THE REPUBLIC OF SURINAME

NATIONAL REPORT
ON
THE IMPLEMENTATION OF THE UNITED NATIONS CONVENTION TO COMBAT DESERTIFICATION

SUBMITTED BY

THE NATIONAL INSTITUTE FOR THE ENVIRONMENT AND DEVELOPMENT IN SURINAME

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I. EXECUTIVE SUMMARY

The following report is produced by the National Institute for Environment and Development in Suriname (NIMOS), and complies fully with decisions ICCD/COP (2)/5 and ICCD/COP (1)/11/COP1/Add.1 of the United Nations Convention to Combat Desertification (UNCCD). As a Party to the UNCCD, and adhering to decisions aforementioned, the Republic of Suriname acknowledges it's obligation to inform the international community on the progress being made towards achieving the objectives of the UNCCD, and to make appropriate recommendations to better pursue these objectives henceforth. At the national level of implementation this report will serve as a guide for the further development of policies, among which will be the formulation of the National Action Plan to effectively deal with the phenomenon of desertification and land degradation. In preparing this report the views of key actors at the national level have been observed and subsequently included. This was done after a consultative process, which culminated in a special workshop to discuss its main content.

The complexity of the phenomenon of desertification and land-degradation has evolved as an issue of both national and international concern, and is increasingly being recognized as an issue that requires immediate and decisive political action. While the level of awareness and knowledge about desertification and land-degradation is fairly recent at the national political level, the phenomenon is by no means a new one for Suriname. In often-dramatic ways, government, private sector and communities are seen wrestling with the effects of years of neglect stemming from inappropriate land-use and land-use management practices. This is particularly evident in the coastal zone where soil erosion caused by decades of unsound agricultural practices is wreaking havoc to large tracks of land. In the hinterland, the economic practices of small-scale gold mining and timber logging, over the last decade, have further complicated the rate of erosion and land degradation. Finally, note is taken that the heightened frequency of droughts in recent years due to climate change is slowly but surely compounding the overall situation.

While the phenomenon of desertification is not considered an immediate issue of concern in Suriname, land degradation is clearly becoming increasingly problematic.

With the ratification of the United Nations Convention to Combat Desertification (UNCCD) in August 2000, Suriname has joined the ranks of countries in the world that are obliged to pursue policies that will lead towards a more sustainable path for future development.

1. GENERAL INTRODUCTION

The Republic of Suriname has become a Party to the UNCCD in August 2000. It is understood that one of the main objectives of this convention is to offer countries a framework for national, regional and international co-operation, in order to combat the causes of land degradation and the negative consequences of drought. This objective is to be facilitated through an innovative mechanism in the form of a National Action Plan. This plan will seek to include, among other, strong partnership agreements between affected countries and the countries of the international donor community. The stakes are mutual, and it serves the "cause" well if understood in that context. At the current stage, it is understood that countries produce a National Report on the known status of land degradation and also of the implementation of national activities.

The Republic of Suriname is located on the Northeastern Coast of South America, between 2°-6° Northern latitude and 54°-58° Western longitude. The land surface is about 164.000 $km^{2,}$ of which 90% is classified as tropical rainforest. The country borders the Atlantic Ocean in the North, the Federative Republic of Brazil in the South, Department du France in the East, and the Cooperative Republic of Guyana in the West. The main rivers Marowijne and Corantijn, historically establish the borders in the east and west respectively, and in the south the watershed between the Amazon basin and the basins of the Suriname rivers. As such, Suriname takes a central position within the Guiana Shield, which stretches out from the Amazon mouth in the East all the way to Orinoco in the West. The capital of the country is Paramaribo, and is situated on the left bank of the Suriname River.

The largest portion (about 80%) of the total land surface is part of the deeply weathered and eroded Precambrian Guiana Shield, consisting of crystalline basalt basement complex. This part of the country, also called "hinterland", is undulating, hilly and mountainous, varying in height from 50 to 1230 meters above the mean sea level. The relatively thin topsoil layer, under-laid by granitoid rocks complex, varies in thickness from less than 1 meter on the slopes of hills and mountains to some meters in the valleys. The soil consists of coarse sandy loam to sandy clays intersected by coarse sand, sandstones and gravel. The area is well drained and covered for about 90% with tropical forest. In the northern direction, the Cover Landscape or Savanna Belt is found, ranging in height from 10 to 50 meters above the mean sea level. The soil of this belt consists of bleached and unbleached sand and is infertile. Lower downstream this belt the Old and young coastal plains are found deposited on the top of the Precambrian bedrock in the periods Pleistocene and Holocene respectively.
The Young Coastal Plain borders the Atlantic Ocean in the north and the Old Coastal plain in the south, having soil types ranging from sand (shell), clay (ripened and unripe) to peat. Along the coastline and estuaries, where alluvial sediments have been deposited, large tracts of mangrove forest are found. Going land inward the alluvial deposits are gradually thinned out and become confined in narrow zones and isolated patches in present river valleys, at heights ranging from 1-4 meters above mean sea level. The extensive marine clays of the young coastal plain, intersected by narrow sand and shell ridges, comprises brackish to fresh water swamps with floating peat layers up to 2 meters thick. Near the coast, the clay may have a thickness up to 25 meters. The Old Coastal Plain, found between the Young Coastal Plain and the Savanna Belt, lies about 2-10 meters above the mean sea level. The northern part of the Old Coastal Plain consists of eroded sand ridges, while the rest is a dissected plain of silt loams and silt clays, having moderate to poor fertility. At several places along the main rivers south of the Old Coastal Plain, sandy to clayey river deposits, locally underlain by gravel are found in terraces at elevation 4-20 meters above the mean sea level.

The climate of Suriname is tropical, humid and warm, with daily average temperatures between 26^0 and 29^0C, whilst the average variation of the daily temperature ranges between 7^0-8^0C. The annual average temperature for the capital Paramaribo is about 27^0C with the lowest occurring in January (on average 26 ° C) and the highest in October (on average 31° C), which is also the warmest month of the year. However, it should be noted that a rising trend of temperature has been observed for the capital Paramaribo, which is equal to about 0.6^oC over the last 30 years.

Based on existing rainfall data two rainfall seasons can be distinguished throughout a year, of which the shorter one is rather irregular and sometimes hardly occurs. About 50% of the annual rainfall

occurs during the four month long wet season, lasting from April to mid August, and about 20% in the short wet season during December and January. The remaining annual rainfall occurs in the short dry period, February-March, and the long dry period from mid August–December. Extreme dry periods occur during those years when the short rain period does not occur or is extremely short (less than a month). In these cases the dry periods are combined lasting for 6-7 months. In most cases the El Nino events coincide with the extreme droughts in Suriname exacerbating the entire situation in the country. The average rainfall at Paramaribo, taken generally as the representative value for the country is about 2,200 mm.

There is a notable variation within the territory which can be distinguished as 1,500–1,750 mm in the coastal strip, 1,750–2,000 mm in the north western part of the country, 2,000–2,250 mm in the north and west of Suriname, 2,250–2,500 mm in the southeast Suriname, and 2,500–3,000 mm in the central part of Suriname. These variations are due to the geography of the central part of the hinterland. Evaporation in Suriname is relatively high with a mean monthly average of about 142 mm and a mean annual of 1700 mm. Maximum evaporation corresponds with the dry seasons of the year. The mean wind speed is 1.3 Beaufort with a maximum occurring during short and long dry seasons (1.6 Beaufort). At the coast the wind speed is 3-4 Beaufort during the day, becoming gradually mild during the nocturnal hours in the interior.

As a former Dutch colony, Suriname's economy was largely based on agricultural production such as sugar, coffee, cacao, tobacco, wood, cotton, balata and citrus meant for the Dutch kingdom. These activities were generally concentrated in the coastal area, along rivers and in estuaries. Today the main agricultural production evolves around rice, bananas, vegetables and fruits, fishery and aqua culture, covering an area of about 50,000 hectares, of which 48,000 hectares for rice alone. The major economic activity since the Second World War is bauxite mining, which is carried out by two foreign multinationals (Suralco and Billiton). This sector contributes anywhere between 50-80% to the countries foreign revenues, and is therefore the mainstay of the national economy. During the last half of the twentieth century, production of crude oil commenced under the auspices of the state owned oil company (Staatolie), which is concentrating its activities on shore of the coastal plain. Small-scale Gold mining is also now an increasingly important economic activity, taking place mainly in the hinterland of Suriname. These activities are resulting in relative large-scale pollution of surface and ground water. It is also observed that these activities contribute to erosion, species extinction, degraded landscape, damaged and polluted environment.

The total population of Suriname is about 450.000, with the largest concentration (70%) residing in the capital-city Paramaribo. Suriname is comprised for about 98% of descendants from Africa, Asia (India, Indonesia and China), and Europe. Initially brought in as slaves and indentured labor to run the plantation-based production system during the early phases of Dutch colonial rule. The original inhabitants, the Amerindians, presently comprise about two percent of the total population. Together with the descendants of slaves (Maroons), they form the inhabitants of the country's hinterland. In the coastal zone the main ethnic groups are the Hindustanis (descendents from India) and the Creoles (descendents from Africa and those of mixed blood), followed by the Javanese (descendents from Indonesia), and the Chinese (descendants from China).
The country is to be considered culturally plural, ethnically diverse and multilingual with Dutch as the official language. However, the lingua franca "Sranang Tongo"and English are widely spoken.

The oriental languages brought over from India, Indonesia and China are also spoken and/or written by members of the social construct. All the major religions of the world - Christianity, Hinduism and Islam - are practiced alongside traditional African tribal rituals. Life expectancy for males is about 64.7 and for females 70.1 years. The rate of population growth for the Suriname has declined over time due to migratory factors, but has stabilized since 1995 at around 1% per year.

1.1. Affected areas and stakeholders

At present one of the main environmental concerns in Suriname is related to decades of inappropriate land-use and land-use management practices. In the coastal area, encroaching land degradation is primarily the result of environmentally inappropriate economic activities, in particular agricultural farming practices, petroleum exploration, and mining of sand, - shells, - and bauxite. In the hinterland land degradation is mainly the result of timber logging and small-scale gold mining. These issues and concerns are not being adequately addressed due to poor institutional framework and the absence of proper environment protective legislation.

1.1.1 Agriculture

The agricultural sector which is the most important economic sector for the majority of people in the coastal area is experiencing serious decline as a result of practices that lead to land degradation. The traditional polities of allocating land for agricultural purposes on soils that are not suitable for agriculture, such as brackish clay soils, poorly drained and less fertile soils, is named as the leading cause for erosion and land degradation. The evidence is most obvious within the irrigated rice and banana cultivating areas. In the rice sector evidence is pointing to the irreversible destruction of the upper soil structure of areas previously under cultivation. Moreover, pesticides drained from these fields into wetlands destined for swamp and river fisheries are also having negative environmental impacts. The unregulated use of agro-chemical pesticides is resulting in topsoil and water pollution. Residues of the agro-chemicals applied in the coastal cropping areas are found in the fresh and brackish water ecosystem, exacerbating further the threat of irreversible land degradation on a long term.

1.1.2. Watershed management

In the main rivers - Suriname, Saramacca, Marowijne and Tapanahony - a number of different activities are taking place, which are bearing a negative effect on the quality of the land. Mentioning is made of gold mining and timber logging for which these rivers are used, and which is resulting in water pollution and erosion. The numerous villages of Maroons and Amerindian communities, which are settled along these rivers, invariably are suffering the most. First from the “hit-and-run” economic practices from the small-scale gold miners, and second from the changed environment, including degraded water quality, exhausted fishery resources, and increased malaria causalities. Such human interventions affect the entire river basin, which, if not managed properly, will cause further harm to the entire natural and socio-economic system of the basin. Today, the need for watershed management is inevitable for ensuring the sustainable development of the region.

1.1.3. Land degradation in the coastal zone

In Suriname the mangrove forest provides important natural protection of the coast, river estuaries, and lower river courses. At places where deforestation of coastline protecting mangrove forests have taken place, as for the conversion into agricultural land or housing projects along the coast and outer river banks, shoreline erosion has accelerated drastically. The costs of now having to safeguard and maintain the coastline through artificial barriers are proving to be extremely costly. Presently, erosion processes are found in the areas of Commewijne, Wanica, Coronie and Nickerie.

Inland subsidence and siltation processes cause considerable negative impacts on the natural, as well as man made landscapes, and on the ecology of both. Next to this, sea-level rise may be expected in the future. Construction of freshwater extraction canals and/or polders in ocean drainage basins prevent the natural flow of freshwaters towards brackish mangrove forest, which are important nursery grounds for marine fish and shrimp in mangrove forest tracts in the coastal zone.

It is being observed that deforestation as a result of mangrove forest loss for aquaculture, excavation of sand and shell beaches for housing projects, and exploration of oilfield development are threatening the natural coastal functions. Furthermore, improper road constructions parallel to the coastline impede the natural freshwater flows into the mangrove ecosystems resulting in more degradation and improper functioning. These negative impacts of the socio-economic development in the coastal zone amalgamate the destruction of the relatively pristine costal zone.

1.1.4. Tropical forestry

About 80% of the Suriname territory is covered with tropical forests, of which an unknown part has been granted as concessions for purposes of logging and mining. However, while environmental impact studies with respect to forestry in Suriname are in the making, logging of large-scale forest concessions in the hinterland of Suriname are causing inevitable damage to the forest ecosystems. In particular, felling and skidding are having a very negative impact on the regeneration of timber species. The use of heavy logging equipment is also leading to the unnecessary destruction of the upper soil structure, especially of the weak waterlogged soils. Under these circumstances, erosion increases as vertical penetration of water is hampered and surface runoff is enhanced. The disturbance of soils along bodies of water is particularly harmful, because it also provokes bank encroachment. The ad hoc approach towards issuing concessions for loggings and mining purposes in the hinterland forms a major obstacle for rational use and sustainable development of this resource. In addition, lack of adequate legislation, monitoring and enforcement facilities, trained personnel, and other technical equipments, is exacerbating the degradation of the tropical forestry. The realities of the situation are well known to a number of international organizations, NGO's and government institutions. However, so far little has been done to mitigate the adverse impacts of the human interventions.

1.1.5 Mining

Starting around 1916, bauxite mining has evolved as the dominant economic activity in the country. Two foreign multinationals, Suralco (Suriname Aluminum Company) and Biliton (Billiton Maatschappij Suriname), are at present exploring the bauxite reserves in the (old) coastal zone. It has been observed that the main mines will be exhausted around the year 2007. Until now a total

area of over 100 sq km has been excavated. Parts of this area are currently being rehabilitated, though planting of trees. However, the larger part is still waiting for rehabilitation. It appears that new efforts are being made towards the rehabilitation. In this regard, mentioning is made of the role of the University of Suriname, on behalf of the Suralco multinational, in finding solution for the rehabilitation of these exhausted mined areas. For transport purposes, mentioning is made of the construction of a canal, connecting the Suriname River with the Para River at Para Doorsteek. It is pointed out that this intervention has caused silting and portions of the rivers being overgrown with vegetation, resulting in drainage problems in the entire downstream area of the Para River. The mining activities also have an impact the drinking water situation in the coastal area, damaging the aquifer, which provides drinking water to the inhabitants of the capital city of Paramaribo.
Sand and shells excavation is occurring all along the coastline beaches (Braamspunt), the inland ridges of Coronie, Kwatta, Charlesburg, and from the productive areas with high agricultural potential in Commewijne, Wanica and Saramacca. These activities, however, are leaving behind deep pits filled with water. This creates, in turn, the conditions for outbreak of infections and diseases, whilst impacting negatively the ecosystem of the immediate area.

With regard to oil production, it is pointed out that the State Oil Company Suriname (Staatsolie) is granted the exclusive exploration and production rights of the total onshore and offshore sedimentary basin of Suriname. Oil exploration takes place in the north of the Saramacca District, but which also has large ecological value and potential for both indigenous and boreal birds. The latter visit the region annually during the winter periods in the north. Consequently, drained coastal wetlands for oilfields development will prevent the natural flow of freshwater towards the coastline. This will damage the mangroves zone, which also acts as nursery ground for marine fish and shrimp.

In the early 1990s the attempts were undertaken to turn the entire Greenstone Belt as gold “reconnaissance concessions” to small-scale gold miners, who started immediately with commercial mining. Illegal gold mining upstream of the upper Coesewijne River causes pollution in the river catchments, where internationally threatened Manatees, Giant Otters and Spectacled Caimans are observed. Illegal gold mining also takes place within the Brownsberg Nature Park, causing land degradation, water pollution, and serious damage to the environment of the Nature Park.

The most obvious environmental impact of small-scale gold mining is damage to the forest, land, and riverbeds, resulting in soil erosion and high degrees of suspended solids in tributaries of the creeks and rivers. Less obvious is the (potential) mercury poisoning to workers and mercury contamination of gold mine drainage waters affecting downstream communities.

2. Coordinating process of the UNCCD in Suriname

2.1 Strategies and priorities

Decades of developmental policies based of mining and agriculture are beginning to take its toll. The government faces new challenges, as large-scale agricultural practices on increasingly exhausted land are being continued and even extended. In addressing these challenges, the government faces the serious dilemma, which includes the inability of existing institutions to manage, monitor, control and resolve the relevant problems regarding all forms of land degradation within the country. Moreover, the land-use and land-use management is fragmented among a number of ministries and agencies. There is no national legislation framework or defined policy for integrated land-use management. Likewise, there is currently no mandate by responsibility agencies to coordinate their activities. This means that land-use planning is occurring on a sectoral basis, and does not include the socio-economic and environmental issues as being crosscutting through sectors. In addition, there is a noticeable difference in land tenure between the coastal area and the interior. Land titles within the interior are not addressed, while the land titles used in the coastal area (lease, rent and property) are not applicable within the interior, that is characterized by its typical customary practices of indigenous communities (e.g. shifting cultivation).

In an effort to address the challenges faced in the area of land degradation, the following steps have been suggested to be undertaken:

- national framework legislation. This framework will have to include all the necessary provisions to overcome existing shortcomings at all levels. In addition, future developments regarding land-use and land-use management should be taken into account.
- raising awareness. The overall awareness of the populations is relatively low, which perpetuates land degradation in the country. In order to reverse this trend a long-term awareness program is needed.
- equipment and training. For monitoring, controlling and analyzing purposes appropriate technical equipments and related human skills are required.
- institutional strengthening. The institutional capability is not fully development at the moment, which, if not taken in consideration will impede the future developments of other sectors. Therefore, attention should be in strengthening the institutional capability for proper managing and coordinating the ongoing and future activities.

2.2 Institutional structuring and policies for implementing the convention

With the ratification of the UNCCD in August 2000, under auspices of the National Council for Environment as technical focal point, the implementation of the convention is a responsibility of the National Institute for Environment and Development (NIMOS). This institute has been established in 1998 by presidential degree and is residing within the Cabinet of the President of the Republic. The specific tasks of the Council are to provide advice on environmental issues to the relevant institutions and organizations, including governmental departments and NGOs. Recently, the institute is obliged, among other, to report the ongoing developments to the Ministry of Labor, Technology and Environment.

The council consists of ten members, composition of which consists of five members from the government of different areas as welfare, planning, economic development, biodiversity, and sustainable development; one member from the private sector; one representative from the trade unions; one member on behalf of the maroon community; one member from the indigenous community and one member from the consumer organizations. Two technical advisory bodies are supporting the council on biodiversity and climate change.

The National Institute for Environment and Development in Suriname, together with the Ministry of Labor, Technology and Environment, are at the moment the mechanisms through which the Council reaches its decisions, regarding the issues on environmental policies. The Institute is steered by a Directive Board, named by the President. The Directive Board is the formal mechanism of supervision overseeing the NIMOS. The Board is made up of minimum three and maximum seven member.

This current environmental management structure, as outlined above, facilitates the implementation of the three conventions, UNFCCC, UNCBD and UNCCD. In addition this structure allows for rapid responses in critical situations.

The implementation of aforementioned tasks requires the strengthening of human capacity in the area of networking, consensus building and awareness raising. In this regard, the NIMOS scientists have been trained over the course of two years. In addition, networking structures have been set-up, and are working in conjunction to raise the awareness of peoples at all levels. At present, efforts are being made towards having a fully developed national environmental law.

The Surinamese government, the Inter American Development Bank (IADB) and the European Union (EU), is funding the NIMOS. The project is currently in the end of phase one, and is now waiting for funding to enter into phase two.

The NIMOS is projected to have eight offices, from the four which are currently operational (box 1). The staff of NIMOS consists of ten people, six of which have their roots in scientific education. These scientists reside within the offices of environmental and social assessment, environmental monitoring & enforcement, legal review, and administration. The remaining personnel provide support services within the office of administration.

Box 1: offices within the NIMOS

Environmental planning
Environmental monitoring & enforcement
Environmental and social assessment
Legal services
Public education & outreach,
Environmental research
Funding & investment
Administration

Since its establishment as national environmental management structure, the NIMOS has developed the necessary technical capacity, among other, to disseminate relevant information to existing networks of stakeholders (NGO's, industry etc.). The philosophy adhered to be that the dissemination of relevant information would raise environmental awareness of the stakeholders and consequently simplify the decision-making process within the country. One way through which this has been done is through the Inter-ministerial Advisory Committee (IMAC), which disseminates environmental information to the different sectors, including the ministries. The IMAC meetings are

held on a monthly basis, and are attended by the executive directors of the corresponding ministries. Other ways for disseminating information are public communication and presentations, as well as media and open-house informal sessions within the NIMOS.

As mentioned earlier, the NIMOS is the national institute responsible for implementing the international conventions and agreements. Presently efforts are being made to finalize the UNFCCC-Initial National Communication, UNCBD National Biodiversity Action Plan, and Ozone National Country Programme. Previous efforts have produced the State of the Environment report (in press). Still ongoing are the Forestry Sector Assessment, Laboratory Survey and the National Environmental Law.

2.3. Implementation of the recommendation of the Committee on science and technology.

To implement the recommendations of the Committee on Science and Technology, the NIMOS has embarked on the preparation of a regional workshop on Benchmarks and indicators. This regional training workshop will be held during the period 27-30 May 2002, in Paramaribo. The main objectives of this workshop are:

- educating participants in using of scientific data for monitoring the status of desertification;
- assisting the Conference of the Parties in evaluating or assessing the effectiveness of national efforts to implement the UNCCD Convention.

Realization of these objectives will provide a valuable avenue on the implementation of the UNCCD at the national and regional level, while enhancing awareness regarding land degradation overall. Since Suriname is covered for 90% with forests, flora and fauna, it is essential to develop its own benchmarks and indicators. At the current stage Suriname is not capable in dealing with desertification processes and its phenomenon, and therefore is in need of an early warning system for providing a preventive tool for further destruction of its flora and fauna, and to combat land degradation if necessary.

With respect to combating land degradation, Amerindians and Maroons have played historically an important role for decades in Suriname. Their knowledge pertains particularly practicing of shifting cultivation techniques on the agriculture fields in the hinterland. Further detailed studies about these techniques and implementations can have a valuable contribution in combating land degradation.

The degree of success in preventing further land-degradation includes the rapid response on changes, and in the successful utilization of gathered scientific data. Much will depend on the handling of information, facilitating the dissemination to relevant stakeholders, and the role of institutions to carry the process further

3. RESOURCE MOBILIZATION

3.1. Financial Resources

At the national level, efforts are being studied by the NIMOS to establish proper mechanisms for augmenting the availability of resources in the protection of the environment. Much will ultimately depend on the environmental legislation, currently in the make under auspices of this Institute. It is suggested that in the future revenues from the national budget will go into a specially created fund for the protection of the environment. Among the objectives of such a fund will then be, among other, to support the local communities initiatives in sustainable natural resource management and development.

3.2. Technical and Financial Cooperation

At the international level, financial contributions in the form of projects and otherwise contributions will remain for the foreseeable future an integral component in the national effort to deal with the phenomenon of land degradation.

3.2. Capacity Building

While Suriname is blessed with abundant rainfall, which is serving as a safeguard against extreme problems related to desertification, it is clear that increased pressures on the natural resources are resulting in land degradation. This trend is likely to continue if appropriate measures are not taken.

At present there are several institution and organization that deal with the question of strategies for proper land-use and land-use management. As we have seen, these range from government ministries, research institutions, NGOs, and numerous grass-roots organizations. While all these organizations adhere to specific sets of strategic interests, there are many levels of overlapping in their activities. The general constrains faced by these organizations is their general lack of coordination and networking capability, weak financial and human resource base, weak information base, ad hoc research and support base, and often a lack of government recognition. The very few national environmental conservation experts are thinly spread over the various ministries, NGOs and research institutions.

At the local level, particularly within the different communities in the interior, the level of awareness about the environment is considered low. This is mainly due to lack of information reaching these difficult accessible areas of the region. In the coastal zone, on the other hand, the rate of awareness is starting to increase.

In this context, the NIMOS is playing an active role in campaigning, public awareness, organizing workshops, publication and dissemination of information by means of television and radio. Short- and long-term capacity building shall hence be promoted through:

- public participation involving local communities, private sector, women groups, and youth organization;
- dissemination of scientific as well as traditional knowledge and practices, institutional know-how, and application of relevant environmentally sound technologies;
- training opportunities for policy makers, private sector entrepreneurs, managers, and others who have a responsible role for the collection, analysis, and the dissemination of relevant data;
- application of early warning information on drought conditions, especially in the area of food production;
- development of specific programs and projects geared at combating land degradation, including those that specify the use of alternative energy and ways to work the land.
- enhancing the role of existing national environmental institutions along with strengthening the strategic planning and management capability of government ministries;
- enhance visitors exchange between countries having similar problems;
- establishing of a network of regional educational and training centers to combat desertification and mitigate the effects of draught.

3.4. Linkages and synergies between conventions

With the creation of the NIMOS as modern environmental management structure, Suriname has placed itself on the forefront of implementing the three conventions UNFCCC, UNCBD, and UNCCD. As technical focal point the NIMOS is implementing the conventions in order to augment national efforts towards enhancing the sustainability of the environment and poverty reduction.

With regard to the three mentioned conventions, much effort is being done to ensure compliance with the stipulations established by the Conference of the Parties. In terms of the UNFCCC, a First National Communication is being formulated which considers the serious ramification in terms of threats to human and natural systems. The convention deals primarily with the build-up of greenhouse gases such as carbon dioxide in the atmosphere, rising temperature and changes in rainfall patterns, as well as sea level rise. The UNCBD has as main objective the conservation of the earth's natural environment.
As such, the convention covers every aspect of the biological diversity, including genetic resources, species and ecosystems.

The linkages between climate change and biological diversity and between the UNCCD is increasingly recognized. Most noticeable is the interaction that exists between forests and climate change. This is one of mutual effects and dependency, as is the link between forests and biological diversity, and between forest and desertification. On the other, combating deforestation and desertification not only reduces net carbon dioxide emissions and the loss of biodiversity, but also helps in defining a more effective strategy for sustainable development.

The NIMOS continually seeks to harmonize the national efforts towards a more efficient implementation of the conventions. The goals and objectives of the conventions come together in efforts to maintain the biological habitat, protecting the soil and keep its fertility, safe-guard the water resources, and enhance proper land use and land use management in order to ensure the sustainable use and rehabilitation of soil, especially when exploring industrial activities.

Apart from linkages, there are general components that overlap between the conventions. These are:

- **public awareness and education**.
  The principles of the conventions are diverse and usually unknown to society. The issue of awareness raising is important to gain understanding of the civil society, and most important, to educate them to prevent damage to the environment.

- **public participation**
  the importance of public participation varies between the conventions. However, public participation processes are usually the key to success for implementation of conventions.

- **data gathering, inventories and information system**.
  The organization of information in a format that can be used for analysis, monitoring and predictions is the basis for the implementation of the environmental principles. In addition it stimulates the development of useful tools.

- **training and capacity building**
  Conventions outline new concepts and approaches, and these needs to be accepted and carried by strategic persons within the country. The “change” of thinking” strikes sometimes against the thematic education methods, performed by academia and others.

Suriname is defined primarily in the context of its tropical rainforest and biological diversity. Its forests count high within all three conventions. Preserving the forest serve the climate change because of the sinks. It also serves the CCD because removal of the biological cover and the compaction- and movement of the soil by (for example heavy logging) is known to cause disruptions in the ecosystems functioning, soil structure and fertility. The expected dryer conditions and higher sea level rise due to climate change will further cause the depletion of nutrients, so that badly-managed tracks of land will be further prone to land degradation. Conservation measures need to be taken to protect the environment to dramatic changes.

4. Plans and Measurements for Implementation of the UNCCD

In order to implement the Convention to Combat Desertification, a number of measures are in the making. Foremost will be the making of the National Action Programme. The approach will be geared towards full inclusiveness of all the relevant stakeholders, while at the same time taking into account the recommendations made by the Commission on Science and Technology of the UNCCD.

In the process to develop a National Action Plan a number of recommendations for implementing UNCCD will be considered. These recommendations will include further guidelines for, among other:

- Proposals for sustainable environmental management of the natural resource base, without compromising the long term viability;
- Actions at the national, district, community and neighborhood level in order to promote the conservation and sustainable use of the biodiversity;
- To develop increasing capacities, education, public awareness, technical, scientific corporation and financial resources and mechanisms.
- Strengthening of the institutional and legal frameworks.
- Strengthening and/or establishing information, evaluation and follow-up systems in areas prone to desertification and drought, taking into account meteorological, hydrological, biological, soil, economic and social factors.

Proposals to combat land degradation using Benchmark indicators:

- Project for the protection of the mangroves of the coastal zone area (Benchmark and indicator is area vegetation cover of Mangrove forest).

- The fundamental research based on watershed management principles and the set up of a land use and administration system to define and monitor the status of land degradation in Suriname (Benchmark and indicator is land use).

- Monitoring of the pesticide contamination in the river waters entering the Coastal Zone, from the rice cultivation and gold mining (mercury pollution) (Benchmark is water quality).

As can be concluded from the above-mentioned paragraphs, an immediate danger and catastrophe following from land degradation and desertification in Suriname is presently not the main issue. Preventing this from happening is the main objective. Factors contributing to land degradation and desertification need to be identified and measures have to be proposed necessary to combat and mitigate its adverse effects. To do this a National Action Plan is required, which will include, among others, watershed management, long-term strategies, mitigation of draught, implementation of national policies, alternative livelihood, strengthening institutional framework, waste management, and other activities affecting land degradation and promoting desertification.

Although measures taken in the past within other context and framework, as prevention of part of the coastal zone, preservation of ecological important areas, the various nature reserves, irrigation and drainage schedules, positive contribution have been made in combating land degradation. Since ratification of the UNFCCC convention is a fact combating of land degradation will be enhanced and streamlined through a rational approach and integral coordination of the involved and relevant institutions, NGO, departments, and organizations.

For a successful approach in combating land degradation the National Action Plan shall be based on: inventory of factors and practices affecting the land degradation, raising the public awareness, proper program development, implementation of preventing measures, creation of the necessary laws preventing and combating land degradation, and strengthening the existing institutional framework for combating and mitigation of land degradation.

For implementation purposes funding is necessary, which consists from the contributions of the international donors, government and stakeholders. In particular contributions of the private sector are expected to be significant, since they recognize their responsibility in conserving natural resources and combat land degradation, including protection of the environment. However, support of the government is needed to encourage the contribution.

II. CONCLUSION

The writing of this report has brought to the fore numerous deficiencies in the country's effort to deal with-, and adequately respond to the phenomenon of land degradation. For many decades economic growth rationale has dictated policies, and is now showing clear signs that much has been at the expense of the environment. It is also clear that this generation, and those to come are to pay a heavy price is measures are not taken.

In highlighting some of the areas that are being affected by the phenomenon of land degradation, it is clear that the problem is slowly but surely affecting the whole of society. While desertification is not considered an issue of immediate concern, as it is the case in other parts of the world, this doesn't mean that Suriname can retreat into complacency. The global scale of climate change is already making its mark in areas that previously had little to fear from drought. Throughout this report, evidence has been presented to indicate the encroaching nature of land degradation in Suriname. Based on this evidence, it is concluded that the trend is a negative one.

The fact that Suriname still does not have a national environmental legislative framework is not helping the fight against land degradation. However, under auspices of the NIMOS efforts are underway to rectify this shortcoming.

It has been pointed out that the financial ability of Suriname to effectively turn the current situation around will require special funding mechanism. It is also clear that the government will need to develop and implement policies and legislation that encourages the use of preventative measures, including placing more responsibility of rehabilitation on the individuals and the private sector. In addition, institutions, agencies and ministries will need to renew their efforts to network, thus using their resources more efficiently. Numerous regions, especially the rivers of the southeastern part of Suriname, are faced with the far-reaching consequences for the immediate natural and socio-economical systems. It is clear that decades of working the soil inappropriately has resulted in a legacy of erosion, species extinction, degraded landscape, damaged and polluted environment. This constant shift in the economic use of the land and natural resources has therefore created new challenges and issues. As a biodiversity rich country, Suriname is more than ever faced with the challenge that its species and habitat are under threat of becoming endangered or extinct

End.