Republic of Djibouti
Ministry of Housing, Urban Planning, the Environment and Land Management
Department of Land Management and Environment

First national communication of the Republic of Djibouti to the United Nations Framework Convention on Climate Change

Summary

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1. National situation

The Republic of Djibouti is situated in the Horn of Africa, between the tropic of Cancer and the equator, at the junction of the Gulf of Aden and the Red Sea. The country has an area of 23,200 square kilometres and a coastline 370 kilometres long. The terrain is craggy and features plateaux and plains as well as mountain ranges, the highest of which is 2,000 metres. As it is located in an area of tectonic plate separation, the landscape is largely made up of volcanic formations.

The Republic of Djibouti has a dry climate with a mean annual rainfall of about 150 mm. Average daytime temperatures vary between 17°C and 42°C and relative humidity is fairly high, between 40 per cent and 90 per cent. An analysis of climate patterns shows these levels dropping by between 6 per cent and 15 per cent further inland, while on the south coast there are wide fluctuations both in the annual average from year to year, and in levels within the course of the year. There are occasional catastrophic floods resulting in massive damage to people and property. The drought of 1986-1988 was followed in 1989 by a record rainfall of 692.9 mm, of which 543.6 mm fell in the month of April alone.

In 1991 the population of Djibouti was 520,000. Almost 82 per cent of the population live in urban areas and 65.5 per cent of those live in the city of Djibouti. The population growth rate is 3 per cent and the population is a young one, with 54 per cent under 20 years old and slightly more females than males. Most family units are traditional and composed of 6.7 individuals per family. Family sizes can be increased by the inclusion of extended family members, depending on specific social circumstances. It is estimated that, by the year 2010, the country’s total population will have reached 1 million. Moreover, the situation in the region as a whole has caused a large influx of refugees into Djibouti.

Poverty is a significant factor in Djibouti society. Some 45 per cent of the settled population is poor, and 10 per cent of these are destitute. The human poverty index as defined by the United Nations Development Programme (UNDP) is estimated at 40.8 per cent. This means that more than one third of the population of Djibouti is living below subsistence level.

The fact that economic activity is concentrated in the city of Djibouti has led to an exodus from rural areas and an influx of refugees, rendering accommodation very hard to find. With the exception of certain residential suburbs, the working classes live in corrugated iron and wooden-plank shacks, at a density of 500 inhabitants per hectare. Added to all this, the cities face other problems related to urban infrastructure, such as sanitation and the draining of rain water.

In 1996, 62 per cent of the country’s settled, working population was concentrated in the city of Djibouti, and the unemployment rate was estimated at 58.8 per cent. The service industry accounts for 88.3 per cent of all employment. The high level of unemployment is linked to the economy’s failure to create new jobs. Women, who form the majority of the employable population, are under-employed at a rate of 34 per cent. Furthermore, the formal sector is the largest supplier of employment, accounting for almost half of all registered jobs (44 per cent).

In the area of health, national policy is mainly directed towards primary health care, although the infrastructures are still inadequate and there is a shortage of medical staff. Life expectancy is only 50 years and the rates of child and maternal mortality remain high. The situation is all the more critical because of the influx of people from neighbouring countries attracted by the free health care.

In the field of education, despite the efforts made by the Government, the overall school attendance rate is estimated at a mere 40 per cent and in rural areas this falls to 17.3 per cent and as low as only 8.3 per cent for girls. The illiteracy level is 39 per cent, which breaks down into 26.1 per cent for men and 56.9 per cent for women. The lack of resources and the selective way that education is provided make for high drop-out rates: 58.1 per cent between primary and lower secondary level and 51.35 between lower secondary and upper secondary level. The informal sector with its Islamic schools and evening classes plays an important role in overcoming illiteracy among young people and adults. In view of the recognized gulf between education and the country’s actual social and economic situation, a specially adapted educational system has been developed.
In the primary sector, as water supplies are inadequate, the role of agriculture is limited, with only 388 of the 10,000 hectares of arable land under irrigation. Despite a production increase to 5,000 tons, basic food needs still cannot be met, and the country has to import large amounts of food from abroad. In the stock-raising sector the population is traditionally pastoral and concentrates mainly on nomadic herding, the sole source of subsistence in rural areas. The country’s total herd numbers over 1 million head, 89 per cent of these being sheep and goats. Some 90.5 per cent of the country’s territory is used for herding and the grazing routes through the country are determined by the situation of the watering points and the pasture areas. Fishing is a promising source of food. The country’s fish resources measure an estimated 18,000 tons, although annual production levels are still below 400 tons.

Water supplies remain one of the country’s biggest problems. With annual demand now exceeding 24 million cubic metres, only 85 per cent of this can be assured. The situation in the city of Djibouti itself, where more than 65 per cent of the population is concentrated, is particularly critical because of the over-exploitation of resources. Further inland, the scarcity and inadequacy of water points makes life very difficult for rural populations and hinders the development of agriculture.

The energy sector is heavily dependent on foreign countries for the import of hydrocarbons. The total demand for energy is 98,716 tons of oil equivalent (TOE), most of which is used in transport and by the housing sector, which account respectively for 39 per cent and 38 per cent of the total amount. The production of electricity is now in excess of 225,000 megawatts. Consumption in the industrial sector of Djibouti remains static at 6 per cent. In the rural areas, there is heavy exploitation of the biomass and this is a contributory factor in desertification. In the year 2000 this exploitation reached 15,600 TOE.

The economic scene is largely dominated by the services sector, which accounts for 71.9 per cent of GNP. The primary and secondary sectors account respectively for 13.1 per cent and 3.1 per cent of GNP. Because of the high energy and labour costs, industry accounts for only 3.8 per cent of GNP. The economy suffered a significant downturn between 1990 and 1996, followed by a recovery starting in 1997. This boost is largely due to an expansion of the transportation network, particularly in the ports. With this background, the new direction taken by the Government in economic and social development is towards State modernization, efforts to eradicate poverty and the consolidation of macroeconomic reforms, as well as the development of economic growth sectors such as the transportation network.

2. National greenhouse gas inventory

Emission and absorption levels remain relatively low. This is a result of the limited population size, the very low level of industrial activity and the sparse vegetation, which, nevertheless, is sufficient to absorb the full amount of greenhouse gas emissions. The national greenhouse gas inventory estimates the emission and absorption levels at 2,353.26 and 2,446.42 Gg of ECO₂, respectively. This means that all emissions are absorbed, leaving Djibouti with a negative balance of -93.16 Gg ECO₂ and making it one of the world’s greenhouse gas sinks. Djibouti’s sequestration capacity is therefore 103.9 per cent in relation to its greenhouse gas emissions.

Functioning thus as a greenhouse gas sink, the per capita absorption level measured 164 kg ECO₂ per inhabitant per year.

The energy sector, with 274.79 Gg ECO₂, accounts for 11.7 per cent of all greenhouse gas emissions. Its main components are the transport sector, which accounts for 45.7 per cent and the housing sector with 27.8 per cent. Industry itself only accounts for 7.2 per cent of the emissions from the energy sector. It is worth noting that the agricultural sector, which, because of the climate, has not been developed to any great extent, accounts for almost as high a level of emissions as the energy sector (206.37 Gg ECO₂).
Table 1: Greenhouse gas (Gg ECO\textsubscript{2}) emissions and absorption in Djibouti

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Absorption</th>
<th>Emissions</th>
<th>Total emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CO\textsubscript{2}</td>
<td>CO\textsubscript{2}</td>
<td>CH\textsubscript{4}</td>
</tr>
<tr>
<td>Energy</td>
<td>274.16</td>
<td>0.63</td>
<td>274.79</td>
</tr>
<tr>
<td>Agriculture</td>
<td>205.8</td>
<td>0.57</td>
<td>206.37</td>
</tr>
<tr>
<td>Forests</td>
<td>-2 446.42</td>
<td>1 764.47</td>
<td>71.82</td>
</tr>
<tr>
<td>Wastes</td>
<td>29.61</td>
<td>29.61</td>
<td>307.86</td>
</tr>
<tr>
<td>Total</td>
<td>-2 446.42</td>
<td>2 038.63</td>
<td>694.63</td>
</tr>
</tbody>
</table>

Although the level of emissions is relatively low, particularly in the area of wastes, with 29.61 Gg ECO\textsubscript{2}, and the greenhouse gas inventory classifies Djibouti as one of the world’s greenhouse gas sinks, Djibouti’s policy on greenhouse gas is geared towards greenhouse gas reduction. Efforts are being made to promote appropriate options and their implementation in the energy production, transport and housing sectors. Desertification control is another area in which the capacity for greenhouse gas absorption could be increased. The sound management of wastes would also be conducive to the reduction of greenhouse gas emissions.

Moreover, in all sectors, the inventory suffers from a lack of data, and the available data are not always very reliable. It has often been necessary to resort to default figures to calculate levels of greenhouse gas emissions. An analysis of the situation has identified gaps that need to be filled to improve the greenhouse gas inventory. Action needs to be taken in the areas of institutional support, data collection and capacity-building.

3. Vulnerability and adaptation

Climate projections up to the year 2050 are based on the ISP2a greenhouse gas emissions scenario and findings using the CSIRO-TR3, BMRC-EQ and HadCM2 global models. The MAGIC model shows that the minimum and maximum sea levels are +8 cm and +39 cm respectively, with an average increase of +20 cm as compared to the 1990 sea level. SCENGEN, an associated model, produces projections of rainfall, average air temperatures and cloud cover. These show temperature increases of between +0.6°C and +2.4°C. Where rainfall is concerned, the city of Djibouti and the interior of the country are treated as separate cases because of local variations in climate patterns. So for the former, rainfall variations lie between –10.9 per cent and +17 per cent and for the latter between –10.9 per cent and +3.9 per cent. It is worth noting, however, that these projection models are based on resolution scales that are too great for the relatively small size of Djibouti and it is therefore impossible to make any really accurate analysis on their basis. It is hoped that the international scientific community will be able to refine the existing models so that better projections can be made on a sufficiently detailed scale for Djibouti.

Working on the basis of results obtained from the study of climate change scenarios, the study of vulnerability and adaptation has proceeded to examine water resources and the coastal zones. These studies cover various aspects, partly using a quantitative approach and partly following the method recommended by experts in the relevant manual prepared by the United Nations Environment Programme (UNEP).

The study of the vulnerability and adaptation of water resources was carried out on the Djibouti watertable and on that feeding the Mouloud and Ali-Sabieh region. The first was chosen for its importance in supplying water to the capital, home to more than 65 per cent of the country’s population, and the second for its rural location. It must be noted, however, that the country is already facing serious problems in the areas of water supply and water quality. The results obtained from the use of hydrodynamic models, the country’s water balance and information gathered in the field can be summarized as follows:

- Water supplies will record a deficit at least equal to the decline in rainfall, causing a reduction in the quantity of water soaking into the watertable and the lowering of piezometric levels;
Given the country’s specific hydrogeological conditions, with a relatively high level of mineralization of its water, we may expect a rise in the salinity of the water at the pumps;

Sea-level rise, linked to the decline in rainfall, will mean a gradual increase in the influx of sea water into coastal regions;

Ultimately, in both urban and rural areas, the problems entailed in providing water for human consumption, agriculture, stock-raising and industry will become increasingly serious.

4. Response strategy

The Government’s response strategy has been to develop a programme of action based on the principles of the United Nations Framework Convention on Climate Change and on the guidelines set out in the country’s programme for economic and social development over the period 2001-2010. Among other things it includes the following major goals:

- To mitigate the effect of greenhouse gas emissions, bearing in mind that emissions in Djibouti account for only 0.045 per cent of all emissions across the world and that the country is in fact a greenhouse gas sink;
- To develop and implement adaptation measures to enable the country to cope with the negative effects of climate change on the natural environment.

4.1 Mitigation measures

Reducing greenhouse gas emissions by identifying and implementing mitigation measures is one of the goals of the Convention on Climate Change to which the Republic of Djibouti is committed. The 1994 greenhouse gas inventory showed that Djibouti’s biomass, although limited, was sufficient to enable the country to act as a greenhouse gas sink. In any case, given the country’s arid climatic conditions, population pressures and the effects of overgrazing, it cannot maintain this status indefinitely.

The mitigation measures advocated for the energy, transport and waste management sectors, and reforms in the areas of land-use and forestry, form part of the general government strategy for sustainable economic and social development. The development of the country’s geothermic resources, efforts to regulate the transport sector, reforestation and biomass conservation projects, together with techniques for the composting and recycling of wastes as energy sources, are key elements in Djibouti’s proposed programme of action. Where renewable energy is concerned, the geothermic project has already been launched, with support from the Global Environment Facility (GEF).

To succeed, these measures must be implemented as part of a comprehensive undertaking, involving capacity-building, the drafting of regulations, awareness-raising and information activities, and institutional strengthening. As a whole, all these measures are incorporated in the various sector-based proposals. In addition, the implementation of mitigation measures is heavily dependant on the availability of funds, which can cause serious delays to some projects.
Consequently, if the measures could be launched as promptly as possible, they would produce the hoped for results. Under those conditions, and if the actual results of the mitigation measures are close to these projections, taking as the baseline an emission level of above 1,100 Gg ECO₂, and looking ahead as far as 2030, emissions in Djibouti should remain under 250 Gg ECO₂ until that date. The country would therefore retain its status as a greenhouse gas sink until the year 2022.

4.2 Adaptation strategy

The adaptation measures proposed are largely derived from the 1999 water management plan. They include conduct of the requisite hydrogeological studies of the country’s aquifers so that the more detailed knowledge thus gained can lead to their improved management and protection. At the same time, if water needs are to be satisfied and solutions found to problems related to climate change, new sources of water must be identified and the water-tapping and collection system widely expanded. Facilities for the collection of surface water, the artificial replenishment of the groundwater table, underground dams and water recycling systems are all possibilities worth studying. Social and economic studies of water consumption are to be carried out, the effects of climate change are to be factored into the water management plan, and a network of technical facilities is to be set up to monitor climate change impacts.

The study of the vulnerability and adaptation of the coastal region focuses primarily on the city of Djibouti, an extensive urban sprawl and hive of economic and social activity, which is in the throes of rapid urban development and a marked population growth. After considering all the aspects relevant to the conurbation of Djibouti, the study then looks at the areas most liable to flooding, according to the conclusions derived from the various climate change scenarios.

Following the available calculation methods, the estimated flood levels would lie between 1.88 m and 2.78 m. These rising water levels would have a significant impact throughout the city of Djibouti, affecting between 26 per cent and 45.5 per cent of the population. Between 18 per cent and 30.8 per cent of homes would be affected, between 47.1 per cent and 52 per cent of economic activity, between 25.4 per cent and 30 per cent of public utilities and between 61 per cent and 76 per cent of its nature areas. Even allowing for a margin of error in the calculations, it goes without saying that these figures are indicative of the serious problems faced in any future urban planning and development in the city of Djibouti.

The following is a summary of the adaptation measures proposed by the study, which must form part of a comprehensive social and economic approach:

- Coastal protection;
- Strengthening of rock rubble breakwaters on the marine coastline;
- Development of the Ambouli wadi;
- Reforestation of dunes;
- Banking up the walls of landfills;
- Installing a drainage system for rainwater;
- Implementing regulatory and institutional measures.

Finally the two studies estimate the financial costs and propose adaptation measures, specifying the relevant costs where possible. Although the results of these studies and the estimates of the costs involved may not be exact, they bring out very clearly the highly adverse effects of climate change on resources and the environment.

The consideration of coastal, marine and land ecosystems, which looks in particular at mangroves, coral, fauna and forest areas, assesses their current state as fragile and vulnerable. Ecosystems and the population are already suffering the effects of human activity and also, in all probability, climate change. Given the gravity of the situation, the following measures are proposed:

- Creation of a national network of protected areas;
- Putting in place a follow-up programme for ecosystems;
- Examination of the vulnerability of ecosystems;
- Establishment of an integrated development programme for the Day forest;
- Conduct of institutional measures.

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