly Planalto Norte and Planalto Leste, even the rearing of goats is limited.

Types of stock raising

There are many different forms of stock raising which are often interlinked with other forms of production. The following classification of stock raising into three types is a simplification, in practice the methods are often mixed.

- The raising of major livestock (cattle, horses, etc.) and minor livestock (pigs, goats, poultry) on medium or large holdings in irrigated areas. The animals are penned and form part of agricultural systems in which nutrients and energy circulate without significant wastage. An example is the production of sugar cane spirit by animal powered presses; there are 68 of these on Santo Antão (Uchoa, 1992). The lack of grazing lands due to drought and the subsequent replacement of animal powered presses with diesel presses may affect the viability of this agricultural system in the long term, see Section 5.2.1.
- The raising of poultry and one or more pigs or goats to complement family income and act as security for unexpected expenses. Many households on Santo Antão practice this form of stock raising, both rural and urban. The activity is mainly the responsibility of

women. Pigs and goats are kept in pens close to the house in rural areas and on specially designated land in urban areas. The use of organic domestic waste, especially maize husks, is a significant incentive for this kind of stock rearing.

- The pasturing of goats and the production of cheese and meat on a large scale. This type of stock raising is important only in the Concelho de Porto Novo. There are generally between 10 and 100 animals in each family's herd. Free grazing pastures are of very poor quality and only sufficient during rainy periods. At other times it is general practice to supplement with feedstuffs.

Extent of stock raising

Tab. 4.11 shows the total numbers of livestock.

There is no information available on the extent of different types of stock raising and the contribution of stock raising activities to the economy in general. However, the following statistics give some insight into the situation. There are 366 holdings with cattle, 7% of the total of 5,176 holdings (GEP, 1990). 82% of farming households raise goats, and 75% pigs. This corresponds to 55% and 50% respectively of the total number of households on the island (GEP, 1990). It remains to be established how many non-agricultural households (not included in these percentages) also raise goats and pigs. There are an estimated 400 large herds of goats.

2.6 Forestry

Reafforestation was given priority by the colonial government from the 1950s. Before independence some 400 hectares of production and protection forest was planted in the most humid parts of Planalto Leste. The result today is a fully developed forest of pine, cypress and acacia. The location of the first plantations afforded excellent protection to the upper parts of the large hydrological basins where irrigated agricul-

ture is concentrated. The effect on the absorption of rainwater, the availability of water in springs downstream and the control of flooding has not been evaluated, but must be considerable.

After independence (from 1977), reafforestation was vigorously taken up by FAIMO. Activities were concentrated in Planalto Leste because of this area's significance for the absorption of rainwater and recharge of ground water. An average of 120 hectares a year was planted through the 1980s, until the total forested area in Planalto Leste had reached 1,614 hectares by 1990 (see GIS Map 2.2). An area of 2,000 hectares north of Vila do Porto Novo is being forested with species resistant to arid conditions.

The method used for forestation is the construction of contour ditches and crescent-shaped terraces to retain rainwater. The latter are about one or two metres in diameter, constructed out of earth and stone. When the rains fall, the contour ditches and crescent-shaped terraces are planted with saplings grown in the island's 22 tree nurseries. Many plantations have failed because of lack of prolonged rain in the last decade. Nevertheless, the large area of soil and water conservation structures could be of great value for the control of torrential rain in the future.

There has been resistance from farmers whose animals graze on the land to be forested (especially in the Concelho de Porto Novo where the animals graze freely) and occasionally from landowners. The conflict with farmers grazing their animals has resulted in the loss of some saplings which were destroyed by goats. Plantations have also been lost because of drought. There have been instances of landowners planting their plots with trees for production of firewood.

Use of the forest

The use of the forest is almost entirely the domain of the government which plants trees and plans and implements its exploita-

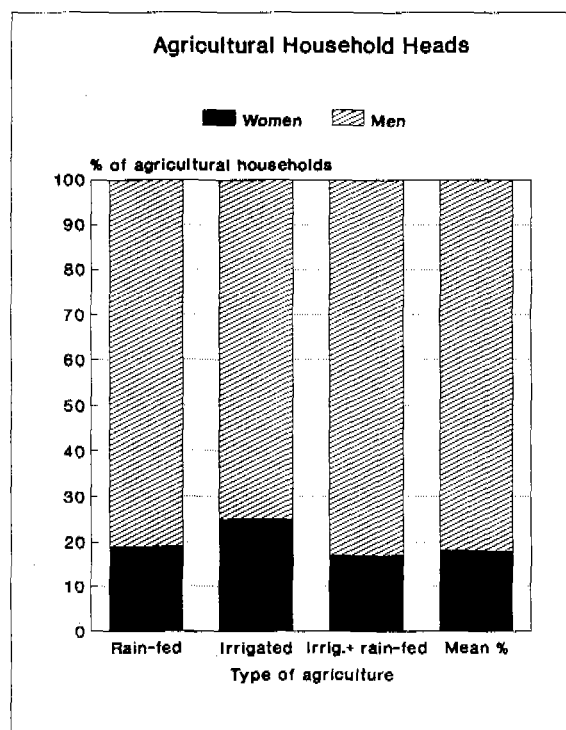


Figure 4.7 Male and female heads of agricultural households. After GEP (1990).

tion. Landowners receive compensation of 15% of the forestry production on their land. The production forest yields 440 tonnes annually, most of which serves as firewood for the bakeries of the three main urban centres. This output covers just over 2% of the firewood requirements of the island. The amount of timber produced is minimal and most of this product has to be imported.

2.7 Division of labour in the agricultural sector

The division of labour on Santo Antão is not as marked as in some other regions. Although there exist different roles, these are only clearly defined when circumstances are favourable. Men, women and children will participate together in some tasks, such as the preparation and sowing of land after rain. It is often women who sow and harvest beans and maize, as well as grinding the maize flour, gathering coffee beans and working in the forest nurseries.

An important part of agricultural work, and the construction and maintenance of contour terraces is undertaken by men. The cultivation of sugar cane and the production of *grogue* is almost exclusively the domain of men, except for the transport of cane to the presses which is often the task of women.

About 18% of farm holdings are headed by women (Fig. 4.7) who in many cases are the partners or wives of emigrants (see Section 3.6.2). If the woman has a family, work is done by the children but this depends on the type of farm holding. Labourers are often contracted and paid by remittances from emigrants.

Women have more defined roles in the stock raising sector, such as the care of poultry and pigs. Men generally attend to goats but women milk them and make the cheese.

3 FISHING

Fishing in Santo Antão is almost entirely a small-scale, traditional activity. About 500

fishermen depend on the activity, as well as nearly 100 female peddlers (Tab. 4.12). Some of the latter are fishermen's wives but many do not come from fishing families.

Outboard motors were introduced in the early 1980s to boats that had generally been rowed until then. The lack of protected ports obliges fishermen to drag their boats onto land after fishing. This determines that the size of fishing vessels does not exceed 6 metres. The landing points are limited to those places on the coast where it is possible to drag boats ashore with relative safety.

Almost all fishing boats are built by local carpenters. A particular problem in boat building is the supply of timber for the hulls. This is still procured on the island itself, but with increasing difficulty.

Line fishing is the most common method, used to catch Yellowfin tuna (*Thunnus albacores*) and Wahoo (*Acanthocybium solandri*). In addition to these two most often landed species a whole range of demersal fish species are caught. Beach net fishing is practised in the southwest of the

Table 4.12 Small-scale, traditional fishery of Santo Antão: Basic data. Source: PAPASA.

Landing points	Concelho	Number of:				
		Boats	Fisher-men	Peddlers (♀)	Nets (seines, etc.)	Beach-based nets
Porto Novo	Porto	25	87	28	3	7
Tarrafal - Monte Trigo	Novo	30	126	0	0	4
Ponta do Sol	Ribeira	35	98	28	4	0
Sinagoga	Grande	9	27	6	0	0
Cruzinha		9	25	18	0	0
Janela	Paúl	12	34	11	0	0
Other (6 landing points)	---	14	92	0	0	3
Total		134	489	91	7	14

island. Bait for line fishing is caught in this way. Lobster fishing by traditional methods is limited to the quantities that can be sold on the local market and in São Vicente.

Small pelagic species, especially the *cavala* (*Decapterus macarellus*) are relatively abundant in the waters around Santo Antão and provide a cheap but highly nutritional food (*peixe dos pobres* — poorman's fish). They are an important catch for baiting line fishing. Small pelagic species were previously caught using dynamite, with very destructive results. Over the last 10 years, PAPASA has equipped 7 of the island's 122 fishing boats with circular fishing nets and these boats now provide more than 50% of the total catch (INDP, 1990). The main problems for development are the limited market demand and the high cost of the nets. In the last year, the sale of *cavala* in the interior of the island has increased, although villages distant from motorable roads are still not supplied. The difficulties lie in the lengthy transport times without protection from heat and the high perishability of this type of fish.

Selling fish is a task generally performed by women. The peddlers take small amounts of fish to sell in the *vilas* and villages. Each peddler sells fish in her own area but the conditions for selling fish are very unfavourable causing wastage and a restricted supply to potential consumers.

4 USE OF OTHER RESOURCES

Firewood

The main sources of energy for cooking are firewood, gas and oil (PDSA, 1991; Van den Briel & Brouwer, 1985). Although the use of gas and oil is increasing, some 80% of the population still burn firewood. Many households use firewood in addition to other sources of energy. The above-mentioned study of 1985 researched the use of firewood in the rain-fed area of Planalto Leste, and found that firewood is normally cheaper than gas or oil in rural areas. This

difference is less marked in urban areas because of lower transportation costs.

The collection of firewood is a significant burden for rural households, particularly women who are usually responsible for this task. The situation has deteriorated so that the number of cooked meals a family has often depends on the amount of firewood collected. Another indicator of the seriousness of the situation is the fairly generalised use of other organic material for fuel, such as manure and dry grasses, including roots. These practices clearly demonstrate accelerated process of environmental degradation due to demographic pressures in rain-fed rural areas.

Collection of other vegetal products

Many people use medicinal herbs (teas) as remedies for various ailments. The gathering of these herbs is generally the task of women.

Sisal (*Agave sisalana*), found in rocky sub-humid areas, is used for various purposes including the traditional manufacture of ropes for tethering animals (semi-free grazing system).

Mining activity

The island has no mineral resources that could significantly contribute to the development of economy.

Until recently, a mine in Porto Novo extracted pozzuolana, employing 30 workers. This mineral, used in construction as a substitute for cement, is found in great abundance around Porto Novo. The potential for exploiting this resource on a greater scale is currently being studied.

Sand and gravel for construction are usually taken from the *ribeiras* or from the few beaches. Stone for construction is abundant but is no longer used extensively; preference is usually given to concrete blocks for their ease of use. Roads are surfaced by using paving stones produced in mines. These are easily cut to appropriate shapes using simple tools.

COLOUR PHOTOS

- 1 Many *levadas* (traditional irrigation canals) are lined with concrete
- 2 Soil and water conservation (water catchment treatment) in rain-fed area, Ribeira de Duque (C. de Ribeira Grande)
- 3 One of the two permanent rivers (Ribeira de Paúl)
- 4 *Trapiche* (sugar cane press) in Paúl (vila das Pombas)
- 5 Near urban centres, pigs are kept on specially designated land; photo taken near vila de Ribeira Grande
- 6 Natural harbour of Synagoga (C. de Ribeira Grande)

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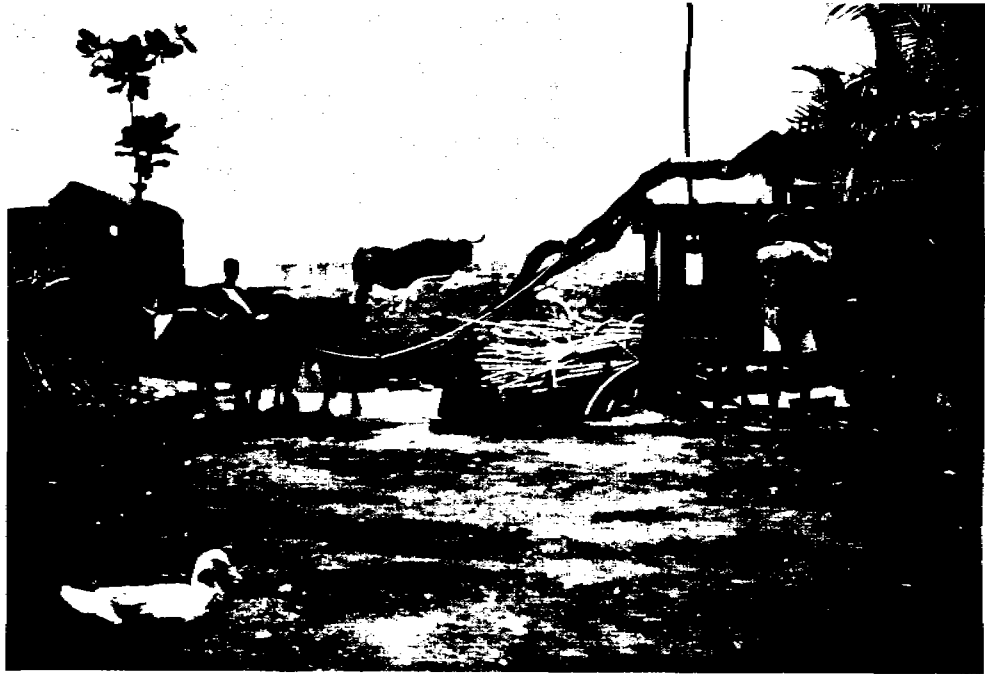
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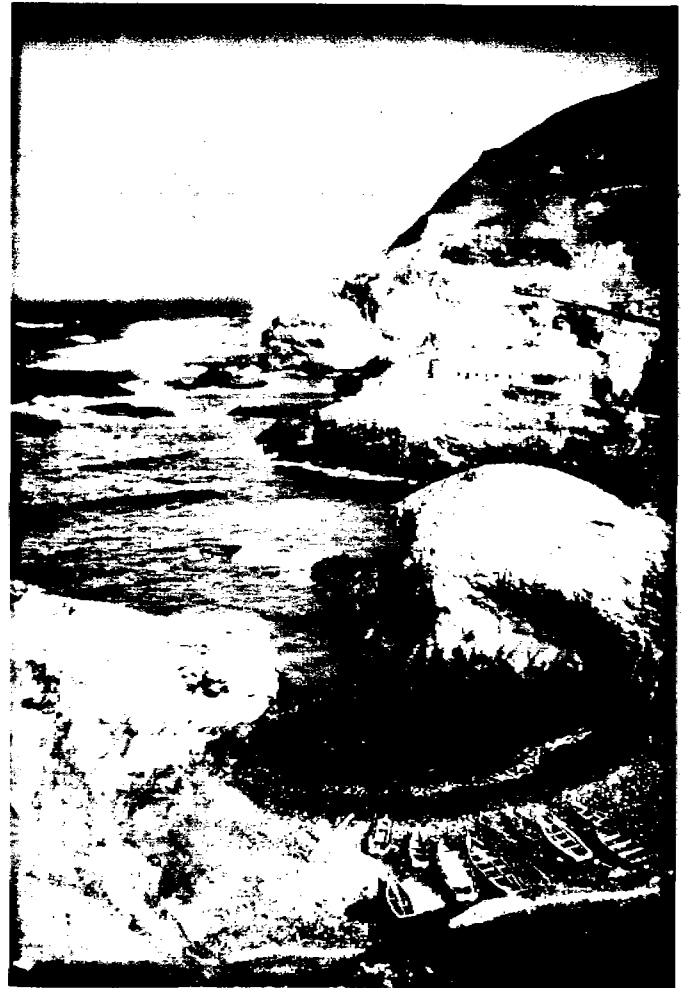
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6



ANALYTICAL PART

Table 5.1 Damage caused by the storm and the flood of September 1984. After Andriess (1985) and MSAS (s.d.).

Damage	Unit	Porto Novo	Paúl	Ribeira Grande	Total
Deaths	persons	18	-	3	21
Ruined agricultural area	ha	66	36	81	183
Concerned farmers	farmers	400	341	1,105	1,846
Damage to privately-owned land	CCV	13,360	24,260	97,800	135,420
					197,205 ¹
Damage to hydraulic equipments	CCV	36,400	21,635	3,750	61,785

¹: 2,323,339 US\$

5

ENVIRONMENTAL PROBLEMS

1 ADVERSE NATURAL CONDITIONS

Drought

The drought that afflicts Santo Antão is a natural phenomenon that has caused many ecological and socio-economic problems. The ecological problems include the deterioration of plant cover and a decline in soil fertility due to lower content of organic material (this also affects the water retention capacity of the soil during the rare rains). Another problem is the almost non-existence of plant succession due to the combined effects of drought, the erratic distribution of what rainfall there is, and erosion. The lack of plant succession is a severe drawback as it prevents the establishment of natural vegetation suited to the predominant climate. The droughts have led to the deterioration of natural resources and have accentuated the poverty of Santo Antão's inhabitants. The lack of alternatives open to the islanders has forced them to exert increasing pressure on the natural resources.

Rains, floods and erosion

As the song says: "...Si tchuba ben, morré fogad..." (if it rains, you drown). As this song says, rain is not only rare, but when it does come it is often torrential. In 1984 and 1987 for example, rainfall of 500 - 600 mm was recorded in single days (Da Pina, 1992). Because of the relief and scarcity of plant cover, torrential rain gathers into violent waves of water that hurtle down the

mountainsides to the valley floor where they cause enormous damage (Tab. 5.1).

The consequences of rain such as this can be catastrophic when the direct results for people and their property are considered as well as the long-term effects of erosion that follow. The estimate of soil lost each year is 100 m³/ha (i.e. 1 cm). Despite the lack of data on erosion for Santo Antão, it is clear that soil is lost at a faster rate than it is formed — soil formation is estimated at 0.1 cm per annum (Haagsma, 1990a).

However, erosion is not a phenomenon resulting solely from extreme events such as the deluges of 1984 and 1987. Each year Santo Antão loses a little more soil because of the concentration of rainfall into a short space of time and strong winds on large, open spaces, devoid of vegetation.

These phenomena would still occur even if Santo Antão was uninhabited, but human activity has exacerbated and accelerated erosion processes by changing plant cover, loosening the soil and opening up cracks in soft rock. The scarcity of natural resources and the poverty of much of the population also are significant factors in the erosion process.

2 PROBLEMS RELATED TO THE USE OF RESOURCES

2.1 Deterioration of the soil

Some farming techniques are more widely used in Santo Antão than in other parts of

the developing world. These techniques are: associating crops (including vegetables), rotating certain crops, recycling nutrients by using manure or crop stalks, and mulching to retain soil moisture. Unfortunately these techniques are not applied systematically and moreover, droughts create increased competition between the different users of plant material: the soil, the animals and the humans.

Some crop farming techniques lead to decreased soil fertility because the crops stay in the same soil with few returns of organic material or minerals. This is because the shortage of natural vegetation for feed and fuel (household requirements, distillation of *grogue*) means that manure, which could be used to enrich the soil, is required for other purposes. The case of sugar cane could be quoted as an example of a crop relatively well adapted to the local conditions, but soil cannot indefinitely

support the same crop without becoming impoverished. This is as true of sugar cane as it is of other crops.

In times of drought, many farmers remove some foliage from crops before the harvest in order to feed their animals. This practice not only reduces the amount of plant material that can be returned to the soil, but also reduces the photosynthesis potential of crops and thus yields.

Another problem is the gradual replacement of animal powered presses with motorized ones for the production of *grogue* from sugar cane (Tab. 5.2). In the short term this trend for mechanisation could result in a significant decrease in the number of cattle and thus manure. If it is also considered that 40% of the population use manure as household fuel (Van den Briel & Brouwer, 1985), then it is clear that the amount of manure available for agriculture will be considerably reduced.

Table 5.2 Evolution of the number of motorized and animal-powered sugar cane presses used for the production of 'grogue'. After GEP (1990) and Uchoa (1992).

TYPE OF PRESS	RIBEIRA GRANDE		PAÚL		PORTO NOVO		TOTAL SANTO ANTÃO	
	Number	% ¹	Number	% ¹	Number	% ¹	Number	% ¹
Motorized								
1988 ²	3	6	7	23	1	6	11	11
1992 ³	19	34	16	52	3	16	34	36
Animal-powered								
1988 ²	51	94	23	78	17	94	91	89
1992 ³	37	66	15	48	16	84	68	64
Total								
1988 ²	54	100	30	100	18	100	102	100
1992 ³	56	100	31	100	19	100	106	100

¹: The value in % has been rounded.

²: Based on data from GEP (1990).

³: Based on data from Uchoa (1992); survey that considered 106 of the 128 presses that were identified in 1992.

In the long term, the trends of climate and human activity could decrease soil fertility and result in substantial drop in yields.

A particular problem is posed by the cultivation of maize on land that is not protected against erosion or on land with inadequate or badly built structures for soil and water conservation. The linkage between the socio-economic conditions of Santo Antão and the deterioration of the environment is once again evident. The poorest sections of society are obliged, for survival, to plant crops in areas highly susceptible to erosion and do not have the means to carry out the necessary protective measures (besides, these protective measures have often been the responsibility of the state). The poor returns under these conditions mean that disadvantaged farmers cannot afford to invest labour or time in developing the land or maintaining existing structures. Other farmers not disposed to investing in protection against erosion are the 'landless' farmers (who do not own the land that they cultivate) and those without an assured right to the land (e.g. brothers or sisters of emigrants who may one day return and reclaim their land) (Haagsma, 1990a).

2.2 Deterioration of the natural vegetation

Firewood and other plant fuels

Most of the rural population gathers firewood for use as a source of energy. It is estimated that the daily requirement for firewood is 1.5 kg per person. Commercial output of 440 tonnes per annum only covers just over 2% of the requirement (PDSA, 1991). It is obvious that there is great pressure on the small amounts of ligneous and herbaceous vegetation on the island. The problem has not been resolved by the introduction of other sources of energy such as gas bottles. An issue often raised is the four hours it takes to cook *cachupa*, but firewood remains an essential 'ingredient'

of this dish for reasons of taste as well as price (gas is more expensive than collected firewood, grasses or manure). Given the extent of the problem, improved stoves only afford a limited saving, as firewood consumption between the different stove models only varies from 356 to 416 g/kg of *cachupa* prepared. It is hardly surprising, therefore, that 'theft' of wood from forests is fairly common.

Overgrazing

Free grazing is a form of exploitation of resources which is particularly common in Concelho de Porto Novo because of the low agricultural potential of this area and subsequent lack of conflict between stock raisers and crop farmers. In the other *concelhos*, the crop farming area is greater and rural households generally combine crop farming with stock raising; animals are traditionally penned, or in the case of goats, tethered. Overgrazing is a pressing problem in Concelho de Porto Novo where vegetation and water are scarce.

A few weeks after *satisfactory* rains, herbaceous plant cover appears which is sometimes useable for up to 3-4 months, but after this period the herds of goats completely denude the soil. Once the resources are exhausted, the animals are kept on feeds. The effect of this grazing on soil fertility and the stock of seeds is certainly considerable. This method of stock raising is continued out of necessity, despite the consequences. Goats produce milk each day, contributing to household subsistence.

The serious problems associated with the free grazing of animals do not mean that raising goats in pens is without environmental repercussions. The current practices of gathering feed for animals do not take into account the stage of development of plants (e.g. grasses cut before flowering or seeding) or the destruction caused by pulling out the roots along with the rest of the plant. However, the effects of this practice on vegetation are perhaps less serious than those of free grazing and may

be reduced by efforts to raise awareness of the consequences of uprooting plants. The efforts to combat overgrazing not only require improved dissemination of information but also, given the area in which it is practised, a lower number of animals — or higher regular rainfall. The gathering of feed and overgrazing may also have harmful effects for endemic flora and rare plants.

2.3 The management of water resources

The problems relating to the management of water resources (see Chapter III) embrace technical aspects (the waste of water due to irrigation methods and structures in need of maintenance) as well as socio-economic and politico-economic aspects. In environmental terms these aspects are interconnected and it is appropriate to use them to appraise the allocation of a precious resource. The pricing system for urban consumers (a fixed rate based on connection to the mains water supply) does not reflect the cost of water production (surveys, collection, distribution, maintenance of the network, etc.), nor the value of the resource, and it encourages excessive consumption. The contrast with public water supply points, where water is paid for by the amount consumed, is striking.

The predominance of sugar cane in irrigated agriculture and the enormous consumption of water in the production of *grogue*, are extraordinary when the low output of food crops (staples, vegetables) on the island is considered. It is true that sugar cane is more resistant to long intervals between irrigation than many other crops, but how can its conversion into *grogue* be justified when one litre of alcoholic spirit requires approximately 7.5 m³ of irrigation water?

The supply of water for stock raising has not been a major issue, either because water resources are insufficient or because Santo Antão's recent development policies

have been based on crop farming. Policies more favourable to stock raising would encourage a reduction in the number of goats in the island's livestock and also the development of stock raising methods which place fewer constraints on the environment.

2.4 Fishing methods

Despite the lack of relevant data on fishing resources, it is possible to say that there has been no over-exploitation of fish in the ocean around Santo Antão. However, the use of dynamite by fishermen has led to significant losses of fish stocks. This technique is used to catch the pelagic species that live in the surface waters, but as most of these species are sedentary the repeated use of dynamite destroys their habitat. As already mentioned, the fishing communities are a disadvantaged section of society; the island's authorities understand this and turn a blind eye to fishing by dynamite. The situation seems to have improved slightly with development aid leading to the introduction of better fishing equipment and techniques. Nevertheless dynamite is still used. The effects of this practice should not be underestimated considering that it constitutes a danger to one of Santo Antão's rare resources, even though fish stocks around this island are not as abundant as around other islands of Cape Verde such as Maio, Boavista, etc.

2.5 Sand mining

The intensity of sand mining on the coast near the main settlements (e.g. Praia de Gi) seems likely to lead to partial destruction of the island's few beaches. In addition to the aesthetic consequences (and effects on the tourist potential of the island), this activity may accelerate the process of erosion in the areas concerned. The clearing of stones to facilitate collection of sand and the successive lowering of the surface of the beach reduce protection against waves.

The use of sand from the beds of the *ribeiras* is less intensive and does not currently pose a problem. However, the decreased demand for stone-built houses ('houses of the poor') and the increasing desire for comfortable modern buildings may lead to an intensification of the exploitation of sand resources, in the valleys as well as on the coast. Sand mining has taken on a commercial character and become a sector of the economy, allowing some households to receive extra income and promoting the growth of small enterprises (formal and informal) which manufacture construction materials. This trend should probably be encouraged in that it creates jobs and sources of income. The sustainability of these activities should be studied however, as should the effects of erosion on the natural environment and the possible repercussions for tourism and areas important in the reproductive cycles of turtles.

3 POLLUTION PROBLEMS

Water quality

Water for human consumption is generally of a satisfactory quality. The Porto Novo region is an exception however, which once again illustrates the extent of water shortage in the south of the island. Drought combined with the substantial water requirements in this area have led to the intrusion of salt water into ground water supplies.

Elsewhere, problems are more localised. Health problems are not uncommon despite the good quality of water, but this is often due to a lack of education. Many cases of health problems with water are due to dirty receptacles, etc.

In some places, health problems are clearly linked to the waste matter of animals (e.g. pigs) polluting ground water. In these places, increased illness is noted directly after the rains (personal communication, C. dos Santos, UNICEF, 1993).

The situation in some *ribeiras* is such that pollution could be a problem in the

near future. The large amount of washing detergent released into the watercourses of the Ribeira de Paúl and the Ribeira da Janela is a potential environmental problem. Already some white slicks can be observed here and there in irrigated plots or at the sides of the watercourses. There is no data available on this problem, but the effects in the short and medium terms for the aquatic organisms in the watercourses and for the crops grown in the valleys must be considered. If this problem is confirmed, appropriate action would be to cooperate with the women who use the detergents to find a viable long-term solution.

Domestic waste

Migration to the secondary urban centres of Santo Antão (Ribeira Grande, Paúl, Porto Novo) seems to be creating problems of the 'treatment' of domestic waste. At present, household waste is simply dumped on the beaches, alongside the roads, etc. In addition to the aesthetic aspects (and reduction of the tourist potential of the island), any increase in population or consumption risks provoking serious health problems. At present, pigs (always close to human settlements) perform a valuable service by consuming much of the organic waste and removing the need for this to be dumped as well.

The use of chemicals

Relatively few chemical products are used for agricultural purposes on Santo Antão because of the poor financial condition of many of the farmers, difficulties of supply and shortage of water (the efficiency of many products depends on the availability of water). Of the chemicals that are used, most are for irrigated agriculture (see Tab. 5.3).

However, there are some chemical products available in Santo Antão that have been banned in other parts of the world (e.g. Europe), for instance products containing Fenthion and Quinomethionate. Moreover, some mineral fertilizers used on

Table 5.3 Use of production factors in farms with irrigated land. After GEP (1990) and PDSA (1991)

Production factor used	% of plots ¹	% of commercial farms ^{2,3}	% of subsistence farms ^{2,4}
Manure	78.3	85	70
Artificial fertilizers	7.3	10	4
Pesticides	8.0	12	1
None of these	?	14	30
One or more of these	?	86	70

¹ After PDSA (1991).

² After GEP (1990).

³ Farms which sell at least one of their products.

⁴ Farms which sell none of their products.

Santo Antão are not purified (e.g. superphosphates) and can contain heavy metals or toxins such as arsenic, which can accumulate in the soil and plants (CNUCED, 1992).

DDT is also available even though it is considered carcinogenic and its use is prohibited in many countries. The danger to people is fairly high if it is used domestically. This has been confirmed by the discovery of DDT in the breast milk of some Capeverdean women (CNUCED, 1992). DDT also weakens the shells of eggs, with consequences for domestic poultry and wild birds.

The exploitation of pozzuolana

The possible re-opening of the pozzuolana mines in Porto Novo would pose air pollution problems due to the dust generated on transporting the material from the mine to the port, via the town. This problem could probably be addressed by agreement between the municipality and the transport company on the type of vehicle used, road speed limits, etc.

4 BIOLOGICAL DIVERSITY

Flora

As previously mentioned, agriculture, the collection of firewood and even the use of plants for medicinal purposes have serious effects on the natural vegetation. Endemic and rare species, and plants with unusual characteristics, no longer go undisturbed by humans or goats. It is striking that none of the species used for making medicinal teas, or the trees which provide (or used to provide) firewood such as *Sideroxylon marmulano*, are actively planted (CNUCED, 1992).

It should be recalled that Santo Antão is one of Cape Verde's richest islands in terms of endemic species due to its relatively extensive 'humid' and semi-arid areas. The collection of plants for animal feed in the less arid areas (where animal grazing is relatively rare) probably threatens many endemic species because these are the areas where they are most abundant. Rain-fed agriculture is practised in the upland areas where there are benefits of humidity not found in other parts of the island. This

considerably restricts the habitat of endemic hygrophyte and mesophyte species.

Fauna

The legal protection given to some species (seaturtles, cagarra, etc.) is ineffective because of the poverty of the islanders, certain socio-cultural attitudes and the lack of technical and financial means of enforcement.

Despite a very active programme of education in recent times, turtles are still regularly caught outside the authorised period. Although turtles are not actively hunted, the catch of an adult specimen is a welcome compliment to the income of a fisherman.

The total population of gon-gon in Cape Verde does not exceed 200 pairs. This bird has become rare mainly because it is associated with 'mysterious forces' and because some people prize its fat for medicinal uses (Hazevoet, 1986).

A special case is the cagarra, whose principal habitat is the island of Raso, south

of Santo Antão. The fishermen of Synagoga (Santo Antão) go to this protected island and cull 4,000-5,000 young birds in just a few days. This is an alarming situation given the small cagarra population (approximately 10,000 pairs) and the low fertility of the females (one egg each year). The 'cagarra catch' is a lucrative activity because the meat of the bird is highly regarded locally and apparently abroad too.

Protection

The inefficacy of legal protection of species is hardly surprising; the severe problems facing a large part of the population and the island as a whole very logically engender a lack of interest in nature conservation and protection of the national heritage (see Box 5.1). Nevertheless, the natural environment of the island could constitute a resource in the short term through ecotourism, and in the long term through the use of medicinal plants and species adapted to adverse conditions (which may solve problems of animal feed, firewood supply, etc). In any event,

BOX 5.1

PERCEPTION OF THE ENVIRONMENT

The majority of the population suffers from poverty and the general attitude to the environment is inseparable from the entirely understandable desire to make use of any possible resource to avoid hunger or even starvation. The environment is viewed as a source of problems.

Programmes of environmental education at primary school level are necessary and constitute a first step in the right direction. However, these programmes by themselves probably would not bridge the gaps that exist between: the perception of the environment by those directly affected, the necessary changes of mentality and the limits imposed by natural resources.

The women of Santo Antão play a fairly limited role in agriculture compared to the situation on the African continent. However, women play an important environmental role because they are traditionally responsible for the gathering of scant resources: water, firewood, feed for animals and herbs for various uses.

Women are thus of prime importance in problems of (and solutions to) the deterioration of plant cover and the threat to endemic species of flora. Whatever measures are taken, women must be consulted and encouraged to participate. Women, in their crucial role as the educators of children, are the best means of encouraging the necessary changes in mentality towards the environment.

nature conservation initiatives should include not only programmes of education (current national programmes are often concentrated on the island of Santiago), but also close cooperation with the communities concerned. For any initiative to be effective, natural habitats as well as species should be protected.

Although there are many difficulties, nature conservation should not be undervalued. At present, knowledge of the flora and fauna is relatively limited; the records of existing species are possibly incomplete and could be further researched. It is also not known as to what extent various species are threatened.

6

THE PROBLEM OF POVERTY

Poverty in Santo Antão is caused by a combination of climatic, geographic, economic and historical factors which are closely connected and interact with each other to a greater or lesser degree. Climatic factors, integral to the history of the island, caused periodic imbalances between the levels of natural resources and the population. These imbalances and the resulting decline in population define the current socio-economic state of the island and are the cause of the poverty that its inhabitants suffer.

Demographic pressures are not only accentuating imbalances in the supply and demand of food leading to deteriorating nutritional standards, but are also affecting the system of access to agricultural property. This system has been historically administered by a few families, originally descendants of the recipients of the land but later beneficiaries from the methods of land division and acquisition. The climate and complex relief of the island were major factors in determining the location of settlements and the distribution of land for the cultivation of crops for self-consumption. The complexity of the interacting factors which gave rise to the problem of poverty on the island are repeated in instances of social dysfunction, with negative implications for social dynamics and the productive capacity of the community.

The term 'poverty' has different meanings at different levels, but basically refers to an

insufficiency or absence of basic necessities. Balanced human development in physical, psychological and intellectual terms demands the provision of certain basic requirements, namely:

- an adequate diet,
- basic health care,
- access to drinking water,
- basic education,
- essential items such as housing and clothing.

Poverty is the lack of provision of these basic needs. Thus the criteria usually adopted to describe poverty are diet, health, education, access to essential resources and products etc. — parameters which determine the evolution of every society. Clearly whether a household obtains these basic needs largely depends on its monetary income, access to natural resources, access to produce for self-consumption and so on. The income of the household is an important criterion in the evaluation of a region's poverty. Another indicator of poverty is the position of women (see Chapter VII) because of the role that women usually play in generating family income, obtaining food, providing education, etc. and because of the difficulties encountered by women in gaining access to resources (agricultural land, employment, financial means etc.). Using these parameters, this chapter will describe and evaluate poverty in Santo Antão.

1 CHARACTERIZATION OF POVERTY

1.1 Financial resources

Income

In 1986, a rural family in Santo Antão needed ECV 200 (US\$ 2.50) a day for subsistence (Hemmings-Gapihan, 1986). As the average rate of inflation has been 9.7%, this income can be calculated to be ECV 382 (US\$ 4.90) a day in 1993, equivalent to an income of approximately US\$ 150 per month or US\$ 1,800 per annum. Taking into account that the average household unit comprises 5.2 persons, this suggests that per capita subsistence income is US\$ 29 per month or US\$ 348 per annum.

A study of employment and labour availability on Santo Antão (SARDEP, 1993) shows that about 67% of the economically active population has a monthly income below ECV 10,000 (US\$ 130). This is equivalent to an average annual income of ECV 120,000 (US\$ 1,540), or US\$ 296 for each household member — which is below the subsistence level mentioned above. Moreover, some 6,500 people are employed by FAIMO (41% of the economically active population) which demonstrates their fragile situation (see Tab. 3.18).

Although officially only one person per family may work for FAIMO, this may not be the case in reality. Thus the proportion of the population of Santo Antão that relies on FAIMO directly or indirectly is approximately 60% (Section 3.6.3). These 25,000 individuals bring their families a daily wage of ECV 180 (US\$ 2.30), ECV 4,680 (US\$ 60) monthly or ECV 37,440 (US\$ 480) annually. This is equivalent to a per capita income of US\$ 92 per annum. The average incomes of these families would not be much higher even if complementary activities (crop farming, stock raising, civil construction work, etc.) are taken into account.

The fishing communities also appear to be in a poor state: the annual average

income for a fishing household was ECV 62,000 (US\$ 826) in 1988-89, equivalent to an annual per capita income of US\$ 160. Moreover, fishing households do not usually undertake any agricultural activities and hence do not have many alternatives to supplement their income.

There is no information available on the financial income from crop farming and stock raising. Given the average size of farm holdings, 0.35 ha in irrigated areas and 0.65 ha in rain-fed areas (see Section 4.2.2), it seems likely that income from many of these holdings is very low. (For the country as a whole, it is considered that a holding needs to be at least 1 hectare in size to be profitable). Moreover, agricultural production from rain-fed land, especially in areas where rain-fed agriculture is aleatory, is very low and does not provide substantial income. As for stock raising, it is said that "a goat gives a little each day", but a herd is only viable with at least 25 animals (personal communication, Domingos Antonio Lopes). Only a few farmers have herds of this size. Pigs also contribute to family income, but when a household has few resources there may be very few scraps from the kitchen for the animals.

Remittances from relatives abroad

As explained in Section 3.6.2, remittances from relatives abroad are an important support to the families and constitute a major contribution to the economy of Santo Antão (approximately US\$ 1.5 million per annum). The distribution of these remittances is not known and only a rough estimate of the situation can be given. Given that 18% of farm holdings are headed by women and 82% by men, and considering that 37% of these women and 18% of these men receive remittances from emigrant relatives, the percentage of farm holdings that benefit from remittances can be calculated to be 21%. If this ratio is applied to the population as a whole, it can be estimated that some 1,800 households each

receive an average US\$ 831 annually. This is equivalent to a supplementary annual income of US\$ 159 for each member of the household. This income is much higher than the annual income for each member of a household dependent on FAIMO labourer.

1.2 Nutrition

It is estimated that 75% of a household's income is spent on food. However, the quantum of nutrition provided is such that approximately 20% of children under 8 years in Santo Antão suffer from under-nourishment (although these figures await confirmation, see Section 3.4). This gives an indication of the level of poverty on the island.

The poorest levels of nutrition are found in the fishing villages where traditional methods of fishing predominate, and in some areas of irrigated agriculture where there are a great number of landless peasants and others who practise traditional subsistence farming.

A partial explanation for the large number of children suffering from under-nourishment is the low socio-economic status of their families. In Concelho de Paúl and Concelho Ribeira Grande, the majority (84%) come from a low socio-economic category. Other possible reasons are:

- many children in the household (average 6 in the rural areas of Concelho de Paúl; see App.C/Tab.2), combined with lack of agricultural land for the cultivation of food crops (Sections 4.2.2, 4.2.3, 4.2.4);
- sale of agricultural produce (mainly outside Santo Antão); the proportion of farmers selling at least part of their produce is greater in Concelho de Paúl (54%) and Concelho de Ribeira Grande (48%) in comparison with Concelho de Porto Novo (30%) (GEP, 1990).

1.3 Health

Access to health services is very limited among the majority of the rural population (see Section 3.4). Moreover, some people who do have better physical access to health services do not have the financial resources to pay for even basic treatment. Many cannot even afford to buy medicine or pay ECV 100 (US\$ 1.30) for a consultation (55% of daily FAIMO wage). This lack of financial resources results in the widespread use of traditional medicinal herbs. Results are satisfactory in some cases of diarrhoea, coughs, fever, etc.

The problem of water supply is illustrated by the high incidence of infant mortality from diarrhoea. 40% of rural households do not have access to drinking water (Section 3.2).

1.4 Education

The absence of a survey on the relationship between needy households/households with children of school age/index of school attendance impairs the objectivity of an analysis of school attendance in relation to socio-economic resources. It can merely be indicated that children from rural areas are participants in their family's economic activities and the school competes with these tasks. Their chores may involve taking animals to pasture, collecting food and water for animals, attending to crops and selling agricultural produce in urban areas (PDSA, 1991). It is often girls who miss school or drop out to help their mothers. It is likely that the tasks children are expected to perform have a negative effect on their success in school, particularly when they have to travel long distances between school and home. The fact that the EBC passing rate for Santo Antão is lower than for the country as a whole (see App.C/Tab.7) seems to confirm the existence of a relationship between a disadvantaged background and difficulties at school.

2 FACTORS FAVOURING POVERTY

Adverse orographic conditions

In the Republic of Cape Verde, health and education services are seriously hindered by the dispersion of population and mountainous relief of the land. The island of Santo Antão is typical of these problems: the population is scattered in small settlements spread over mountainsides and deep valleys where access is very difficult.

In the field of health, doctors and PMI-PF teams travel to the interior of the island, but cover is inadequate due to lack of human resources (Section 3.4). About one quarter of the population has to walk for over two hours for a consultation.

Children frequently have to travel long distances to school along dangerous paths, often only passable on foot. In the case of the few EBC schools, many children have to walk distances of 15-20 km (return trip) taking an average of 4 or 5 hours. This obviously affects school attendance and educational success. For example, the EBC attendance of children from remote areas in Concelho de Ribeira Grande is some 10% lower than the attendance of children from urban areas (PDSA, 1991).

The scarcity of cultivatable land is also largely due to relief. The relief combined with adverse sea conditions and the virtual non-existence of port infrastructures limits the yield of traditional fishing (see Section 2.8).

Level of education and quality of teaching

The low level of education and the near absence of professional qualifications among the unemployed (Section 3.6.3) may partly explain the high rate of unemployment. Having a trade would seem to be one of the basic prerequisites for access to the jobs market.

However, the subjects taught in the secondary schools of Santo Antão and the rest of the country clearly do not constitute vocational training. As a result, young

people who could have the opportunity to further study on other islands have no career prospect, all the more because Santo Antão lacks a centre for vocational training.

Lack of natural resources

Agricultural land is very scarce on Santo Antão. Plots are very small and the 2,700 farm holdings which consist of only rain-fed land have no security in terms of production (Section 4.2.2 and 4.2.3). Due to poverty and a lack of alternatives, farmers are obliged to continue the often unviable cultivation of rain-fed land on an aleatory basis. What is more, some 1,300 rural households do not have any agricultural land.

However, crop farming and stock raising are significant on the island, particularly in Concelho de Porto Novo where it contributes modestly to household incomes. Nevertheless, the lack of natural resources is a serious hinderance, especially for stock raising. Animal breeders without their own pasture must feed their stock with imported feed — a costly procedure.

Marine resources appear to be the only possibility for increasing output, but the catches in recent years have not exceeded 800 tonnes because of the existing infrastructure and landing points as well as poor conditions and market opportunities.

It should be emphasized that income from FAIMO and remittances sent by emigrants play a vital role in the support of rural households. Many households could not survive solely on natural resources.

The scarcity of firewood, other fuels and water gives rise to serious problems: financial difficulties, arduous domestic tasks for women and, in the case of water, health problems.

Lack of employment opportunities

The unemployment rate is high on Santo Antão, especially among the women of Concelho de Porto Novo (Section 3.6.3; Tab. 3.17). Most of those employed on the island are involved in activities linked to

agriculture and construction. Given that agriculture barely covers 10% of the island's nutritional requirements and has only a moderate capacity to absorb labour even for irrigated crops, it is clear that the public works conducted by FAIMO provide a major source of employment. Despite the low income and temporary nature of this employment, FAIMO prevents the unemployment rate from rising to approximately 70% of the economically active population.

28% of Santo Antão's population remains unemployed; because of the difficult conditions on the island, the unemployed do not have many alternatives to earn an income and ensure their survival.

3 EXTENT OF POVERTY

The poverty on Santo Antão is manifest, although there is still no reliable information to allow a precise appraisal of its extent. However, based on the minimum subsistence income calculated in Section 1,

it can be concluded that 70-80% of the population lives below the poverty line.

The Social Affairs Service defines the 'most needy households' as those with a fixed daily income below ECV 50 (US\$ 0.64) per person. This is equivalent to US\$ 3.20 for a household of 5 people or US\$ 3.84 for a household of 6. Some 15% of Santo Antão households are assisted (approximately 6,500 people). Other groups considered as most vulnerable are: the elderly over 65 years (over one third are assisted by the Social Affairs Service), the sick and children under 6 years who are undernourished (40% of children in this age group). The financial contribution granted by the state sector (ECV 500 monthly, US\$ 6.40), reaches 25% of the island's population.

It seems clear that the majority of emigrants in recent years have been women, mostly young, who migrate to meet the existing demand for domestic help. Men without a skill or vocational training normally do not migrate and their only alterna-

BOX 6.1

THE MOST VULNERABLE SECTIONS OF SOCIETY

In an effort to describe the most vulnerable sections of society, the following groups are suggested as having the greatest likelihood of suffering severe poverty:

- single or ill elderly people
- rural and urban unemployed
- rural households without agricultural land and agricultural households with rain-fed land farmed on an aleatory basis (mainly in Concelho de Porto Novo)
- households headed by women
- households headed by adults without children of working age or with unemployed children
- households dependent on a temporary FAIMO worker
- households dependent solely on traditional fishing
- households with many children.

It should be noted that household income can be substantially improved by remittances from relatives abroad. An accurate appraisal of the extent of poverty, even in the categories mentioned above, is not possible at present due to lack of information. This lack of information may be detrimental to those sections of society that are genuinely the most disadvantaged.

tive is construction. In consequence, the number of women heading households has increased, reaching 18% on farm holdings and 20% - 36% of all households on the island. Single mothers generally experience greatest difficulty in gaining access to land and other economic activities. Their difficulty in entering the jobs market is

attributed to lack of literacy and necessary vocational training. Households headed by women form a large part of the sections of society considered vulnerable. Data from the Social Affairs Service show that households headed by women make up the bulk of those assisted.

7

THE WOMEN OF SANTO ANTÃO

This chapter will consider the role and problems of women in more detail, taking into account their importance in the society of the island. Women manage to maintain their families despite severe restraints, but their role is taken for granted and thus hardly analyzed or acknowledged.

First, different groups of women active in Santo Antão are categorised in order to assess the possibilities and limitations with respect to the contribution, or non-contribution, of women to development. Following this, socio-economic factors which affect women will be analyzed and women's problems described.

1 CATEGORIES OF WOMEN

To assist analysis, the women of Santo Antão can be broadly divided into three categories.

Women with a high level of education and good access to information

This is a small group of women who have been educated to a high level. They work as teachers, kindergarten attendants, nurses, or in public administration, business, the hotel trade, etc. — see Tab. 3.14. Married women in this category generally have few children and live in urban areas. This group accounts for less than 3% of the women of the island.

Women with access to some agricultural resources

Of the agrarian population, 48% is female (DGE, 1990). This category is composed of women who have their own land and the wives of farmers who share agricultural duties. Women are the heads of household on 18% of farm holdings. In many cases these women became responsible for land after their husbands emigrated, from whom they receive remittances. Women who head households are generally older; 52% are over 50 years old, 19% are aged 40 to 49 years and only 10% are under 30 (GEP, 1990). In rural areas women have an average of 5.8 children. They generally have access to some products for self-consumption.

Women without land or resources and with little or no education

This group represents a large proportion of women with little means of subsistence. If they do have work, it is rarely skilled; they are, among others, the women who work in the FAIMO. On average they have 7 or more children, not always by the same father. Many are single mothers or heads of household, having to attend to the running of the household, the education of their children and provision for their children's material needs. Although it is difficult to quantify, this group probably accounts for

BOX 7.1.

WOMEN OF SANTO ANTÃO
"The power of figures"

	CAPE VERDE	SANTO ANTAO
Sex ratio ♂/♀	90♂/100♀	100♂/96♀
Women in the total population	52,7% (179 997)	49,0% (21 482)
urban	43,7%	50,7%
rural	53,3%	48,5%
Female household heads	36%	20-36%
Single mothers	33%	27%
Age groups		
0-14	43%	44,5%
15-34	32%	29,0%
35-64	19%	19,5%
+ 65	06%	07%
15-64	26,9%	24,5%
Mean number of children	5,8	5,4
Women of child-bearing age	21,9 %	-
Women in the active population (10-65)	36%	29%
Women in the unemployed population (% of the active pop.)	09%	11%
Education level of women		
No education	41%	47%
Literate	02,7%	03%
Primary education	50,0%	47%
Secondary education (gen./technic.)	04,3%	01,9%
Secondary education (complem.)	01,3%	00,4%
Post-secondary	00,4%	00,1%

After Alcantara Silva & Wind (1993), DGE (1990) and PNUD (1992).

almost half the female population of the island.

The greatest differences between these groups of women are: their level of schooling, their family situation in particular, whether they are single or living with a partner), their access to resources, the number of children they have, where they

live on the island and the work opportunities they have.

Families living in the arid regions of the island and single mothers or women who head a household without resources make up a large proportion of the vulnerable population of Santo Antão. Poverty is most severe among women in these groups.

2 FACTORS INFLUENCING THE SITUATION OF WOMEN

2.1 Legal position

The women of Santo Antão are to a certain extent dependent on men and lack independence, although under Cape Verde's existing legislation men and women are equal in all spheres of political, economic, social and cultural life. Women have the same rights and obligations as men. The new Constitution, passed by the National Assembly on 5 August 1992, reinforces the 'Principle of Equality':

"All citizens have equal social dignity and are equal before the law, none being privileged, advantaged or prejudiced, deprived of any right or exempt from any obligation for reasons of race, sex, ancestry, language, origin, religion, socio-economic conditions or political or ideological beliefs."

The Family Code of 1981 states that "all children are equal before the law (...) independently of the civil status of their parents". There are also stipulations that oblige

both parents to meet the nutritional needs of their children.

Although the law enshrines the principle of equality of rights and obligations, men as well as women are often ignorant of this fact. The law is not always followed and men frequently do not assume their paternal responsibilities. The number of cases taken to court, for example to demand food contributions for children, is still low despite the necessity involved. This is not only because women are unaware that they can make claims and take men to court, but also because they fear reprisals. This is despite the fact that there are legal provisions to protect people from physical abuse.

A better knowledge of the law and improved enforcement of legal rights and obligations would improve life for women and their children and avoid many of the excesses to which they are sometimes submitted.

The principle of equality is also integral to the procedure concerning inheritance. Equal right is given to all children, both male and female. In the case of the death of a man, the wife assumes responsibility, becoming head of the family. It is nevertheless common that management of the land passes to an adult son.

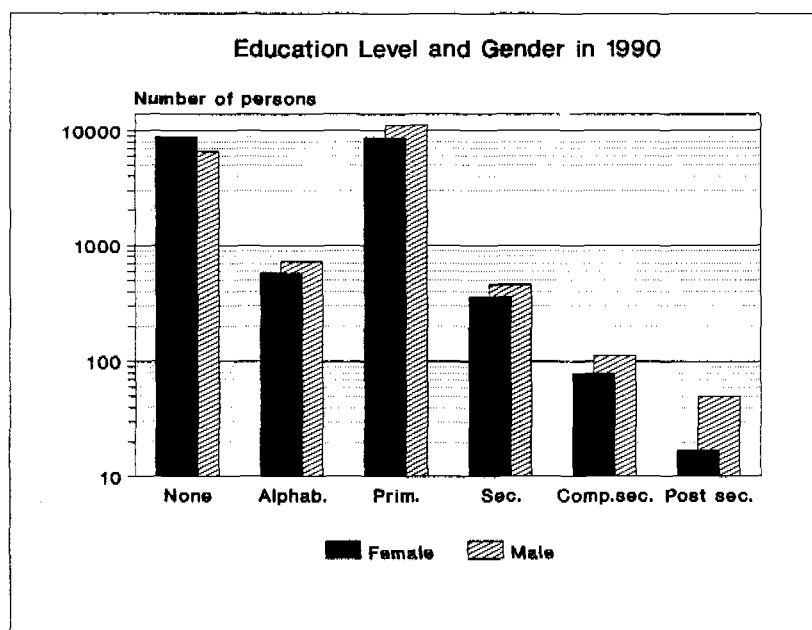


Figure 7.1 Education level and gender in 1990. *Alfab.:* literacy; *Prim.:* primary education; *Sec.:* secondary education (general/technical); *Sec. comp.:* complementary secondary education; *Post sec.:* post secondary. After (1990).

2.2 Education

The participation of females in the education system is marked by a certain inequality. The rate of illiteracy among women is still very high, but has declined in women aged between 15 and 34 years. It is estimated that 60% of urban women and 48% of rural women know how to read and write (DGE, 1990).

The education of young women has improved in recent years because of systematic school enrolment of girls and literacy programmes for adults. Women have been the main beneficiaries of these programmes. The difference in educational level between men and women is narrowing (PNUD, 1992), see Fig. 7.1; see also Tab. 3.9. The school enrolment rate of children aged 6 to 12 years is approximately 95% (see Tab. 3.4).

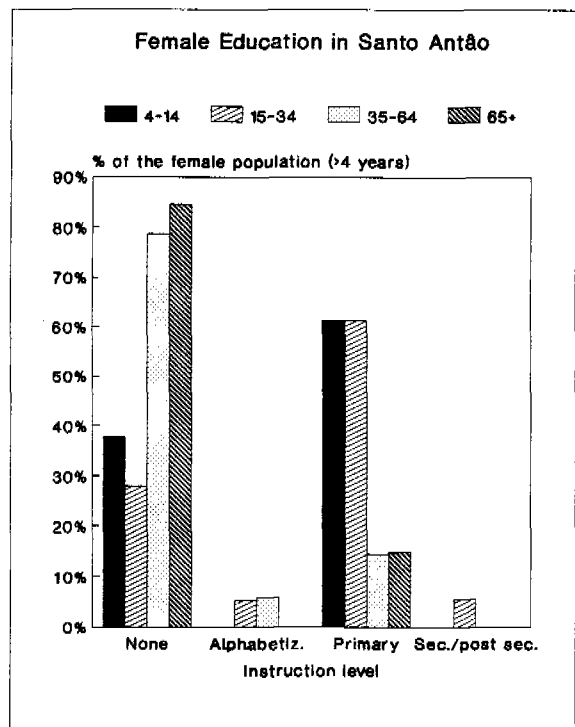
It should be noted that the proportion of female pupils diminishes in more advanced levels of education (Fig. 7.2). It appears that discriminatory attitudes and preconceptions about the education of females are more strongly held in families with the lowest levels of education and poorest economic status. Girls frequently miss school or drop out to help their mothers with domestic chores (looking after younger siblings, fetching water and firewood etc.).

The meals children receive in school sometimes act as an incentive for them to attend more frequently.

The recent setting up of several kindergartens has provided care for children aged 4 to 6 years; this not only benefits the children, but also their mothers. It has been a great help to many women heads of household to have somewhere to leave their children when they are working or busy with their own domestic chores which oblige them to leave the house for some hours. The kindergartens thus help the most disadvantaged sectors of society.

Of the 25% of children aged 4 to 6 years who attend kindergartens, many are

Figure 7.2 Female education in Santo Antão. After DGE (1990).



from disadvantaged backgrounds. Over and above the socialization of these children, kindergartens promote language development and prepare children for primary school. It has been noted that children who have attended a kindergarten perform better in primary school.

Of the 25 kindergartens existing on the island in April 1993, 15 were set up in the last two years. Several were state initiatives with help from various organisations. Most have the aims of teaching through play activities and attending to the children's health needs. Some kindergartens provide meals for the children.

2.3 Health

Women's health is considered to be good. The life expectancy of women has risen to 64.7 years.

Women's most frequent health complaints include problems related to repeated childbirth (average 5.4 children) and sexual-

ly transmitted diseases, such as syphilis. The incidence of AIDS is still not significant in Santo Antão, but it is an issue of great concern to both women and men.

Prenatal checks are well organised by the Mother-Child Support service (PMI), see Section 3.4. On average women receive three checks per pregnancy. Most women give birth at home with the assistance of non-professional midwives, but 32% give birth in the Ribeira Grande hospital and 8% in the Porto Novo hospital. Maternal mortality is very low (KIT, 1991).

Family planning advice reaches 7% of women of child-bearing age, and the fertility rate of women is gradually decreasing. The number of children for each woman of child-bearing age in Cape Verde fell from 6.4 in 1980 to 4.9 in 1986 (KIT, 1991). The average fertility rate is 5.4 in Santo Antão (see Section 3.4). This downward trend can be observed in all age groups except in young women aged 15 to 19 years among whom the number of children has increased by 22% over six years (Alcantara Silva & Wind, 1993). This may be explained by the fact that young women have less access to family planning; as a result of its link with the Mother-Child Support service, family planning services generally only reach women after the birth of their first child.

(For details on nutrition see Sections 3.4 and 4.1.2).

2.4 Work

The 1980 census classified 52% of women as 'housewives'. The 1990 census (DGE, 1990) no longer had a 'housewives' category, but referred to 28% of women as undertaking activities of an undetermined nature, and 2% of an unremunerated nature. The same census indicates that women constitute only 29% of the economically active population (see Tab. 3.14); 36% of whom are unemployed (Tab. 3.17), which represents 37% of the total unem-

ployed population (Tab. 3.16). However, it is almost universally accepted that women work a great deal, indeed probably more than men. The censuses possibly only consider people with a fixed, paid job (such as FAIMO where 28% of workers are women) as part of the economically active population because these are easily defined (Tab. 3.18).

In order to explain the tasks of women in providing for their family, these have been divided into domestic work which every woman *has* to do and paid work which a woman *may* do if available.

Women's economic situation depends partly on the opportunities they have to undertake paid work and how that may be combined with domestic tasks.

Domestic work

Women are responsible for all the tasks related to the running and care of the household including preparing food, washing clothes, cleaning, etc. Traditionally it is women who carry all manner of items on their heads such as water or firewood for cooking. They may be helped by children in these tasks; in one way the division of labour can be considered as between women and children on the one hand, and men on the other.

The time a woman spends on domestic work is directly related not only to the number of people in the household, but also to location of the household on the island. In arid regions the search for drinking water can take up much time, conditions are much more severe and all activities are more time-consuming.

Paid Work

Women *traditionally carry items on their heads* and this fact partly determines their employment opportunities. Women carry sugar cane from the fields after it has been cut. For FAIMO they carry rocks and sand for the construction of roads and contour terraces. As vendors, women transport the

goods that they sell. These are accepted forms of work for women but are recognised as heavy and tiring.

Women take an active role in the retail *sale of fresh food*, such as vegetables and fish. About 100 women are engaged in the sale of most of the island's fresh fish. Fish is bought directly from fishermen and sold fresh in the local markets or brought inland via the *ribeiras*.

Other types of work that women undertake have a more domestic character, such as *sewing or making confectionary or lace*. This is work that women can more easily combine with domestic work.

Many women on Santo Antão work as *housemaids* and also go to São Vicente or even emigrate abroad to become maids. This is one of the alternatives contemplated by many young women.

It is interesting to note that there are *few handicrafts* on Santo Antão. It is reputed that there were previously crafts such as pottery, but this is a tradition that has been lost.

Income

It is difficult to estimate the work and economic contribution of women.

Neither the work that women do at home, such as sewing and making confectionary, nor the *informal sector* of the economy in which they are very active (housemaids, fishvendors etc.) is recorded. Some of these activities do not involve money as they are conducted on the basis of exchanging goods or services.

The income earned by women from crop farming is not very great (Cuales, 1991). This is perhaps more related to the agricultural potential of the island than to the type of work that women do. Approximately half of women are involved in the crop farming sector, but they do not have particularly exclusive tasks, as is the case in other cultures. Santo Antão has the lowest proportion of women in crop cultivation of the country (GEP, 1990).

Women achieve greater income from the stock raising sector by the sale of eggs, cheese and pork over and above that which is produced for self-consumption.

Women earn the same wage as men for the unskilled work they do for FAIMO, i.e. ECV 180 a day (US\$ 2.30).

One thing is certain: *women's incomes directly benefit the household*. In contrast, men's earnings do not always reach the family as the high consumption of *grogue* on Santo Antão indicates.

3 PROBLEMS OF WOMEN ON SANTO ANTÃO

The dependency of women and the lack of responsibility of some men

Women tend to be very dependent on men, especially within the family setting. The *machismo* of some men has negative consequences for the lives of women. On the one hand, machismo makes women dependent on men; but, on the other hand, it forces women to assume almost all the responsibilities of family life, including the provision of sufficient food.

Machismo glorifies men's sexual lives, both within and away from the home, but does not exalt the responsibilities of the man as a father. Thus some men have children with several different women but do not assume any paternal responsibility. Women sometimes choose to have children with different men in the hope that one day a man will stay and share the family responsibilities. When a man leaves his family, the woman has to assume all responsibilities and care for the children. This happens quite regularly on Santo Antão and many women are left in precarious situations with several children to care for without the help of the father.

This situation has an *effect on the traditions and norms of couples*. Civil and church marriages are viewed as the preferred situation (25% of cases). However, for economic and social reasons, common

law marriages are more frequent (40% of cases); they allow the man, or in some cases the woman, to leave the relationship if it is not successful. Common law marriages can be long lasting and are accepted by the law, an important point in the recognition of children and especially in cases when a woman is abandoned and attempts to legally force the father to contribute food for the children.

Machismo in its worst form leads to the *violence of men against women and sometimes children*. Women are reluctant to describe these negative and painful experiences for fear of reprisals. Incidents of violence are only admitted to in private conversations or when the situation has reached serious proportions and many people are already aware of the fact. Only extreme cases are brought to the attention of the law, which has the means to punish the guilty party.

The incidence of sexual violence, child sex abuse and sexual promiscuity are attributed to poor living conditions, lack of prospects for improvement and cramped housing (whole families sometimes sleep together in just one or two beds). Excessive *grogue* consumption also contributes to this situation.

Considering their major role in the upbringing of their children, especially their sons, it can be said that women themselves partly contribute to the continuation of machismo in the Capeverdean society.

Increases in precocious maternity

There is currently great concern over the *increase in precocious maternity*.

Approximately 67% of women who have given birth when aged between 15 and 19 years did not want their first child (Alcantara Silva & Wind, 1993). The behaviour of young people is thought to be changing. The incidence of pregnancy among very young women is a cause of concern for parents, teachers, the medical services and the church. Moreover a rise in sexually transmitted disease has been noted among

young people. One explanation of this is the *lack of sex education* in families and schools. Attempts are being made to start programmes of sex education in schools, but trained staff are in short supply. Another explanation is the resistance of some parents to sex education for fear that it could encourage even more youth promiscuity.

Problems related to family planning

As already stated, family planning exists but is linked to Mother-Child Support, i.e. mothers consult this service after the birth of their first child. In general this has the effect of inhibiting young women from seeking advice on *how to avoid a first pregnancy* because of shame or ignorance. Only a few young women approach the family planning services to ask for contraception.

The recent public debate about AIDS has had the effect of making some men seek protection in their sexual relations. The free distribution of condoms by PMI increased greatly last year. It is possible that fear of AIDS will have a positive effect by opening up the discussions between men and women about sexual relations and contraception. This is an important point given that men have been largely left out of the discussion on family planning.

The greatest challenge for family planning is to raise awareness of its benefits for individuals, families and the community.

Women who already have many children often say that they want to plan their family in future, but that their partners will not allow contraception because they do not have confidence in their fidelity, although this fidelity is often not reciprocated. Some women use contraception without the knowledge of their partner. Others believe that because they are breast-feeding they will not become pregnant.

The stance of the Catholic Church is seen as a great hinderance to the acceptance and utilisation of contraception. This is

despite the fact that the family planning programme is sensitive to the position of the Catholic Church and includes information on natural methods of contraception among its advice. The church is very concerned about precocious maternity and could encourage young people to be more responsible, and only have children when they can maintain them.

Family planning has been an important topic of debate among officials of the services involved, but still has not had a significant effect on the population in general.

Lack of natural resources

The lack of natural resources and the particular characteristics of the island mean that most *food provisions are not produced locally* but are shipped in. A major problem for the poor, and women in particular, is how to obtain supplies to cook the traditional *cachupa* dish. *Cachupa* is prepared from maize and beans which are only produced in small quantities on the island. Traditionally, *cachupa* is cooked for a long time, preferably on a wood stove.

Firewood is a scarce and very expensive resource — 40% of the requirement is not met. Women may spend much time searching for firewood which is collected without restrictions but is increasingly difficult to find each day. If not conducted with care, the collection of firewood or other combustible material can have negative effects on plant cover and the environment.

Shortage of water is one of the greatest daily problems faced by almost all women, except those few in the *vilas* who have running water in their houses. The search for water can be time-consuming. Even if water is obtained from a public tap, women may have to wait until the water is switched on or queue with many other people.

The *quality of water* varies considerably depending on its source (spring, tap, tank or *levada*). Illnesses such as diarrhoea, especially in children, are sometimes caused by lack of hygiene. The problem is not always the quality of the water but the

cleanliness of the receptacles used to carry it and the means of storage in the house.

Moreover, *personal hygiene* is difficult when there is a shortage of water. Washing clothes is a problem and is often done in the *levadas* or watercourses.

Lack of employment alternatives

The need for an earned income is vital in Santo Antão because most of the basic necessities are imported and have to be bought. However the alternatives for paid employment are still fairly limited. Moreover, women may have to spend a significant amount of time on domestic chores. To achieve a subsistence income women must combine many forms of work which take them away from home for long periods of time. Children, especially girls, help their mothers with domestic chores, for example looking after younger siblings, cooking or washing clothes. Some girls miss school or drop out for this reason, with consequent effects on their future development.

Poor education limits the type of paid work that women can get. FAIMO offers employment to women with little education, although the work is heavy and wages are low.

Many women learn to make clothes and lace. There are courses organised by several organisations to develop these activities and make them more profitable. However, women have *difficulties in obtaining the basic materials* required: cloth is relatively expensive. One metre of cotton costs ECV 260 (US\$ 3.34) which is 45% more than can be earned in a day of work for FAIMO.

The *sale of home produce* such as confectionary or clothes is disorganised and made directly to the consumer. This takes up a lot of time and does not offer much security especially as women sell to other women who have little money.

The income of women who work as vendors, (e.g. fish peddlers) depends on their arrangement with the producers. Some women buy fish directly from fishermen

and earn an income from whatever they can sell, as is the case in Porto Novo and Ponta do Sol. In other ports where women have fewer resources, they receive fish, sell what they can and then are remunerated by the fishermen but their income is not secure and not very high. Sales are often on a barter basis; fish for potatoes, cassava, tomatoes, etc. Many women working as vendors are single mothers or heads of household. They are the most needy but because there is no man in the home they are freer to go out and travel around the island, though they are looked down upon socially for this reason.

Lack of women's organisations

Women in Santo Antão do not have the opportunity to work together, obtain credit, or meet other women engaged in similar activities.

The Cape Verde Women's Organisation (OMCV) is the only national women's organisation with a representative on the island. However, due to its political links, it is currently viewed as a political organisation rather than an organisation for the support of women in general. The OMCV declares that it has changed its direction but this is not believed by many women and local officials. The Organisation has a comprehensive programme of action that could be well accepted in Santo Antão, but it will have to depoliticize itself to become effective. However, the OMCV has few staff to implement its programmes and is currently waiting to move into a new building.

Perhaps what women need most are centres for meetings and activities. Places where they can go for training, but above all where they can meet other women,

BOX 7.2

RECENT DEVELOPMENTS RELEVANT TO WOMEN

Coordination of kindergartens

Kindergartens on Santo Antão operate in many different ways. The need to try to coordinate the activities of kindergartens is recognised on a practical basis as much as on educational basis. The training of kindergarten assistants also needs to be coordinated. Joint proposals in this respect are being prepared by the Ministry of Education, the Chairs of the *Concelhos*, the Cape Verde Organisation for Children and the NGOs involved with the kindergartens.

Coordination of family planning

The Health Services together with BØRNEfonden, and possibly the Social Welfare Services, intend to coordinate information on family planning.

Development of a sex education programme

As a result of the recognition of the need to develop sex education programmes for young people in schools, a survey of parents is planned to ascertain their views on the matter. The research should shed light on the real problems relating to the lack of sex education.

Information on the rights and obligations of individuals

On World Health Day, celebrated in Ribeira Grande in April 1993, the Judge of Santo Antão suggested that information on the rights and obligations of all persons, both men and women, should be distributed. Ignorance leads to poor observance of the law. The proposal was made to distribute the information via extension workers who have more contact with rural areas where ignorance of the law is greater.

Schools could also be used for improving knowledge of the law.

discuss their problems and perhaps initiate action. In reality little is known of what women themselves want. *A women's centre could promote their own initiatives.*

(See Appendix A, which details organisations that assist women either directly or indirectly, i.e. through children).

8 INTERVENTIONS

This chapter will identify and evaluate, as far as possible, the effects that interventions have on the physical and human environment of Santo Antão in terms of poverty, the environment and the position of women. Originating with the government, the local authorities and aid agencies, these interventions have taken the form of projects, programmes and policies for aid and development. Policies - recent and in the making - are also taken into consideration in spite of the inherent difficulties it entails for any such evaluation.

1 EFFECTS OF INTERVENTIONS IN THE PHYSICAL ENVIRONMENT

Forestry

After the success of the first plantations carried out during more favourable times, reforestation activities have come up against difficult conditions, namely drought. As droughts have continued, technical problems have been compounded by socio-economic problems. The forests have effectively entered into competition with crop farming and stock raising. The long-term objectives of forestation are soil protection and increased forestry output, but this conflicts with crop farmers' and stock raisers' desires for quick returns. Thus confrontation has been generated as illustrated by the current conflict between stock raisers and the forestry service in Concelho de Porto Novo. Whatever the claims of one side or the other, it is clear that the situ-

ation is characterised by lack of communication between the two 'interest groups'. A greater willingness to co-operate between the forestry services and the stock raisers would not inevitably resolve all the differences, but at least it would lead to a constructive dialogue.

Given the island's climatic and economic problems and scarcity of resources the problem of firewood supply takes on a special importance. Reforestation is the responsibility of the state, but individuals are responsible for their own supply of wood by whatever means possible, even if illegal. Women of the rural areas are the most seriously disadvantaged as they search for the necessary fuel to prepare food. These women cannot afford or do not have access to other sources of energy (e.g. gas bottles).

Development of the road network

Policies to develop Santo Antão's road network are mainly directed at opening up agricultural areas and facilitating the distribution of the production.

Due to the needs of the town of Mindelo and the 'agricultural vocation' of Santo Antão, the construction of a road generally has the effect of directing local agricultural production to the São Vicente market. As this is a relatively large market and prices are attractive, production is stimulated. However, the sale of local produce on the neighbouring island can lead to paradoxical situations; malnutrition is high in agricultural areas such as Ribeira de Paúl. Fur-

thermore, the effect of a road may vary considerably depending on the different communities it reaches. In Janela for example, the road facilitated the export of produce to the benefit of local agriculture. In contrast, the fishing communities, traditionally one of the poorest groups, have not benefited at all (personal communication, A. Tavares). The road has thus widened the gap between two of the poorest sections of the society.

Road construction in a mountainous region such as Santo Antão can aggravate the phenomena of erosion; blasting through rocks causes fissures, although the use of dynamite is now restricted. Excluding the objective of creating jobs, it is sometimes difficult to reconcile the enormity of the soil and water conservation work and the effect of road construction in certain areas (e.g. Alto Mira).

In some cases road construction entails the loss of agricultural land. This will be true of the improvement of the existing road from the coast to the head of Ribeira de Paúl. At this stage of the project it is unknown whether there has been cooperation between the services responsible for agriculture and those responsible for road construction. There has been no dialogue between the services responsible for the road network and the farmers who will be affected by the project.

Until recently the relief of the island spared some areas from certain plant diseases (e.g. Tarrafal and Alto Mira). The construction of roads linking infected areas to non-infected areas generally results in the introduction of pests into the previously isolated areas. This phenomenon has already been observed in the Alto Mira valley. The transport of agricultural produce into the valley along the new road is controlled, but the Santo Antão millipede has already been discovered on agricultural land there. There is no known natural enemy for this pest and it attacks one of the most important foods, the sweet potato, among other crops. This could soon be a

serious problem in the newly opened up valley and it would be informative to monitor the situation in the years to come. This type of information will be very useful in the future to accurately appraise the real costs and benefits of development projects.

In the opinion of some observers, the extension of the road network will allow improved access to schools and health centres. This is undoubtedly the case for that part of society able to pay the costs involved in the use of motorised transport. However, some sections of society find it very difficult to pay the costs of road travel. It can therefore be suggested that road construction increases the gaps between families with contrasting financial resources.

The exploration for water

It is evident that the exploration for water is directly connected to the droughts and the lack of information concerning the location and capacity of ground water supplies. These problems are common in the Sahel region of which Cape Verde forms a part and are aggravated by spontaneous migration of people to areas where water is being sought. This phenomenon demonstrates on the one hand how important water supply is for much of the island's population, and on the other hand the need for a prudent, considered and comprehensive approach for all development activities.

The unpredictable nature of spontaneous migration can have serious consequences and in many parts of the world the result has been severe environmental deterioration. As exploration for water is often undertaken in drought-affected areas on Santo Antão, a spontaneous increase in population may have harmful effects in terms of erosion and the destruction of plant cover.

Exploration for water is not accompanied by the development of an infrastructure (clinics, schools, sanitation, etc.) to accommodate the people attracted by the prospects of improved water provision. The

result could be reinforcement of poverty of migrant groups, which generally consist of destitute families and individuals seeking to improve their standards of living.

Soil and water conservation

Soil and water conservation projects have probably protected a large proportion of the land from erosion, and about 60% of the agricultural area (PDSA, 1991). It is estimated that this work has led to an increase in yield on protected agricultural land. However, there is no data to confirm these positive 'results' because no system of monitoring has been implemented. Moreover, taking into account the great variation in the location and timing of rainfall, it is difficult to distinguish whether agricultural output is affected by the climate or by soil and water conservation measures.

Nevertheless, it must be considered whether the systematic construction of a soil and water conservation infrastructure and rain-fed aleatory agriculture are viable undertakings given the climatic and socio-economic conditions of Santo Antão. The construction of terraces and their use for rain-fed agriculture means the destruction of natural plant cover. Taking into account the great annual variation of rain and the lengthy periods of drought, the sowing of terraces does not necessarily lead to plant cover in the form of crops nor does it guarantee a harvest. It is estimated that rain-fed agriculture is impossible for 5 years out of 6 (Blink *et al.*, 1987). After the land is tilled, natural vegetation is lost and the soil is exposed and susceptible to erosion by wind or, if it finally arrives, rain. The conditions are also not suitable for the retention of water in the soil. Terrace construction may well prevent the formation of natural plant cover capable of protecting the soil from erosion and enriching it with organic material. In the absence of any monitoring of erosion processes or a study of the effect of soil and water conservation measures, these potential problems

can only be highlighted along with the need for an analytical overview of the relevant programmes.

When conservation projects are undertaken in areas where the environmental and socio-economic conditions are difficult, groups or families may settle in regions where there is no viable work and in this way poverty tends to increase.

2 EFFECTS OF INTERVENTIONS IN THE HUMAN ENVIRONMENT

FAIMO

Although designed to eliminate absolute poverty and even starvation, FAIMO paradoxically constitutes a mechanism that reproduces poverty in a vicious circle, if not a downward spiral. The wages paid by FAIMO are not sufficient to maintain a decent standard of living nor is it possible for the families involved to take part in other activities which would support them. The FAIMO system is not autonomous and FAIMO workers are not independent from the FAIMO system. This system further depends on food aid.

The projects of soil and water conservation and road construction undertaken in recent decades have been labour-intensive. Although this has guaranteed employment to a large section of the economically active population, there has not been an equal creation of jobs in economical activities such as agriculture and, consequently, many communities have disintegrated. In strictly economic terms and from the point of view of a cost-benefit analysis, the investments made cannot be considered efficient nor as particularly effective in the promotion of economically productive activities.

Young people who join the FAIMO end up being trapped in the system and incapable of visualising any alternatives away from the work gangs, except for emigration.

Aid and social welfare

Because of the precarious socio-economic position of many households on Santo Antão, several organisations are involved in welfare activities. These include the public welfare services such as the Municipal Councils which assist the self-construction of housing, and the regional services of the Directorate-General of Social Affairs which distributes food and cash handouts with the assistance of the World Food Programme and resources from the State General Budget. Other institutions such as national NGOs and international organisations work especially with the most needy sections of society on the island. Favoured areas of activity are the improvement of nutrition, social welfare and development.

In the area of nutrition, the most significant intervention is made by the Social Affairs Service which distributes food. In recent years this has reached approximately 25% of the population of the island. Current assistance schemes provide food aid to about 40% of children but do not guarantee to cover all children nor appraise each individual child's state of nutrition. The World Food Programme provides food aid for children of school age by financing an extensive feeding programme in the island's schools, providing at least one hot meal a day over the six years of compulsory schooling. A fall in drop-out rates has been attributed to these hot meals, as well as to other socio-economic aids, such as provision of school materials, scholarships and transport subsidies. For example, the drop-out rate for EBE fell from 17% in 1978-79 to just above 1% in 1988-89 (PDSA, 1991).

In the short term, the nutrition of approximately two-thirds of the population depends directly on state decisions and planning. The import of basic foods is conducted by the State Provisioning Enterprise (EMPA) with an emphasis on maize. An average of 6,559 tonnes of maize was imported in the years 1986-87-88. However, imports of first class maize to the island have dropped considerably - by 30%

- a decrease that is difficult to explain given the poor productivity of rain-fed maize in recent years. Increases in the consumption of some other products have been noted; oil (29%), cooking oil (28%) and potatoes (42%); (PDSA, 1991). Changes in eating habits and the low productivity of some crops, both irrigated and rain-fed, could be the causes behind this altered consumption. Nevertheless, it would be interesting to ascertain what kinds of food people consume or would like to consume.

Education

The recent establishment of kindergartens appears to be a positive influence for the development and schooling of children aged 4 to 6 years. What is more, women also benefit (especially heads of households) from the opportunity to leave their children somewhere while they work or conduct other activities.

As has already been said, school drop-out rate has fallen considerably as a consequence of socio-economic aid. A general increase in the educational level of the population can also be recognised (see Sections 3.3 and 7.2.2), and this may translate into a significant difference in attitudes, for example with respect to women. As education improves, women will have increased opportunities for advancement and will feel less dependent on men. Observers hope for changes in the so-called 'assistance mentality', referring to FAIMO workers. Many school leavers no longer want to do manual work and in any case young people are now leaving school at a faster rate than the creation of jobs or places for continued study. This situation is a cause of concern for the authorities.

In relation to these changes, the compatibility of the educational system to the realities of Santo Antão should be examined. It must be ascertained whether education on the island is still appropriate to development, given the human resources involved, the existing school network, the

BOX 8.1

NOTES ON INTERVENTIONS IN THE HUMAN ENVIRONMENT

The intervention of various organisations on purely assistance basis has not resulted in a qualitative or quantitative improvement in the living standards of the marginalised population. Indeed, over the years, it has led to large sections of society becoming increasingly dependent on the state.

The roots of the problems encountered by the poor can be traced to low output as a direct result of poor labour productivity on Santo Antão. This is directly related to the scarcity of soil and water resources, poor training, the absence of a credit policy to allow the adoption of intermediate technology and the shortage of employment opportunities. These factors combine with and mutually reinforce one another, creating a synergy in which poverty leads to further poverty and degradation of the environment.

The development of Santo Antão is related to socio-economic problems as well as the adverse environmental conditions. Despite concern shown for the particularly difficult conditions, institutional responses have been insufficient or in some cases unsuitable.

The improvement of standards of living is a complex issue and problems cannot be divided into categories of health, education, economics, etc. These are all facets of the same problem and efforts for improvement must be interconnected. As the focus of development action is people's quality of life, then the integration of development efforts entails evaluation on the basis of this criterion.

Coordination between the various organisations on the island is vital if a qualitative and quantitative improvement in aid activity is to be achieved. Interventions should be coordinated, methods of application rationalised and effects evaluated.

curricular structure and the syllabuses of the three levels of education. The dynamics of development on Santo Antão is in discord with the current types of school, the lack of qualification of most staff, the essentially theoretical nature of teaching (separating education from working life) and the absence of a vocational training centre. The shortage of qualified people in society (see Section 3.6.3) illustrates a certain gap between education and vocational training.

What is required is not centralized coordination of education and vocational training, but direct or municipal level initiatives and planning to develop an integrated system. Only through a planned project of vocational training will it be possible to make effective use of the local workforce in the island's development activities.

Family Planning

The future for women, the condition of the environment and attempts to reduce poverty may well be dependent on the success of the family planning programme. Tangible results have not yet been achieved due to strong social, cultural and religious resistance. Family planning is linked to the Mother-Child Support service and thus only reaches women after their first child. Women often become mothers at a very early age and attempts are being made to extend coverage to the period prior to first pregnancies. Ways of making men feel more responsible and involving them in the problems of family planning are also being sought (see Section 7.3).

The most numerous families are usually the poorest rural families; these families need most labour for tasks such as search-

ing for firewood and water, cultivating the land and working for FAIMO. Family planning programmes should take this into account.

3 POLICIES AND INSTITUTIONAL FACTORS

Environmental policy

Cape Verde does not yet have an integrated environmental policy, i.e. a policy which not only includes the struggle against drought, desertification and erosion, but also the rational use of resources, the conservation of national heritage, etc. Environmental problems are the responsibility of the National Institute for Agricultural Research and Development (INIDA). An environmental outline law is presently in preparation as part of the current government's programme. This will probably result in the establishment of a body responsible for environmental policy and administering a structure for research.

Policy for the control of desertification and rural unemployment

Since Cape Verde's independence, the government has concentrated all its environmental efforts on the struggle against desertification and erosion. This policy has gone hand in hand with employment policy. The objective has been the relief of rural unemployment and poverty by using international food aid to offer temporary employment and income through High Intensity Labour Gangs (FAIMO). The areas of operation have been reforestation, soil and water conservation and road construction.

This policy is still followed although the high costs and poor productivity of the work carried out by FAIMO are currently under discussion. The central question at present is how the FAIMO system should be modified and on what basis. It is clear that changes in this policy will have signifi-

cant consequences for the struggle against desertification, erosion and unemployment.

Considerable decreases in reforestation and soil and water conservation operations can be expected (Da Pina & Silva, 1992); the vast majority of these environmental operations have been conducted by the state. The 'participation' of the population has always been limited to the supply of a paid workforce. It should not be expected that the popular perception of responsibility for environmental protection will change rapidly.

However, this probable change of national policy will also provide the opportunity to consider the environment in a broader sense and extend activities in other areas such as the management of resources for sustainable development and the preservation of national heritage. The decentralisation processes embarked upon after the first democratic elections may also allow improved consideration of the specific ecological and socio-economic conditions of Santo Antão. This, however, will be the case only if the necessary means are given to the island's authorities and if the population takes a more active part in decision-making processes concerning the environment, upon which depends the life of the island.

In employment terms, and thus in terms of income and poverty, a period of transition is necessary. During this period progress could be made by directing efforts towards stimulating activities capable of self-financing and, as far as possible, of being managed by local people. In this way, policies concerning education and training, as well as those aimed at encouraging the integration of women into the development process will play a crucial role.

Education policy

Education represents the focus of opportunity for Cape Verdean society and is one of the main areas for intervention. Government programmes regard education as a

basic instrument for confronting underdevelopment; by developing the potential of human resources there will be consequent increases in productivity.

An objective of the programme of educational reform is to encourage gaining qualifications. This will be done by creating an environment favourable to integrated training and by providing the resources necessary to increase skills and experience.

Qualifications will be based on educational programmes which balance formal education and vocational training, thus affording attractive opportunities for structured learning.

Policies concerning the role of women in development

The women of Santo Antão are clearly marginalised in the debate on development and distanced from developmental processes. An example of this is the low proportion of women in the municipal assemblies, see Tab. 3.19. The problem of women's involvement in the development of Cape Verde is a concern of central as well as local government (i.e. the Santo Antão Municipal Association). Activities favouring women are not yet well established, but various proposals are currently under discussion. There are certain organisations which assist women either directly or indirectly (see Appendix A).

A step forward at national level is the imminent creation of the Institute of the Female Condition (ICF) charged with formulating a plan of action combining women's needs and expectations. The ICF will represent all women; it is important that women from poor sections of society and women without education are included in the search for suitable alternatives for their development.

On Santo Antão, the Municipal Association is aware that "the participation of women in the development process continues to be extremely limited". Hence the Santo Antão Regional Development Pro-

gramme, initiated by the Association, undertakes to "act to reinforce the integration of the women of Santo Antão in the process of development on the island through productive activities, training and information - in this way society in general will become aware that women are not only as capable as men but also an integral part of the development process" (PDRSA, 1993). The following actions are thus anticipated for 1993:

- "Continuation of the process of making credit available, principally to female heads of household, for the establishment and development of business enterprises of a household nature in the areas of: stock raising, clothes making, baking, handicrafts, commerce etc.;
- Development of management skills training for household businesses;
- Training and development for commercial undertakings in the areas of production methods and promotion;
- Setting up of associations for the support of women in society" (PDRSA, 1993).

The Regional Development Programme is allocating 10% of its budget to the Support of Women in Development programme, although it is unclear how this programme will be implemented and by whom.

Policy defining roles of the different islands

The Cape Verde government has assigned Santo Antão the role of supplying food to its own population and, moreover, to the town of Mindelo on the neighbouring island of São Vicente (Lesourd, 1991). This decision is justified by the importance of Mindelo as a catalyst for the regional and national economy, but pays little regard to the limited agricultural potential of Santo Antão. It also encourages the investment of important financial and human resources in a sector which is near capacity in terms of contribution to the economy of the island.

Policies on water pricing

The real cost of producing water for irrigation and human consumption is unknown because of lack of information on the expenses involved in the construction, maintenance and operation of the water supply infrastructure. At present only the operating costs of pumping systems are taken into account; mainly fuel and operator wages. According to figures from the municipal services and MPAR services, the average operating costs vary between ECV 6 and ECV 9 per cubic metre. Farmers using pumping systems for irrigation (10% of the total of water used for agriculture) pay a rate of ECV 5 per cubic metre. No charges are imposed by the state for the use of water in gravity irrigation systems.

The price of water for human consumption varies according to the type of distribution and area (rural or urban). A cubic metre of channelled water costs ECV 27 if monthly consumption is less than 5 cubic metres, and ECV 40.50 if monthly consumption is over 5 cubic metres. Water transported in tanker lorries costs ECV 100 per cubic metre and the price of water from public taps varies between ECV 20 and 40 per cubic metre. This variety in price reflects the great differences in the costs of production and transport of water. The supply of water by tanker lorry to areas where there are no natural springs is highly subsidised. The price of water at public taps is set on the basis of the operating costs, i.e. the cost of the employee overseeing water distribution.

These figures show a disparity of water prices. A large part of the rural community pays more for water, yet this is the section of society with fewest resources. It is hoped that a more equitable system of pricing can be introduced in light of the socio-economic problems of rural communities, and especially of women who manage domestic water supply.

The current policy of mains water pricing (urban areas) demonstrates the start of moves to use pricing as an instrument to promote efficient water use; wasteful consumers will find their mains water charges higher than careful consumers. In the medium term it would be desirable to implement a general water pricing system for agriculture and human consumption that would promote savings and efficient usage while still protecting the most vulnerable sections of society.

To guarantee the economic viability of the water supply, the price of water should be calculated taking into consideration not only operating costs, but also maintenance costs and depreciation on the infrastructure. If the real cost of water is too high, then subsidies should be considered for the consumers in different areas in accordance with their different capacities to pay and in relation to the different forms of use and distribution of water. In the long term, however, the goal should be the self-financing of water distribution on the island.

9 SYNTHESIS OF AN INTEGRATED STUDY: CONDITIONS TO INITIATE BALANCED DEVELOPMENT

Seven central problems can be identified from the analysis of the situation with respect to the environment, poverty and the position of women. These form the core of the difficulties confronting the island of Santo Antão, and are as follows:

- the imbalance between the potential of natural resources and demographic pressure;
- the limited employment and income opportunities on the island (related not only to the unfavourable environment but also the central role played by the state and the attitude that this has engendered in the people);
- the poor rate of participation of the islanders in activities and decisions that directly affect them;
- an exclusion of women from the island's development issues despite the importance of women's work and their potential;
- the marked absence of communication and consultation between the different development agencies active on the island, and the fragmented approach that results;
- a shortage of human and material resources in the organisations responsible for the development of Santo Antão;
- the lack of legislative and institutional frameworks adapted to local conditions.

These problems, either individually or in combination, exert an unfavourable influence on the environment and its management, hinder the activities and welfare of men and women, and contribute to maintain a large section of the population in poverty. The 'lowest common denominator' of the problems of Santo Antão and its inhabitants are found in these seven issues and must be addressed if a balanced development process is to be introduced.

1 ADAPTATION TO THE ISLAND'S NATURAL POTENTIAL

Santo Antão's natural resources are relatively poor due to the predominant climatic conditions — long periods of drought *sometimes* interspersed with more humid periods (see Box 9.1). Because of the lack of essential data on the condition of soils, changes in the climate, ground water supplies, etc., there are differences of opinion about the island's actual capacity in natural resources and ability to supply the basic needs of the population. However, it is clear that only part of the current population can live from the rational exploitation of the land (crop farming, stock raising, forestry, or combinations of these). There is a lack of balance between the use and capacity of resources,

BOX 9.1

DROUGHT ON SANTO ANTÃO: A CRUCIAL FACTOR IN PLANNING

Santo Antão has been seriously handicapped by periods of repeated drought. The scarcity of natural resources such as water, vegetation, and land suitable for agriculture is largely due to drought. In socio-economic terms the droughts are one of the principal causes of poverty because of the scarcity of natural resources: sufficiently watered land, ligneous vegetation (firewood), water resources, etc. Faced with these constraints, the islanders, especially the most disadvantaged, have no alternative but to over-exploit the scarce resources where available. Santo Antão is thus trapped in a vicious circle: the droughts cause deterioration of the natural environment which in turn compels the local people to accelerate this deterioration.

The current drought should not blot out memories of previous droughts that the island has suffered. Santo Antão's history is linked to the extreme climate and punctuated by tragic famine and periods of emigration. In other words, the current drought is not an unusual event, and periods of more favourable climatic conditions should be considered exceptional. This should not be forgotten when the options for development of the island are considered. Decisions based on the favourable rainfall conditions of limited periods of time will most probably be unrealistic, even if comfortingly optimistic. Such optimism could aggravate an already delicate situation.

as the condition of the soils of Planalto Leste illustrates (Fig. 9.1).

During more favourable times (i.e. periods of rain), the natural resources do allow a larger part of the population to subsist, but whatever proportion of the population this applies to, it does not resolve the underlying problem. When the droughts return, the natural resources of the

worst affected areas dwindle and the situation of local people deteriorates rapidly. Eventually they find themselves in circumstances of extreme poverty and become totally dependent on aid from the state and the international community.

Communities capable of working towards their own development are thus not viable in these disadvantaged areas. How-

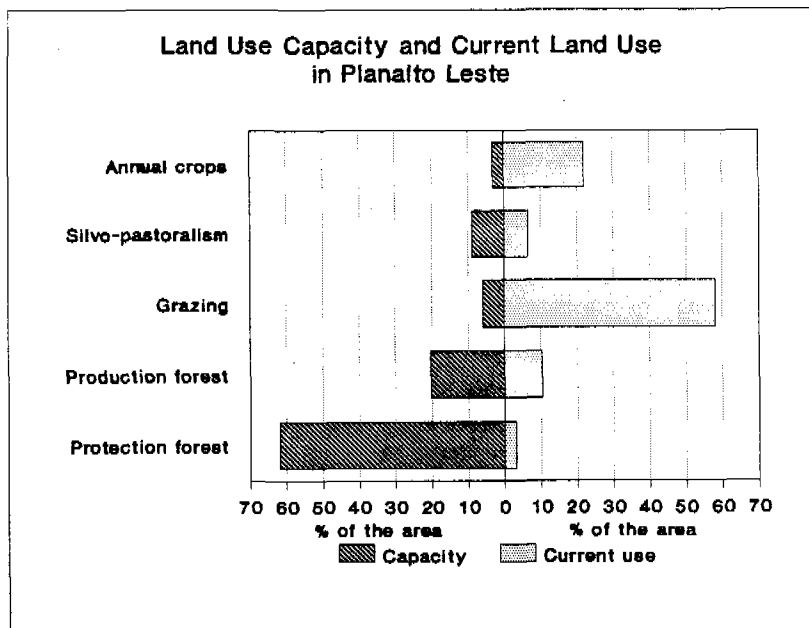


Figure 9.1 Land use capacity and current land use in Planalto Leste. After Van Melle & Delgado (1990).

ever, the growing population of Santo Antão cannot be accommodated completely in those areas where the natural resources are relatively favourable due to the climate.

This imbalance between the resource potential and demographic trends represents an enormous constraint and must be the focus of all development programmes or regional development plans. Failing this, standards of living will continue to be determined by external aid, an artificial situation which certainly cannot lead to sustainable socio-economic development.

Although efforts to control demographic growth are essential, these alone cannot resolve the many pressing problems which confront Santo Antão. There must be rational and optimal use of all the island's resources, both natural and human. One element of the solution may be the use of certain natural resources which are currently under-exploited: minerals (pozzuolana and, possibly, stone), spring water, fish, scenery and some elements of flora and fauna. Other resources could be utilised differently, in ways more suited to the needs of the island. For example, many doubts have been expressed on the leading role given to sugar cane on the island's precious irrigated land (three-quarters of the available irrigated area). Over and above problems of soil impoverishment due to the practice of monoculture, great quantities of water are used for the production of alcohol (irrigation + distillation) while most food crops remain drought stricken. It is true that *grogue* is an export product, is consumed in large quantities and creates employment, but some observers declare that these advantages are not as great as they appear to be and other crops could be equally attractive. This subject deserves careful consideration.

The resources of Santo Antão that are possibly underused or undervalued do not appear to be sufficiently abundant to provide an economic base capable of offering work or income to a large section of the population. The potential to exploit these

resources must therefore be evaluated with great care and realism. At the same time, a considerable effort must be made to seek productive activities that are generally independent of the island's natural resources. The development of the service sector is often quoted as *the* ideal solution for the near future. But strong international competition in this sector and the low level of professional qualification among the people of Santo Antão invite a measure of caution. A less risky approach would be to promote a diverse range of productive activities (including services) and to encourage a spirit of enterprise and private initiative.

2 THE DEVELOPMENT OF EMPLOYMENT OPPORTUNITIES AND SOURCES OF INCOME

The economy of Santo Antão is depressed due to poor natural resources and infrastructure (water supply, energy, etc.). Thus national and foreign investment and other development initiatives are blocked, a fact which is reflected in the shortage of employment for the economically active population.

The lack of employment alternatives has led to the direct intervention of the state, which has taken the role of major employer in order to head off possible famine. FAIMO guarantees employment to a significant section of the population which could not secure subsistence incomes otherwise. FAIMO is currently the largest employer on the island. This large-scale intervention by the state, along with the lack of complementary participation from the community, has led to an assistance mentality and a dependency on the state which hinders individual's capacity to participate and initiate, and is a disincentive for investment. The government is endeavouring to implement a conversion policy for FAIMO to overcome this situation, aiming to gradually eliminate the direct intervention of the

state and to stimulate the growth of civil construction, building and other sectors. This conversion of FAIMO will have to create employment opportunities for men and women outside the state sector, change mentalities and modify the relevant organisational structures.

A major obstacle for local and individual initiatives is the poor development of credit facilities. On the one hand there is a lack of business experience and failure to exploit the credit opportunities that do exist, and on the other hand a lack of adequate credit mechanisms to stimulate investment. For these reasons, interventions in this area should operate at two distinct levels:

- the raising of local people's awareness of the potential of credit,
- the encouragement of banking services and loan facilities.

The informal sector on Santo Antão, as a producer of consumer goods, still plays a lesser role in the development of the island's economy. This makes it all the more important that small family enterprises should be modernised, rationalised and made economically competitive, while technical training is moulded to the needs of the sector.

3 GENUINE COMMUNITY PARTICIPATION

The people of Santo Antão have taken part in numerous projects for development of the land, but this participation has been limited to the supply of a large, waged labour force, employed to carry out soil and water conservation projects, reforestation, road construction, etc.

However, the notion of participation should mean more than this: the local people should take control, decide their future and then work towards it. A first step in this direction was the introduction of democratic government in Cape Verde. The people of Santo Antão can now elect their

own representatives and influence major decisions on development policies. Over 80% of the 21,627 people on the electoral register used their vote in the parliamentary elections held in January 1991 (Official Bulletin, 25.01.91).

It is important that public participation is extended to other areas, especially considering: the dependence of many people on aid programmes; the notable absence of private or community initiatives in economic development; the conflicts of interests between some groups (e.g. crop farmers, stock raisers, etc.); the technical services working for development (e.g. reforestation); and the lack of interest shown by the general public for conservation, given that the environment is the source of all production and life on the island.

However much goodwill and care is invested in development activities by the national and regional authorities, the technical services of government ministries and the different development agencies (governmental organisations and NGOs), the target groups will only take responsibility for their own destiny if the proposed action comes to grips with their immediate needs and if they are convinced that in the short term they will benefit from their work and investment. The needs and interests of the different groups in society determine their level of participation in development actions. These needs and interests should be identified in cooperation with the people themselves, on the basis of a dialogue which will lead to a consensus and eventually the taking on of responsibility by the relevant groups.

The absence on Santo Antão of community organisations and interest groups that can contribute to a dialogue is often lamented. The various intervening parties (regional authorities, technical services, aid agencies) must, therefore, encourage and facilitate the founding of groups to operate as contributors and partners. Some such

groups already exist (cooperatives, 'Water Committees' in irrigated areas, etc.) but their current functions are relatively limited and do not offer a sufficiently broad base. Nevertheless, it may be possible to implement resource management structures based on these groups. Other groups have been formed recently though, for example parents' committees and an association of stock raisers. The former manage the financial and material resources made available to them through certain child aid programmes. The parents' committees are a first step in the process making local people responsible for the management of available resources, and a move towards the decentralisation of power. These experiences illustrate the possibilities for genuine community participation and deserve close consideration.

It should be emphasized that if Santo Antão is to achieve sustainable development, then close cooperation is essential between those directly affected (the local people), and the organisations which offer technical and financial advice and assistance. The necessary changes (in mentality, management of resources, etc.) cannot be unilateral nor can they be imposed. Santo Antão's history must not be overlooked; as the relatively recent experience of agrarian reform illustrates, changes are only possible if procedures are formulated in conjunction with the parties involved. At the time of the agrarian reform, the agricultural labourers took the side of the landowners because of the extreme dependence of the former on the latter.

4 THE INTEGRATION OF WOMEN IN DEVELOPMENT

Considering

- the responsibilities that women carry,
- the difficulties that women have to face,
- women's capacity to confront conditions that are often extremely difficult, especially women heads of household,

- women's responsibility to provide food,
- women's leading role in children's socialization and education

It is evident that women are a pillar of society and should be considered as active players in the development of the island. Development programmes for Santo Antão should actively include women and not consider them as passive recipients of aid.

When new strategies are defined, the specific problems and interests of women should be taken into account and their integration into development processes increased. Moreover, the possible repercussions of development, for both women and men, should be considered in order to avoid adverse effects or the creation of situations of dependency.

Programmes should be sensitive to the situation of women of different age groups. Without strictly defining the generations or their major concerns, it can generally be said that: older women are more concerned with day to day problems, e.g. feeding their families; more educated, younger women are more concerned with their future prospects and have a desire for change. Programmes should reflect, therefore, the needs of the present and the aspirations for the future.

Additionally: "Recognition should be made of the fact that participation and integration of women in the process of development depends on their opportunity to do so. Given that they are generally burdened by many tasks and obligations, women have little time available for activities linked to their own advancement" (Furtado, 1992).

5 INTERSECTORAL COMMUNICATION, COORDINATION AND INTEGRATION

Although several services and organisations are involved in the development of Santo Antão, there is not always a great deal of

communication between them and consequently little integration.

One state organisation may carry out an activity that has consequences for another state organisation's actions but there may be no coordination or even communication between them. This creates problems which are as yet unresolved. The situation is similar among the NGOs and aid donors to the island.

An example of this problem is the reforestation programmes for agricultural land, in which the purely technical agriculture and forestry services are separate from the social services which deal with education and participation of the community. The activities of the two services are often not coordinated and in some areas trees were planted although there was opposition from the local community. This issue could have been resolved or contained if more attention had been paid to the local people — their needs and their perception of their problems.

There are two aspects to the lack of integration. There is the matter of the attitude and training of the staff of the various services and organisations and also the question of having the resources necessary to achieve integration. Services are sometimes overloaded with activities and responsibilities.

There are many instances of complementary activities being undertaken without any coordination resulting in loss of efficiency and high costs. For example, socio-economic surveys are not coordinated nor easily accessible from one service to another. Socio-economic data is collected by the ministries of Rural Activity, Social Affairs, Health, Justice, as well as the Mother-Child Support/Family Planning organisation, Cape Verde Institute for Children, BØRNEfonden, UNICEF and others. There are at least ten instances that collect data for different purposes. A better indication of the socio-economic situation of the island would be formed if these efforts were coordinated, and data made gender

specific. A combined questionnaire could be used by each organisation for its own purposes and analysis could be coordinated. This would be very helpful, especially for organisations such as the Social Affairs Service which has a very broad remit but insufficient staff to carry out its operations. Such a combined study could pinpoint the most needy families to whom aid could be directed.

Other topics with common features could be dealt with similarly, e.g. family planning, health, kindergarten development, activities for young people no longer at school, women's issues, and education on the potential and limits of the island's environment.

However, the situation is changing. The current trend toward decentralisation and the creation of a regional authority charged with the island's development could be a crucial element in the coordination and integration of different activities. An example of this movement towards coordination is the setting up of a structure to oversee the protection of the rights of children and the functioning of kindergartens in Santo Antão. New environmental laws will probably require development organisations to forecast the environmental impacts of their programmes, including the ecological, socio-economic and cultural aspects. Thus the application of the law could stimulate communication between different services and the integration of their objectives and requirements.

6 INCREASES IN MATERIAL AND HUMAN RESOURCES FOR DEVELOPMENT MANAGEMENT

The men and women of Cape Verde are the country's principal source of production. Only the recognition of the value of human resources and investment in permanent training can provide the intermediate and higher grade personnel required for various activities.

Santo Antão has serious problems due to the lack of trained staff in the following areas:

- health care,
- initiation of social projects,
- implementation, monitoring and evaluation of projects and their environmental and social effects,
- education (teachers to guarantee a good level of schooling),
- technical assessment, processing and analysing data from the monitoring of poverty, the environment and the position of women.

There is a notable discrepancy in what is being done (with scarce human and material resources) and what could be done to overcome the worst aspects of poverty among the islanders.

Efforts to eliminate malnutrition, avoidable disease, illiteracy and to attend to the other basic needs of the local people obviously depend on the availability of qualified staff.

Financial incentives are necessary to overcome the shortage of suitable staff on Santo Antão, moreover the following actions must be encouraged:

- the decentralisation of staff from the two principal urban centres of the country, Praia and São Vicente, and the granting of broad powers to independent bodies, with the consequent transfer of financial, material and human resources;
- the partnership with local authorities for professional training in the areas of management, administration, accounting, social welfare, nursing, etc.;
- programmes to encourage companies to take on apprentices and the creation of schools for trades to give young people who have completed secondary education a viable option for access to the employment market;

- the specialisation of existing intermediate and higher grade personnel and the passing on of their skills to other staff. There is no potential for a 'career' on Santo Antão. There is no institutional framework of staff employment to offer the islanders or people from neighbouring islands prospects of promotion.

The nascent local inter-municipal body should gradually take on the personnel management of education, health and development project staff.

As a temporary measure it is possible and desirable to centrally define rules and incentives to assist the appointment of staff on the islands, while the local institutions foster conditions to attract and retain these personnel (houses, bonuses). It is only the transfer of management that will create a genuine 'employment market'.

A strong local authority, capable of successfully conducting development work, will obviously have to efficiently manage its human resources and provide basic assistance.

A nucleus of technical staff is vital to the development of the island, but unless the necessary incentives are provided to create this nucleus, the current situation will be perpetuated. At the present time there is insufficient technical support for the structures responsible for the difficult task of conducting effective development work.

The existing material resources of Santo Antão are generally obsolete and irrecoverable due to wastage and irrational use or distribution.

Financial resources are also a problem for the municipal and central authorities. Without sufficient financial resources, Santo Antão will not be able to acquire qualified staff for the various services. Specialised staff are required for the collection and processing of data on the environment, poverty and the position of women, and

also for the acquisition of vital materials and equipment for the efficient operation of services.

7 EVALUATION AND REVIEW OF LEGISLATION AND INSTITUTIONS

Legislation

A critical evaluation of all the laws and regulations dealing with the economic, social and environmental issues of Santo Antão is an integral part of the formulation of development plans and policies.

This is particularly the case for the laws protecting flora and fauna. The protection of natural habitats can greatly improve the protection of certain species. In order to be effective, the laws concerning the protection of the environment should be established in close cooperation with the communities who depend on, or use, the resources to be protected.

In a more general way, the effects of existing laws should be appraised in the light of the actual situation. For example, if the law considers men and women to be equal but investigations suggest that this is not the case in reality (as indeed this current profile does), then measures should be taken to ensure the law is implemented. Significant efforts should also be made to improve communication, i.e. improving knowledge of the law, explaining the objectives and benefits, accepting possible criticism from the public, etc.

Institutional aspects

Considerable opportunities have been created by the current process of decentralisation of decision making. If well-managed, this process will result in a significant improvement of existing development planning and better coordination of the different activities on Santo Antão. The potential to match development activities with the realities of the island is a great step forward. For example, the suitability of the policies to stimulate the flow of local agricultural produce to São Vicente (policies defining different roles of the islands, pricing policies, etc.) may be examined and, if need be, a new policy negotiated, possibly comprising all the Windward islands.

During the debates on the implementation and definition of the role of the authority responsible for the development of the island (currently the Santo Antão Municipal Association), special attention should be paid to the need to promote integrated development. In principle, an 'island authority' could be the ideal structure for an interdisciplinary service to control the various development activities and to evaluate, analyze and improve the current methods of allocation of natural, human and financial resources. This service should appraise development activities not only for their contribution to the economic development of the island, but also for their impact on the environment, poverty and the position of women.

APPENDICES
REFERENCES

Appendix A

ORGANISATIONS WHICH ASSIST WOMEN AND CHILDREN

The following organisations assist women and children either directly or indirectly.

AT NATIONAL LEVEL

Institute of the Female Condition (ICF)

In January 1993, a workshop on the integration of women in economic and social development was held in Praia, organised jointly by the government of Cape Verde, PNUD and the Canadian Embassy. The result was a commitment to establish an Institute of the Female Condition) with access to the government at high level. The ICF will represent all women and will formulate a plan of action combining women's needs and expectations. In addition, an important role was assigned to NGOs as approved participants, independent of ideological or party affiliations.

The imminent creation of the Institute of the Female Condition will address the needs of all women. It is vital that women, including those with few resources or little education have a place where they can participate in the search for suitable development alternatives.

Cape Verde Institute for Children (ICM)

The objective of the ICM is to ensure the observance of the rights of the children and young people of Cape Verde as set out in the Code for Minors in the Constitution of the Republic. In Santo Antão attempts are being made to create a Municipal Council for the Protection of the Rights of Children and Adolescents. This will be undertaken by the cooperation of public bodies and NGOs active in work with children. Its function will be to implement programmes to help those groups which are particularly in need of social welfare, such as: unemployed young people, families without resources, young mothers who are heads of household and have young children, the disabled, the alcoholics, the mentally ill, undernourished children and street children.

AT SANTO ANTÃO LEVEL

Third World Solidarity Action (ASTM)

For a year from May 1993, this NGO from Luxembourg will directly assist the setting up of a women's centre in Vila de Ribeira Grande. The priorities in relation to the needs of the women of the *vila* have yet to be established. ASTM has given assistance in the construction of the OMCV building.

BØRNEfonden

The objective of this Danish NGO is to develop the community through education and health projects and assistance to families. It operates a programme of sponsorship of children from poor backgrounds. Its endeavours to encourage relevant community activities selected by the parents of these children. Social workers assess the socio-economic status of families to identify the children to be sponsored. BØRNEfonden has made possible the sponsorship of 5,300 children in three years. The programme has reached almost all of the poor families of Santo Antão, providing basic aid in the form of school materials, school clothing, free medicine and hospital transport. The NGO runs 20 kindergartens, a primary school and a course on clothes making for which sewing machines have been provided. In the future it aims to train people to help families in matters of education, health and family planning. To this end the NGO has coordinated with the health services.

Its budget for 1992 was ECV 66 million (US\$ 850,000).

Caritas

Caritas is an organisation linked to the Catholic church to promote social welfare in accordance with the Social Mission of the Church.

Caritas seeks to stimulate solidarity and shared work to improve the living conditions of the most socially and economically disadvantaged sections of society. Its activities include projects for infants and women. The projects for women and girls concentrate on social and practical education, e.g. health, nutrition and the learning of handicrafts, mostly in rural areas. The centres are self-financing from the sales of clothing, embroidery and lace.

Programmes to construct community cisterns for the collection of rainwater are also being taken in hand.

A group of Catholic *Orionitas* nuns from Brazil administer a programme for young people, single mothers and wives of emigrants. There is also a church school for children aged 15 years who have not attained the level necessary to study in the public education system.

Red Cross

This organisation has constructed community centres and two kindergartens, one in Ribeira Grande and the other in Paúl. These assist working mothers who can leave their children in care. Each kindergarten takes 100 children aged between 4 and 6 years. They take 25 children from the families of officials and 75 children whose mothers work for FAIMO. Monthly contributions are made by parents, ECV 750 (US\$ 9.63) from the former group and ECV 75 (US\$ 0.96) from the latter. The organisation operates on a voluntary basis.

Close attention is paid to the health of the children and they are given medical care if necessary. The children are vaccinated in the kindergartens.

The Red Cross also gives first aid courses and administers projects for the elderly.

Aid Fund for Family Initiatives (FAIF)

This project began at the end of 1990, under the auspices of SARDEP, to provide small amounts of credit to enable businesses to be set up in activities such as stock raising, fish selling, baking, clothes making, etc. Two thirds of the funds are directed to women, as it is mainly women who carry out these activities; a further objective is to raise awareness of the value of women's contribution to household income. The loans are followed up by liaison workers. Problems have been encountered in the introduction of the scheme due to ignorance of the notion of credit and fear, especially by women, of not being able to pay back the money. The project deserves to continue however, being virtually the only way that women

activity. The Bank of Cape Verde does not give credits of small amounts to people with limited resources.

Santo Antão Aid Project for Traditional Fishing (PAPASA)

The objectives of PAPASA are the improving of the output and commercialisation of fishing. In the past, most attention was given to the first objective, i.e. to the fishermen. It is only in recent years that PAPASA has started to concern itself with the work of the women who play a vital role in the sale of fresh fish.

In 1991 and 1992, PAPASA organised courses for women on the subject of different methods of preserving fish: use of ice, dry curing, wet curing, smoking and production of fish meal. The courses also dealt with appraisal of fish quality and concepts of management.

The project is financed by Dutch Cooperation. The budget for 1993 was ECV 23,000,000 (US\$ 295,250).

Cape Verde Women's Organisation (OMCV)

This national NGO was founded in 1981 with the basic objective of "defending the specific interests of Cape Verdean women, promoting and contributing to their self-development and integration in the process of development of the country". In Santo Antão, there is a 'Centre for Women's Advancement' which is in the process of moving premises with the financial assistance made available from Luxembourg.

There is a kindergarten currently operating but which is also waiting to move into the new building. It is planned that the Centre will act as a meeting place for women from all sections of society. The Centre engages in activities in the field of social welfare, development of productive pursuits, rural development, health, literacy and aid to cooperatives.

UNICEF

This organisation runs an extensive programme on Santo Antão for the development of sanitation and the distribution of drinking water in rural areas. Furthermore it plans a series of studies which will have particular relevance to women. The topics of these studies are: domestic hygiene, diarrhoea, acute respiratory disease, breast-feeding and weaning, the pre-school sector (disadvantaged children, children not in pre-school education and children not attending EBE), and also a study on pig rearing, a task undertaken by women and children.

Appendix B

SANTO ANTÃO FLORA: ENDEMIC SPECIES

List prepared from Brochmann & Rustan (1987), Hansen & Sunding (1979), INIA (in preparation), Lobin & Zizka (1987), Van Melle & Delgado (1990) and Lobin (personal communication, 1993).

R: Rare species **VR:** Very rare species *****: Endemic species specific to Santo Antão

SPECIES OR SUB-SPECIES

FAMILY

<i>Aeonium gorgoneum</i>	CRASSULACEAE
<i>Aparagus squarrosus</i>	LILIACEAE
<i>Aristida cardosoi</i> COUT.	POACEAE
<i>Artemisia gorgonum</i>	ASTERACEAE
<i>Bubonium smithii</i> (synon. <i>Asteriscus smithii</i>) R	ASTERACEAE
<i>Campanula jacobea</i>	CAMPANULACEAE
<i>Campylanthus glaber</i> spp. *R	SCROPHULARIACEAE
<i>Carex antoniensis</i> *R	CYPERACEAE
<i>Carex paniculata</i> spp. <i>hansenii</i> *R	CYPERACEAE
<i>Conyza feae</i>	ASTERACEAE
<i>Conyza pinnosa</i>	ASTERACEAE
<i>Conyza varia</i>	ASTERACEAE
<i>Diplotaxis gracilis</i>	BRASSICACEAE
<i>Diplotaxis hirta</i>	BRASSICACEAE
<i>Diplotaxis</i> new species *	BRASSICACEAE
<i>Diplotaxis vogelii</i>	BRASSICACEAE
<i>Echium hypertropicum</i>	BORAGINACEAE
<i>Echium stenosphon</i> spp. <i>lindbergii</i> *R	BORAGINACEAE
<i>Euphorbia tuckeyana</i> R	EUPHORBIACEAE
<i>Forsskaolea procrudifolia</i> WEBB	URTICACEAE
<i>Fumaria montana</i>	FUMARIACEAE
<i>Globularia amygdalifolia</i>	GLOBULARIACEAE
<i>Gnaphalium candidissimum</i> (or <i>G. dealbatum</i>) var. <i>luteo-fuscum</i>	ASTERACEAE
<i>Gossypium capitis-viridis</i> VR	MALVACEAE
<i>Helianthemum gorgoneum</i>	CISTACEAE
<i>Kickxia brunneri</i> (BENTH.) JANCHEN	SCROPHULARIACEAE
<i>Kickxia dichondrifolia</i>	SCROPHULARIACEAE
<i>Kickxia webbiana</i> *	SCROPHULARIACEAE
<i>Launaea picridioides</i> R	ASTERACEAE
<i>Lavandula rotundifolia</i>	LAMIACEAE
<i>Limonium braunii</i>	PLUMBAGINACEAE
<i>Lobularia intermedia</i> spp. <i>intermedia</i>	BRASSICACEAE
<i>Lobularia intermedia</i> spp. <i>spathulata</i>	BRASSICACEAE
<i>Lotus brunneri</i>	FABACEAE

Lotus candidissimus
Micromeria forbesii BENTH.
Papaver gorgoneum spp. *theiresias* *
Paronychia illecebroides var. *illecebroides*
Periploca chevalieri
Phagnalon melanoleucum
Polycarpaea gayi WEBB
Sarcostemma daltonii
Sida coutinhoi
Sideroxylon marmulano BANKS ex LOWE R
Sonchus daltonii
Tolpis farinulosa
Torbanea bischoffi R
Umbilicus schmidtii
Verbascum capitis-veridis R
Vernonia cinerea var. *antoniens* *

FABACEAE
LAMIACEAE
PAPAVERACEAE
CARYOPHYLLACEAE
ASCLEPIADACEAE
ASTERACEAE
CARYOPHYLLACEAE
ASCLEPIACEAE
MALVACEAE
SAPOTACEAE
ASTERACEAE
ASTERACEAE
APIACEAE
CRASSULACEAE
SCROPHULARIACEAE
ASTERACEAE

Appendix C

ADDITIONAL TABLES OF CHAPTER 3

	Area (km ²)	Total number of inhabitants	Density (inhabitants per km ²)
Santo Antão	779	43,845	56.28
Ribeira Grande	166	20,851	125.61
Paúl	55	8,121	147.65
Porto Novo	558	14,873	26.65

Table C.1 Demographic density in the concelhos. After MRDF/MPC (1986) and DGE (1990, 1992).

Concelho	Areas	Urban areas	Rural areas	Mean family size
Ribeira Grande		4.95	4.91	4.92
Paúl		5.05	5.96	5.79
Porto Novo		5.33	5.39	5.37
Santo Antão		5.14	5.23	5.21

Table C.2 Household size in Santo Antão (number of persons). After DGE (1992).

Table C.3 Type of access to water for domestic use in Santo Antão. After DGE (1990).

Type of access to water	Number of families	% of families
Internal pipe (inside the house)	261	3.10
External pipe (outside the house)	438	5.21
Public water fountain	4,406	52.37
Spring	1,839	21.86
Well, bore hole	187	2.21
Levada (irrigation canal)	839	9.97
Water truck	251	2.98
Tank	67	0.80
Other	126	1.50
Total	8,414	100

Concelhos	State classrooms	Rented classrooms	Lent classrooms
Ribeira Grande	38	23	4
Porto Novo	34	4	15
Paúl	16	4	4
Santo Antão	88	31	23

Table C.4 EBE classrooms available in 1989. Source: Ministry of Education.

Concelho	Pupils per class	Pupils per classroom	Pupils per teacher
Ribeira Grande	29	52	29
Porto Novo	25	44	27
Paúl	31	60	31
Santo Antão	28	50	29
Cape Verde	31	62	34

Table C.5 EBE classes, classrooms, pupils and teachers in 1989. Source: Ministry of Education.

Concelho	80/81	85/86	88/89
Ribeira Grande	0%	10%	8.3%
Paúl	0%	0%	28.6%
Porto Novo	0%	0%	33.3%
Santo Antão	0%	6.25%	25.6%

Table C.6 EBC: Evolution of the rate of qualified teachers. After PDSA (1991) and data from the Ministry of Education.

Table C.7 EBC: Passing rate in Santo Antão and at the national level. Source: Ministry of Education.

	82/83	83/84	84/85	85/86	86/87	87/88	88/89
Santo Antão	40.0%	36.6%	37.6%	64.6%	56.2%	69.0%	73.1%
Cape Verde	42.6%	40.0%	43.4%	45.3%	57.9%	59.5%	68.0%

Table C.8 Illiteracy in Santo Antão in 1990. Source: DGE (1990).

Age class		Number of illiterates	Total population of the age class	% of illiterates in the age class
4 - 14	♀	2,494	6,615	37.70%
	♂	2,524	6,908	35.54%
	♀ + ♂	5,018	13,523	37.11%
15 - 34	♀	1,734	6,221	27.87%
	♂	1,369	7,718	17.74%
	♀ + ♂	3,103	13,939	22.26%
35 - 64	♀	3,286	4,175	78.71%
	♂	1,930	3,382	57.07%
	♀ + ♂	5,216	7,557	69.02%
65 and more	♀	1,287	1,521	84.62%
	♂	816	1,318	61.91%
	♀ + ♂	2,103	2,839	74.08%
Total Santo Antão 4 years and more	♀	8,801	18,532	47.49%
	♂	6,639	19,326	34.35%
	♀ + ♂	15,440	37,858	40.48%
Total Santo Antão 15 years and more	♀	6,307	11,917	52.92%
	♂	4,115	12,418	33.14%
	♀ + ♂	10,422	24,335	42.83%
Total Cape Verde 4 years and more	♀	63,979	155,699	41.09%
	♂	38,866	137,163	28.34%
	♀ + ♂	102,845	292,862	35.12%
Total Cape Verde 15 years and more	♀	45,223	103,331	43.77%
	♂	19,939	84,637	23.56%
	♀ + ♂	65,162	187,968	34.67%

Gender	Year	1980	1985	1990
♀		88%	58%	53%
♂		53%	43%	33%
Total Santo Antão		64%	51%	43%

Table C.9 Evolution of the rate of illiterate men and women (aged 15 or more) in Santo Antão (1980-1990). After PDSA (1991) and DGE (1990).

Year	Ribeira Grande	Porto Novo	Paúl	Santo Antão
1980/81	12	4	0	16
1985/86	63	47	37	147
1988/89	47	69	32	148

Table C.10 Number of literacy trainers (1980-1989). Source: PDSA (1991).

Years	Number of deaths (%)		
	Ribeira Grande	Porto Novo	Paúl
1974 - 1976	75.1	120.3	134.0
1984 - 1986	53.2	61.5	55.8

Table C.11 Rate of infant mortality (RIM) in Santo Antão. After De Boer (1991) and data from the Ministry of Health.

At the level of Santo Antão, the RIM was 90‰ in 1975 and 42‰ in 1988.

Table C.12 Evolution of the cost of education per pupil (EBE & EBC). Source: Ministry of Education.

1980		1987		1988	
Number of pupils	Cost per pupil	Number of pupils	Cost per pupil	Number of pupils	Cost per pupil
7,770	CCV 1.73 US\$ 35	7,307	CCV 4.06 US\$ 56	7,169	CCV 4.30 US\$ 60

Medicines	24%
Infrastructure and material	20%
Salaries	47%
Per diem	8%
Total costs	ECV 13,832,197 US\$ 197,602

Table C.13 Health services in Santo Antão: distribution of costs in 1990. Source: Ministry of Health.

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