Integration of Biodiversity into the Forestry Sector in the Democratic Republic of Congo (DRC)

Congo Case Study

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SUMMARY

The biodiversity problematic in the DRC's forest sector is justified on account of the 54,6 % of the national territory is covered by the forest. The present draft retraces the inventory of the forest management in the DRC in front of the biodiversity stakes, defines the state of planification and conservation of the biodiversity, summarizes strategies adopted in the forest sector to plan and conserve the biodiversity and propose issues to different theats which bear upon the biological diversity.

Concerning the forest management in DRC, it is based on forest system from the royal decree of April 11th 1949. Its revision is imposed by the forest administration evolution, forest sciences and the new lasting management of forest resources.

The forest occupies an important place in the life of local communities and the economy. The itinerant lived agriculture, the artisanal and industrial exploitation of timber products and no-timber products and the hunting exert an important negative impact on the size of biological resources of the forest ecosystems.

The DRC has a national plan of forestry which pursue the following objectives:
- to harmonize and adopt common regulation measures
- to preserve the existing natural forests
- to guarantee the link between the forest lasting management and the alleviate poverty.

The plan in its relation with the biodiversity rhymes with forest director national parks, management plans of animal species, management plan of floristic ressources.

Its application requires the contribution of different institutional partners as Institut d'Etudes Agronomiques de Bengamisa, la faculté d'Agronomie et de Biologie de l'Université de Kinshasa et de Kisangani, l'Institut National d'Etudes et de Recherches Agronomiques (INERA), le SPIAF, l'Ecole Régionale de Forestière (ERAIFT), l'ICCN, le CERDAS et, le GSUDAC et le PNAE.

Several laws and orders reinforce the politic will of the DRC to preserve the biodiversity, will demonstrated through the signature of 8 international conventions related to biodiversity.
Constituent elements of biodiversity go from micro-organismes, flora to fauna which species are assessed to 3.000.

At the genetic level, researches are in full stammering. This deficiency is compensated for the numeric maps which provided until now the mapped areas of Salonga parks, Okapi Faunal Reserve and Kahuzi-Biega National Park.

Several factors occur in drastic way on the biodiversity. Its is question of:
- Poaching
- Acts of sabotage by Rwadan and Ugandan militaries
- Exploitation of work wooden
- Irrational hunting and fishing
- War and refugee's number
- Land conflicts
- Deforestation for feeding needs
- Bush fire
- Dollarisation and hyperinflation

Solutions come from politic and institutional plan and the one of community participation.

INTRODUCTION

In the recent past, there has been talk about the forest as a future challenge and as a consequence of sustainable development. Regarding biodiversity in the Democratic Republic of Congo (DRC), the forest issue comes up not only as recognition for its rich and complex forest cover, but also to show that it is from these forest biological resources that the population derives its basic economic needs, notably products from gathering, hunting, construction materials, medicinal plants, firewood, wine and cola nuts, etc.

The Democratic Republic of Congo extends 2,345 million km^2 and by its geographic position astride the equator is traversed by the central basin surrounded by the Kwango and Kasai plateaux, by the high plateaux of Katanga and the massive mountains of the Great Lakes region. Its tropical climate characterised by high rainfall of 810 mm along the coastline and up to 2000 mm in the central basin, which favours the formation of the rich, and complex Congolese vegetation stretching over 1,280,042 km^2 covering 54.6% of the national territory. The latter is characterised by the following physiognomy:

Clear forest mosaic
Dry degraded dense forest
Semi – deciduous forest
Evergreen forests
Tropical rain forests

The vegetal formations of the large biodiversity zones constitute more than half of the remainder of the forests in Africa and an eighth of those that still exist in the world.

In the framework of safeguarding biodiversity, the national parks and reserves and hunting areas do not constitute the only natural jewel, but there also exist sacred forests which form the culture, the biodiversity guardian. But nowadays this great expanse recedes year after year due to shifting agricultural practices, gathering firewood, exploitation of timber for industrial purposes, as well as use of inappropriate techniques in quantity and in rhythm that is totally incompatible with the demands of sustainable utilisation of the said resources. However, the development and management of the forest sector brings in new vision of sustainable utilisation of natural forest resources, which includes biodiversity. Indeed the destruction of forests leads to serious consequences in terms of production levels, lose of biodiversity and disruption of water regimes. Current studies reveal that the forest potential is evaluated at 60 million hectares of productive forests, of which 12 million hectares are allocated in letters of intent and 20 million hectares in provisional guarantees.

The important question that this study proposes to answer is that of the relationship between national forest policy in relation to biodiversity, performance and weaknesses of forest management in DRC as well as the proposed solutions. To respond to this, a documentary research has been carried out and the results of the biological and cultural studies have been referred to. We have also made our contribution to the subject based on our experience in natural resource management.

Our report comprises five essential parts, named:
1. State of forest management in DRC;
2. State of biodiversity in DRC;
3. State of biodiversity planning and conservation;
4. Links between the forest sector and biodiversity planning and conservation;
5. Strategies and proposed solutions.

I. STATE OF FOREST MANAGEMENT AREAS

In DRC, the massif forest linked to equatorial rain forests comprises of big forests; either the dense forest type also called rain forests, or the semi-deciduous humid dense forest or even semi-deciduous forest or tropophyte forest. They are forests with several stages of trees, a rich variety of flora with a mixture of complex and anarchic species, with the trees reaching heights of 40 to 60 metres and allowing very little light. Reserves of woody and non woody resources, providing species for commercial purposes such as *Chlorophora excelsa*, *Milletia laurentii*, *Gilbertiodedron deweri*, *Mammea africana, Piptadeniastrum africanum, Gossweilerodendron balsamiferum, Entandophragma cylindricum, Alestonia congensis, Strombosiopsis totandra, Canarium schweinfurthii, Antiaris welwitschii, Ongokea gore, Nauclea diderrichii, Brachystegia laurentii, Guarea cedrata, Lovoa trichiloides, Copaifera millorcedi, Morus mesosygia, Lannea welwitschii, Gambeya lacourtianam*, etc. The forest plays an important economic, ecological and cultural role.

1.1. History of forest management

Before colonization, the native Africans lived in harmony with nature. Forest exploitation fitted in the context of subsistence economic activities. The people indulging in synergetic activities, fishing and gathering activities were only concerned with their subsistence needs and did not exploit materials that would destroy biological resources. Forest ecosystem management responded to customary tenure. The fundamental pre-colonial setting was founded on registers, namely, religions linked to ancestral cults, policy registers or the head of the clan had commanding power, land tenure register, united, undivided and inalienable heritage.

The traditional Congolese society knew of five methods of accessing land, namely:

- Heritage and usage rights concession;
- Location and concession related to usufruct rights;
- Authorisation to occupy and exploit;
- Occupation by fact;
- Allocation of land to State Agricultural farms.

With colonialisation, the traditional practices of biological resources exploitation were almost destroyed by the new methods of exploitation that were introduced such as mechanised agriculture. Certain laws governed the colonial concept of access to land. Their documentation shows an evolution of perception considering forests as wealth for the State to manage.

a) **Decree of 17 August 1809** which distinguished the cultivated, indigenous lands, occupied by the natives but extendable by agriculture and rotary habit, registered lands subjected to written law and state land. The state land was divided into public and vacant areas and private land managed by chartered companies (Immocongo, Cfa). As an example, the Immocongo society was in charge of managing the littoral lands and those situated along the railway line, 200 m on each side.

b) **The Concordat – convention of 26 May 1906** passed between the Independent State of Congo and the Saint – Siège according each national mission post inalienable concessions of 100 to 200 ha free of charge and as perpetual ownership.

c) **The Decree of 6 February 1920** repealing that of 1809 and distinguishing three types of land:

    1. Indigenous cultivates land occupied by the natives but extendable by agriculture and shifting habitat;
    2. Registered lands subjected to the written law, some in perpetual ownership and others in temporary concessions;
    3. State lands.

d) **Royal Decree of 11 April 1949** on forest regime regulated the forests, which formed part of the colony area and customary usage as well as wood exploitation in the indigenous forests. This legislation distinguished the indigenous forests into classified forests and private forests, meaning the special committee of Katanga and the national committee of Kivu managed them.
The consequences of the these colonial laws were:
    - The revival of vast operations of compulsory purchase order from the farmers;
    - Subjection of the people to free and docile labour.

e) **Law 73 / 021 of 20 July 1973** proclaiming the State as the sole proprietor of the land, but can give concessions to some perpetual ownership (only to the Congolese, those present physically) and temporary ownership to the others.

Besides these laws, three orders related to the forest regime can be cited. They are:
1. Order n° 52 / 208 of 15 June 1950 on the rules to follow and rents, dues to pay for felling trees by the mine agents and permit holders;
2. Order n° 52 / 119 of 2 May 1951 on the rules to follow in felling trees authorised by the Decree of 11 April 1949;
3. Order n° 82 / 211 of 20 August 1985 on creation of funds for the restoration of commercial forests with a view to protect the Congo forest heritage.

The forest legislation is 52 years. It does not integrate the options linked to capacity to engender positive, external effects by rational management and to slow down the price policies and appropriate taxation, the development of activities creating the negative effects such as exploitation of forests rich in biodiversity. Further, it is not adapted to the dynamism of administration and forest sciences.

Kalume Sefu distinguished three periods in the forest sector management in relation to industrial forestry:

1. **Period from 1885 to 1945**
   (The first 23 years of this period concentrated on the occupation of the land, establishment of authority and pacification of the independent state of Congo. These activities led the country to financial difficulties from 1890; which forced the state to orientate itself towards activities of immediate profitability, thereby encouraging private enterprises to indulge in sale of gathering products).
   Beside the artisan exploitation by the natives, it is the Forminière which started industrial exploitation of the Congolese forest. The post war (1914-1918) forced the state to impose limitations on felling activities to activate the creation of forest reserves.

2. **Post war period (1945 – 1960)**
   With the increase in wood needs in Europe, the attention of the colonialists was drawn to the Cuvette forests. This situation led to extensive exploitation of the Mayumbe forest. Kalume writes: "the improvement of the quality and presentation of the wood, the drying, protection against insects, standardisation, allowed the skilled exploiters to value their product".
   The consequence of the colonial policy on forest management today is negative.

   Professor Ngoma Ngabu gives an illustration:
   The damage caused by colonisation and acculturation is great. Effects of loss of traditional land continue. The concessions given to individuals or to societies do not respect the clauses of their grant. Without its species, Mayumba forest is in the process of disappearing. The SCAM, AGRIUM or AGRIFOR did cut the available Limba and Kamba without carrying any replanting. This leads to deforestation and desertification, with the destruction of fauna and flora.
   What heartache didn't I get on 30th June 1987 on seeing the destruction of this same Mayumba forest which had marvelled me in 1962 during research for my thesis.

3. **Period from 1960 to present**
   This period is characterised by reinforcement measures such as creation of parks and reserves and by haphazard exploitation of the Congolese forest. A few companies carry out the forest exploitation for export (using a quota system for exportation) presently. But many pitfalls arise in forest development:

   - Absence of sufficient knowledge in the management of forest enterprises;
   - Repetition and shifting of the destruction phenomena due to production of coal, wood harvesting, construction of pirogues, making of household objects and wood sculpture;
   - Militarisation of certain regions of the country;
   - Fraudulent sale of wood to bordering countries Uganda, Rwanda and Burundi;
   - Constraints linked to technical aspects, stocking and handling.

   As can be noted, the forest sector is still governed by the Royal Decree of 11 April 1949. A revised project on the regime, which began in 1967 and was completed in 1989, is yet to be debated in Parliament. Only the order – law n° 69 – 041 of 22 August 1969 governs the conservation of nature in DRC.

1.2. The importance of forests in the national economy

The forest plays an important role in the national economy. The three main sectors are:

a) Shifting/itinerant agriculture

Under pressure from socio-economic crisis, the agricultural activity provides the rural and peri-urban population with substantial revenue for survival. The agriculturist farmer plants maize, beans, and cassava on the ashes of the burnt forests. He gets a relatively good harvest for a small investment. It is estimated that shifting agriculture depleted and area 1,400,000 hectares in 2000 against 47,323,000 hectares during the period 1970–1977. According to estimates from the Ministry of Environment, while considering crop rotation of three years as the hypothesis, the Congo forest (128 million ha) would soon disappear.

b) Harvest of woody and non-woody forest products

The non-structured forest sector comprises the harvest of all the woody and non-woody forest products in the margin of Government control and taxation develop the activities in the charcoal and the wood saw network of artisan production.

The Vangu report of 1981, estimated at 8,740,000 m^3 the volume of wood, needed to satisfy the energy needs in DRC of which 2,360 m at 85,000 of reforestation in 1982 around the big towns out of which 23,000 at Kinshasa was confirmed by studies carried out on the future of the tropical forest people, where the production of firewood in Kinshasa was assessed at 4,790,000 m of firewood in 1995.

According to the Ministry of Environment (2000), about 50 m^3 millions were harvested each year to produce 85% of energy consumption in the country. The dominance of firewood and charcoal in the energy appraisal of the DRC (80%) shows that this network to which is added the wood saw, has attained high volumes of production in the National territory.

The overexploitation of the forest in order to satisfy energy needs justifies the need to implement a reforestation strategy. The reforestation and enrichment of forest were made possible by the internal plan of Reforestation Fund. A committee managed this fund, which was part of SNR (National Reforestation Service). Within this framework, forest brigades were created at Lukaya in Lower Congo Province in 1939 and at Mai – Ndombe in 1940 in Bandundu as well as in other regions such as Kinzono in the hinterland of Kinshasa. The mission of these brigades was to constitute the reforestation zones, enrich them with exploitable wood and plan the felling of wood from industrial forests. Examples of species utilised for reforestation are *Eucalyptus camaldulensisi*, *Eucalyptus citriodora*, *Acacia auriculiformis*, *Pinus occarpa* and *Pinus patula*.

Participation by local NGOs in the realisation of the reforestation programme was mainly in the rural areas as well as in the hinterland of the capital Kinshasa.

1.3. Industrial forest exploitation

There is no doubt whatsoever that commercial forest exploitation constitutes an income-generating sector for the Congolese government. Revenue for the Congolese State from tropical forests moved from 4 million m^3 in 1950 to 66 million m^3 in 1980. This represents an increase of 1500% in a period of 30 years.
The wood is useful in different ways preparation of indigenous alcohol, brickyards, oil works, etc. In DRC there are many forest enterprises: Agrifor, Forescom, Brikin, Bimpe, ICB, Socobela, Soforma and Sokinex. The forest area suitable for industrial exploitation is about 60 million hectares of which 35,830,607 hectares are allocated to forest exploiters. But the Ministry report attests that national production of woodwork has decreased since 1991 and only reached an annual average of 250,000 m^3 of logs against 380,000 m^3 in 1984.
The anarchy that has reigned during the last decade does not allow for industrial forestry.

Table 1: **Turnover from forest production**

Number of societies	Volume of production	Exportation	Total turnover
20	400,000 m^3	About 1,200,000 FB	250 million FB

Source: Mbusu, 1984

The forecasts in forest exploitation sector show that the Congolese forest can offer a real possibility of 13,462,500 m^3 of log production per year. With regard to this volume, the 380,000 m^3 of actual production per year represent $1/35^{th}$.

Among the commercial species the following can be cited:
- *Afrormosia elata*
- *Guerea cedrata*
- *Lovoa trichiloides*
- *Chlorophora excelsa*
- *Khaya anthotheca*
- *Entandrophragma candollei*
- *Terminalia superba*
- *Gambeya africana*
- *Entandrophragma cylindricum*
- *Entandrophragma utile*
- *Entandrophragma angolense*
- *Goswzilerodendron balsamiferum*
- *Milletia laurentii*

These species are chosen based on the following criteria:
- External aspect of the wood
- Colour of the wood
- Difficulty or ease of the work
- Duration
- Possible uses of the wood

At the moment efforts are being agreed upon for the promotion of new species such as *Mytragina stipulosa, Nauclea trileisii*, *Brachystega* sp., *Guilbourtia* sp., *Coelocaryon klanei*, *Combretodendron africana*, etc.

By taking an average market price value of 8,000 FB /m^3, 1,000 million FB is obtained. These receipts are a substantial contribution. To ensure the running of the factories, the exploitation of the processing industry requires a sure and continuous supply of materials for sufficient period of time so as to ensure a profitable yield. The guarantee to supply and the letter of intention are the contracts between the exploiter and the DRC. In the contract, the Ministry guarantees the following rights to the exploiter:

- The exclusive right to harvest within the planned units, the projected exploitable tree species;
- The right to construct the necessary infrastructure exclusively for forest exploitation;
- The right to float the timber and navigate on the river and lake course as well as the right to use public routes for private transportation of the forest products and raw material.

On the other hand, the exploiter is subjected to the following conditions:

- Ensure forest protection in the exploitation unit;
- Pay all the taxes and dues set out in the regulations and rules;
- Respect the regulations on exploitation, commercialisation and exportation of forest products;
- Effect reforestation works to ensure durability of the forest in exploitation units and to respect all the legal decisions in forest planning;
- Carry out minimal harvesting of 10m^3 of wood per ha on the exploitable areas;
- Validate the contract for the sale of forest products: logs, finished and semi-finished products in order to allow the government to verify that the exploitation quota is not surpassed and that the prices indicated on the contract conform to the market prices.

On studying the obligations to the exploiter, it appears that presently no reference has been made to biodiversity in the forest concessions.

1.4. National Forest Plan

Forest planning in its new version was outlined during the PAFT (Plan d'Action Forestier Tropical) round table in 1988. It pursued the following objectives:

- Harmonise and adapt common regulatory measures;
- Increase the contribution from forest contribution to economic development;
- Preserve existing natural forests, reinforce the system of protected zones and preserve the biodiversity zones;
- Recognise the relationship between durable management of forests and poverty alleviation for a better contribution to food security.

It cuts across:

a) The main national park forest plans;
   The main objective is to equip Virunga national parks in the northern province of Kivu, Kahuzi – Biega in the southern Kivu province, Maiko in the western province, and Salonga (36,000 km² of forests) in the Kasaï, Bandundu provinces and the Equator so as to preserve important samples of the forests.

b) Management plans for exploited animal species;
   The three objectives were:
   - To protect the population and the animal species;
   - Ensure an ecologically sustainable exploitation of fauna resources;
   - Involve the local communities in the development and implementation of policies for sustainable utilisation of fauna resources.

c) An institutional framework with the task of leading forest administration activities, surveillance, forest police, reforestation, forest stocktaking and planning. Apart from the Renewable Natural Resources Management, in 1979, the SPIAF was formed. Its duties were to take stock of forests and preparation of plans aimed at guiding rational management of forests.
   Besides the centre for wood promotion promotes the utilisation of wood in construction and furniture making and makes a follow-up of the evolution of internal and external markets for wood and its derived products.

d) The management plans for exploited flora resources whose objectives are:
   - Protect flora population and species;
   - Ensure an ecologically sustainable exploitation of flora resources;
   - Actualise the tropical forest layout plans.

e) National strategy on wood energy effectiveness aimed at reducing the impact of firewood utilisation on biodiversity, to sensitise groups on the impact of firewood utilisation on forests.

f) The forest legislation which should be changed to integrate the law that authorises exploitation of wood, in state forests, permission to cut wood for the small farmers and saw millers.

g) The improvement and knowledge and technology dissemination in relation to forests.
   The contribution of forest sector to the national economy supposes that certain prerequisites are fulfilled, namely:
   - Resource knowledge by means of forest inventory;
   - Forest research

1.5. Participation and degree of interaction by different players

The forest framework needs demonstrate the necessity to build the capacities.
However, DRC has at its disposal the Institut d'Etudes Agronomiques de Bengamisa (ISEA) and the faculty of Agronomy at the 'University of Kinshasa and Kisangani. As for forest research, this is conducted by l'Institut National d'Etudes et de Recherches

Agronomiques (INERA) for food production and industrial crops, by SPIAF, the programme of Man and the Biosphere (MAB), Biology departments, as well as l'Ecole Régionale de Foresterie (ERAIFT), multidisciplinary units, driven by the Centre for research coordination and the documentation of social sciences serving sub-Saharan Africa (CERDAS) and specialist groups like GSUDAC (Groupe des Spécialistes pour l'Utilisation Durable des espèces sauvages en Afrique Centrale).

1.6. Institutional body of planning and forest exploitation

In DRC the institutional body of planning and forest exploitation is under the Ministry of Environment. The specialised services of management of forests and hunting (SPIAF, PNAE) execute the action plans defined in policy framework of forest management aimed at the contribution of natural forest resources to the country's economy and improvement of living standards of the people.
Regarding the forest police force, it is no longer operational since the suppression measures of 1970. The PNAE Congo intends to set up patrol brigades for control and regulation.

1.7. Conformity of forestry policy to international agreements

DRC ratified a number of international agreements with a view to guarantee sustainable forest exploitation. These include:

	Convention	Country or town	Date of ratification
1	Phytosanitary convention for south Saharan Africa	England (London), 29 July 1954	21 September 1962
2	African convention on the convention of nature and natural resources	Algiers (Algeria), 15 September 1968	13 November 1976
3	Convention concerning the protection of the world's natural and cultural heritage	Paris (France), 23 November 1972	17 December
4	Convention on conservation of wildlife migration species	Bonn (Germany), 13 June 1979	5 September
5	Convention on biodiversity	Rio de Janeiro, (Brazil) 4 June 1992	15 September 1994
6	International conservation for the protection of plants	Rome (Italy) ,6 December 1951	16 September 1975
7	Convention on international commerce of wild species, of flora and fauna threatened with extinction or CITES	Washington (USA), 3 March 1973	18 October 1976
8	Convention relative to conservation of natural fauna and flora adopted in London	London (England), 14 January 1936	Put into practice

In practice nothing has been done yet for sustainable exploitation of forests. Concepts such as wood certification and biodiversity conservation in concession forests are yet to be implemented.
However, it can be noted that certain laws and decrees have an impact on biodiversity:

1. Law n° 12 of 12 September 1964 on creation of a permit for licensed sale of game meat;
2. Law n° 67 – 514 of 1st December 1967 on creation of national parks in Congo;
3. Law n° 82 – 002 of 28 January 1982 on hunting regulations;
4. Order n° 0003 – AGRI – CAB – 73 on temporary arrangements aimed at the protection of cheetah and leopards and their repopulation in DRC;
5. Order on creation of hunting areas;
6. Order n° 0001 / BCG /AGRIDRALE / 82 of 15 December 1982 on creation of a commission charged with the national strategy on conservation of nature in DRC.

II. STATE OF BIODIVERSITY AREAS

2.1. Knowledge state

a) *What is known about ecosystems*

Of the four floristic regions of the country, namely savanna woodlands of differentiated clear forests (Moimbo and Muhulu) in the South, Guineo-Congolese rainforest in the central corvette and afro-mountainous forests situated to the east of the country, plant formation in DRC covers about 54.6%.
The table below shows the main plant formations.

Plant Formation	Area	% total forest area	% national territory
Dense humid forest (evergreen & semi – deciduous forests)	872,251.56	68.14	37.21
Mountain forests	40,289.01	3.14	1.72
Dense dry degraded forest	154,161.99	12.05	6.48
Swamp forest	88,614.08	6.92	3.78
Forest galleries	2,500.05	0.19	0.19
Secondary forests	121,670.70	9.54	5.19
Mangrove forests	555.07	0.04	0.02
Total forest	1,280,042.46	100	54.59

In terms of forest cover per province, the equator province has 99.7%, followed respectively by western province of Kivu 70.1%, province of Kasai west 59.4%, Bandundu province 40.6%, Kasai east 25.5%, Lower Congo province 18.6% and Katanga 2%.
The conservation of forests is better ensured through national parks and reserves.

Name of the Reserve	Date of creation	Area (ha)	Ecosystems	Species
Virunga National Park	1925	800,000	Rain forest Mountain forest	Elephants, mountain gorillas, hippopotamus
Upemba National Park	1939	1,000,000	Gallery forest	Zebras, elands
Salonga National Park		3,600,000	Equatorial forest	Chimpanzee, elephant
Maiko National Park	1970	1,000,000	Rain forest of low altitude	Plain gorilla, okapi
National Kahuzi – Biega Park	1970	600,000	Afro- mountainous forest	Mountain gorilla
Kundelungu National Park	1970	760,000	Gallery forests	Cheetah
Okapis Fauna Reserve	1992	1,372,625	Rain forest of low altitude	Okapi, Congolese peacock, elephant

b) What is known about species

Since colonisation, ethno botanical and ethno zoological work on national biological resources have led to estimations on elements that make up biodiversity.

The spermatophytes flora was widely studied during the colonial era by the Institut National d'Etudes Agronomiques du Congo (INEAC) which had published since 1948 ten volumes and several articles on more than 3000 species, namely:

Biodiversity elements	Numerical Importance	Habitat
MICRO – ORGANISMS		
1. Blue algae	± 1,000 taxa	Aquatic
2. Bacteria	60 species	Aquatic
3. Mushroom	10 known species	Idem
4. Protozoa	90 species	Idem
5. Mold	Isolated strains	Food stuff
FLORA		
1. Algae	249 recorded species	
2. Mushrooms	655 known species	Land
3. Lichens	21 species	Idem
4. Bryophytes	154 species	Idem
5. Pteridophytes	378 – 383 species	Aquatic and land
6. Spermatophytes	2,867 known species	Mixed
FAUNA		
1. Aquatic invertebrates	1,596 species	Fresh water and marine
2. Land invertebrates	319 species	Land
3. Aquatic vertebrates 3.1. Fish	± 1,000 known species	Fresh water
4. Amphibians	160 species	Idem
5. Reptiles	12 species	Idem
6. Birds	77 represented families (48%)	Mixed

7. Mammals	6 species	Aquatic
8. Land vertebrates 8.1. Amphibians	87 known species	Land
8.2. Reptiles	331 species	Land
8.3. Birds	1,086 species	Forest
8.4. Mammals	450 species	Land

Source: Ministry of Environment, 1998

Invertebrates

In the DRC this group is represented by nine branches of which are protozoa, sponges, coelenterates, worms, echinoderms, brachiopods, bryozoans, molluscs, arthropods, and proto-chordates.

The invertebrate groups mostly used in the DRC for ornament, food or international trade are the following:

Palaemon jamaicensis, P. lenzii, P. lujae, P. dux, Atya africana, A. scabra, Caridinia nilotica, Palinurus regius, Dromia spinirostris, Dorippe armata, Matuta michaelseni, Micropisa violacea, Pisa carinimana, Achantonyx lunutatus, Callinectes gladiator, Callinectes latimanus, C. marginatus, Ocypode ippeus, Uca tangeri, Grapsus grapsus, Potamonautes africanus, Cardisoma armatum, Bellicositermes natalensis, Euterme spp.*, Trinervitermes* spp.*, Cubitermes* spp.*, Tettigonioïdes* spp.*, Gryllus campestris, Brachytrypes membranaceus, Gryllopsis* spp.*, Papilio dardanus, P. phorcas, Charaxes* spp.*, Euphaedra edwardsi, Homoneures* spp.*, Bunaea alcinoe, Apis adansoni.*

Amphibians

A recent study to assess amphibian biodiversity in DRC indicates that 160 species exist in the country. This number seems small because an earlier study carried out by a conservation NGO from USA indicates that there exist 216 species in DRC placing it at 8th position in the world. Amphibians are useful in DRC. Some tribes eat frogs (Rana, Xenopus, Hyperolius, etc.). One can also cite the use of amphibians (frogs, or crapaud, Rana, Bufo type etc.) in a small scale, for pregnancy tests.

Reptiles

352 species of reptiles have recently been established in DRC. This figure is to be verified since the DRC does not feature in the list of ten countries having the largest number of reptiles. The last country on this list only has 261 species of reptiles. A large number of reptile species in the DRC are used for more than one need:

a) Food
b) Snakes: *Python sebae, P. Regius, Naja melanoleuca,* some tortoises; *Amyda triunguis, Cycloderma aubryi, Pelusios sugniger, Chelonia mydas, Kinixys* spp., and some crocodiles: *Crocodylus niloticus, C. cataphractus, Osteolaemus tetraspis* and monitor lizards: *Varanus niloticus, V. exanthematicus*
c) International trade
   Lizards, chameleons, snakes, tortoise, crocodiles
d) Shoe manufacture, sheath-making and leather working: monitor lizards, crocodiles

Fish
With the exception of three species of Tetraodon which are poisonous and a species of Barbeau*, Caecobarbus geertsii,* which is protected by the national law, the people eat all other fish species. Some fish are used for decoration in aquariums and for international trade. These are for example: *Gnathonemus leopoldianus, Phenocogrammus* sp., *Distichodus fasciolatus, Teleogramme gracile, Lamprolagus mocquardii, Serranochromis gibbiceps, Steatocranus gibbiceps, Tutropius* sp., *Polypterus aethiopicus, Leptotilapia tinanti, Pantodon buchilzi, Barbus tropidolepsis, Barbus holotaenia, Lamprichthys* sp., *Hemichromis bimaculatus*.

Birds
Of the 29 orders of birds living in the world 22 are found in the DRC that is 91% in the whole of Africa. In the DRC there are 958 sedentary or local bird species of which 27 are endemic and 128 species migrate, bringing to a total 1,086 bird species. The bird species in the DRC are used in different ways, for example:
- Breeding: *Numida meleagris, Coturnix* sp., *Alopchen aegyptiacus, Anas* spp.
- International Trade: *Psittacus erithacus, Poicephalus gulielmi*
- Culture and Tourism: *Afropavo congensis, Balearica pavonina, Grus carunculatus, Leptoptilus crumeniferus, Balaeniceps rex, Ephippiorhyncus senegalensis, Treskiornis aethiopica, Phoenicopterus minor*.

Mammals
The mammalian fauna in the DRC is represented by 12 orders subdivided into 44 families, 173 types, 482 species and 171 lower species. According to the results of this inventory the number of the mammal species in the DRC is superior to that which is reported by Conservation International Washington, that is 482 species instead of 409 species, which places it 2nd after Indonesia which has 519 species according to the same source (1992). All the mammal species in the DRC are used in one way or the other for human consumption, trade, medicine, culture, scientific research etc.
The species that are totally protected by the National law are: *Gorilla gorilla* spp., *Pan troglodytes, Pan paniscus, Loxodonta africana* spp., *Equuus burchelli, Cerathoterium simum, Diceros bicornis, Giraffa camelopardalis, Okapia johnstoni, Oreotragus oreotragus, Tauritragus oryx, Tauritragus derbianus, Onotragus smithemani, Tragelaphus strepiceros, Aepyceros melampus, Hyemoshus aquaticus, Felis aurata, Osbornictis piscivora, Acinonyx jubatus, Caracal caracal* and *Trichechus senegalensis.*

Among these species those retained in the (Red data book) of the world union for the protection of nature for the DRC are:
- *Pan troglodytes*
- *Pan paniscus*
- *Gorilla gorilla graueri*
- *Gorilla gorilla beringei*
- *Epixerus wilsoni*
- *Lycaon pictus*
- *Panthera pardus*
- *Diceros bicornis*
- *Ceratotherium simum cottoni*
- *Choeropsis liberiensis*
- *Kobus leche*

Plants
The search for satisfaction of ever growing human needs led to the overexploitation of certain species and the destruction of habitats, for example: *Encephalactos ituriense, Eremospatha cabrae, Eremospatha grex, Julbermardia breynei, Gnetum africanum, Morinda morindroïdes, Entandrophragma cylindricum, Entandossur phragma utile, Terminalia superba, Milicia excelsa* and *Magaphrynium macrostachyum*.
In the national plan no regulations support protection efforts for the following species: *Milletia laurentii, Pericopsis elata, Diospyros grex, Diospyros canaliculata, Eremospatha* sp., etc.

What is known at the genetic level

Research at this level is still in progress, notably on the chimpanzee in the Salonga national park and the white rhino in the Garamba national park.

2.2. Status of the cartography

For the time being, management of the forest allocation is done by the administration of the management of forests and hunting. (DGFC).
The numerical cartography developed by the DGFC and the numerical laboratories of the faculty of Agronomy gives an account of the level of conservation and the degradation of the forest ecosystems.
Available data on the cartographed and allocated land shows that the land supervision and assessment strategies are defective.

TYPE OF TRAINING	SURFACE AREA	
	INVENTORY	CARTOGRAPHY
Forest under swamp soil	633,462	464,580
Semi-deciduos forest	3,276,555	3,073,032
Dry dense forest	565,600	298,600
Clear-savanah mosaic forest	705,216	705,216
Evergreen forest	14,729,675	23,463,131
Total	19,910,508	28,004,559

Source: Ministry of environment.

The numerical results show that the state of the biodiversity cartography is disparate. A lot still has to be done so that this study is carried out in a global manner.
At the level of protected areas, there are some cartographed ecosystems of the Solonga parks, the fauna reserve at Okapi and the Kahuzi park-Biega.

2.3. Changes in biodiversity components

Due to mistakes in impact and supervision studies in the forest ecosystems, The DRC has no sensible data to quantify the degree of the changes in the biodiversity components in the Congolese forests situated out of the protected areas. Efforts started by the ICCN to record data on the population changes of certain key species were hampered by war and the socio-economic crisis that swept across the country.

Some of the available data points to the fact that the population of the gorilla has decreased from 250 in 1996 to 130 in July 2000 in Kahuzi Biega Park. APFT experts have also mentioned the changes, we gather that between 1994 and 1997, the silver back gorillas, head of families, were specifically targeted at Virunga and Kahuzi-Biega. Seven were massacred.

Between October 1996 and March 1997, the Kahuzi-Biega National park suffered the same plight; the local population recruited pygmies and Rwandese refugees to destroy the animals and bamboo forests and to burn considerable portions of biotopes of the mountain gorillas. In this biotope, which makes up almost a quarter of the park, more than 200 dead elephants, among others were discovered, the Batshwa pygymies collusion.
This decrease is linked to the triple factors below:

- Poaching for the sale of small gorillas
- Sabotage by Rwandese militiamen
- Presence of rural communities in the parks

As concerns the birds, species such as, *pssitacus erithacus* (grey parrot) and *Poicephalus gulielmi* (green parrot with red carrotte) are highly hunted for.
Much as it is difficult to evaluate the degree of the damages caused, biodiversity resources have suffered as a result of human activities. Among the major causes of biodiversity destruction one can cite the following:

- Traditional agricultural practices
- Collection of firewood for domestic energy
- Wood exploitation
- Hunting and irrational fishing
- Craft and industrial exploitation of minerals
- Insufficient financial aid organisations in the region
- War and the number of refugees it brings about

For the protected areas poaching and deforestation are at the basis of the loss of biodiversity.

PROTECTED AREAS	**IDENTIFIED PROBLEMS**	**CAUSES**	**CONSEQUENCES**
Garamba National Park	Poaching	Food needs and sell of hunting trophies	Loss of biodiversity
Virunga National park	Poaching, deforestation and degradation of infrastructure	Food and energy needs, population explosion, inter ethnic clashes	Idem and poor tourism returns
Kahuzi-Biega National Park	Poaching, deforestation and land conflicts	Food and profit making needs, agriculture, craft extraction of gold cassiterie and coltan	Loss of biodiversity and erosion
Salonga National Park	Poaching, deforestation and land conflicts	Idem and lack of boundaries	Idem

Upemba and Kundelungu National Parks	Poaching	Food needs	Decrease in human settlement
Maiko National Park	Poaching, deforestation	Idem and presence of rebels	Loss of biodiversity and destruction of the habitat
Forest Reserves	Poaching and deforestation	Food needs, agriculture, wood and charcoal	Disappearance of the fauna and alteration of the ecosystem
Hunting reserves	Idem	Weak control measures, closure of hunting, agriculture, firewood and charcoal	Loss of biodiversity and destruction of the ecosystems

III. STATE OF PLANNING AND PRESERVATION OF BIODIVERSITY

3.1. Priority in the national planning policy

Biodiversity planning calls for a rigorous planning policy. With the different land conflicts, inter-ethnic clashes and civil wars in the DRC, no planning can take place. In the present unstable political condition, the government's priorities are elsewhere.
All the same in November 1997 to June 1998, consultations were organised at the national and provincial levels to integrate in a consensual manner the specific preoccupations of different provinces with the aim of the preservation and sustainable utilisation of biological resources. These consultations led to the adoption of the action plan on the national strategy on biodiversity but the implementation was hampered by what has been mentioned above.

3.2. Institutional planning structure

At the level of the Ministry of Land Affairs, Environment and Tourism, there is a national body on biodiversity. Started officially in December 1997, this national body on biodiversity is attached to the institute of zoological and botanical gardens of Congo. It has the task of ensuring the co-ordination and supervision of the implementation of the convention on biodiversity at the national and international level and to ensure the dissemination of the strategy. This body has faced a number of difficulties due to financial constraints.

3.3. The Level of perception of the country's participation in the convention on biodiversity is seen through the application of certain articles.

Articles	Themes
Articles 7 and 17	Acquisition of knowledge
– Article 7 on the identification and supervision of the biodiversity – Article 8 on the preservation *in situ* – Articles 10 and 11 on the taking into account of the biodiversity in the national plans. – Article 14 on impact studies	Protected areas
Article 9	Preservation *ex situ* of the elements that constitute the biodiversity
– Articles 6, 7c; 8c; 9a,b; 10; 12,c; 14a,	Fauna resources
– Articles 6b, 8c; 10; 11; 12b,c; 14 a, b;	Flora resources
– Articles 14a and b	Environmental assessment
– Articles 13a and b	Education, training and sensitisation programme on biodiversity
– Article 10	Participation of the population, NGO's and the private sector in the management of biodiversity

3.4. Role of the NGO's and the local communities

The number of NGO's registered in the DRC is growing. From 1986 to 1996 the number of NGO's rose from 275 to 1322, unevenly distributed from the geographical point of view. They are made up of Associations, development committees and co-operatives. The proliferation of the NGO's across the country is encouraged indirectly by the external donors preference to work with NGO's rather than with the government. Their role on the land is seen through the multiplication of the land support activity systems without any formalised co-ordination structure among them. Each NGO grows autonomously.

Among the major activities are:
- Planting of trees
- Sensitization
- Capacity building
- Popularization of agro forestry practice
- Forest management using traditional knowledge
- Implementation of alternative strategies (ecotourism, extractivitism, breeding, medicinal plants)

The population has for decades developed knowledge that is at times compatible with the models of sustainable management but analysis of the institutional framework reveals that "the private sector and the population have not been incorporated in the management of the environment and the natural resources through the consultative mechanism".

The implication of the native community in the conservation of biodiversity is based on the traditional know how on one part and on the other part on the necessity to satisfy their socio-economic needs with the obligation of conserving the biodiversity. This is justified in the sense that man on the one hand plays the destructive and on the other the protective role of the biodiversity. As relates to environmental problems linked to forests, the local communities have taken into consideration the risk in destroying forests. But financial means to support other alternative solutions are lacking.
Several constraints hamper the implication of this process. They are:

- The duality between rights and customs
- Lack of environmental education
- Lack of community participation
- Demographic pressure
- Exploitation of forest resources by an impoverished population

In the protected areas, the involvement of the local communities is done on the participatory management framework. The experience of the ICCN at the Bombo-Lumene reserve shows that one can do away with misunderstandings and define a new type of understanding between the population and the conservationists. This new approach on the one hand calls for mediation between the two parties for a discussion and on the other hand the taking into consideration of the traditional knowledge, which is judged positively by the population in the focus group.
The results of the involvement of the population in the fight against poaching must be consolidated by regular supervision measures, among others, the activities involving the population in the management of forests such as tree planting in the Virunga National Park and agroforestry in the Kahuzi-Biega National Park.

3.5. National forest production system, National Parks and protected areas

The National forest production, National parks and protected areas system follows a national land management plan elaborated by an intermediate committee. It is normally under the institutional responsibility of the Ministry of Environment, Conservation of nature and is executed by the DGFC, the SPIAF, ICCN and local NGO's. Since 1997, the government's efforts have been concentrated on the elaboration of this plan. These efforts have however been constrained by the war, which has been going on for four years.
But the administrative structures called upon to animate the operational budget aimed at putting it to work to:

1. Prepare a sustainable management plan
2. Plan the implementation of a forest management system
3. Reduce the pressures caused by the irrational exploitation of forest resources by applying the regulations in place are not available

IV. LINK BETWEEN THE FOREST SECTOR AND THE PLANNING AND CONSERVATION OF BIODIVERSITY

4.1. National strategy description

Developed in conformity with the commitments made at the Rio de Janeiro earth summit in Brazil and the ratification of the international convention on biodiversity on 9th September 1994, the national strategy aims at the prevention of the destruction of resources and at the repair of the damages caused to the biodiversity as a result of irrational exploitation.
Biodiversity planning is a process that goes through seven basic stages:

1. Organisation: establish institutional framework, design leadership, form an interdisciplinary and intersectoral team.
2. Assessment: receive and evaluate information on the state of biodiversity and biological resources.
3. Development of a strategy: determine the operational goals and objectives, analyse and choose specific measures to fight shortcomings in the assessment.
4. Development of an action plan: determine which organisation will carry out what activities, on the geographical plan as well as on the resources, specify the bill books.
5. Implementation: to concretely set in motion activities and policies, pass on some of the elements of the plan to partners; see to it that the biodiversity planners become directors of the biodiversity.
6. Supervision and Assessment: establish success indicators, determine which organisations follow what steps and the methods to follow; check on the state and the tendencies of biodiversity, apply policies and laws, realise specific strategic measures and investments and to develop capacities.
7. Report: determine who prepares what type of report and for whom. Prepare and distribute reports.

The DRC is at the 4th stage.
At this point one can note the political willingness on the exploitation, planning and the conservation of biodiversity and the sustainable utilisation of biological resources.
From the elaboration point of view, the National Strategy and its action plan were elaborated by a group of national experts and then passed on to large consultations during national and provincial seminars.

At the beginning, 21 themes were tackled and regrouped in 3 chapters:

- Conservation of biological resources;
- Management and sustainable use of the elements that make up the biodiversity and,
- The implementation of the national strategy and the action plan.

This regrouping into chapters took into account the triple objective of a sustainable development such as the one in the Convention on biodiversity, namely:

- Conservation of biodiversity,
- Sustainable utilisation of its elements,
- Just and equitable distribution of the benefits accrued from the exploitation of the resources.

The aspect of sharing of the benefits, much as it did not have a separate chapter, was taken into consideration in the themes touching on the utilisation of resources and the implementation of the strategy and the action plan.

The following themes were adapted with regard to each section:

Section 1: Biodiversity conservation

1. Acquisition of knowledge
2. Protected areas
3. Threatened or vulnerable species and ecosystems
4. Conservation *ex situ*
5. Biodiversity: indigenous or foreign organisms harmful and modified living organisms
6. Fight against negative global changes (population increase, urban development, reduction of harmful gases)
7. Urgent environmental measures

Section 2: Management and sustainable utilisation of biodiversity resources.

8. Fauna resources
9. Forest resources
10. Agricultural resources
11. Mineral resources
12. Energy resources
13. Biotechnological resources
14. Environmental resources

Section 3: Implementation and follow-up of the strategy and Action Plan

15. Information, sensitising, education and training
16. Participation of the population, NGO's and the private sector
17. Native communities
18. Judicial and institutional framework
19. Encouragement measures
20. International co-operation
21. Assessment and follow-up

4.2 National plan on biodiversity

In an attempt to remedy the continuous degradation of biodiversity in the DRC, several propositions of activities to be carried out were formulated both at national and provincial workshops.
In the end, the activities that were similar to priority 1 in the national strategy were adopted in the Action Plan.
The national action plan was to cover the period between 1999 and 2003 at the end of which it should have been actualised, having progressively included the actions in priority 2 and 3 of the national strategy.

Contents of the present plan consists of a total of 17 project papers whose titles are:

1. Management plan for national parks
2. Protection and re-establishment plan for threatened species and ecosystems
3. Development of the Institute of Zoological and Botanical gardens of Congo
4. Programme on eradication of malaria parasites
5. National strategy on biosecurity
6. Management plan on exploited animal species
7. Management plan on exploited floral resources (forest)
8. National programme on reforestation
9. National programme on sustainable agriculture
10. Study on the impact of mineral exploitation on biodiversity
11. National strategy on wood energy efficiency
12. Environmental assessment procedures
13. University programme on research and training in the management of the environment (biological resources)
14. Creation of a national framework on biodiversity
15. Legal framework on environment
16. Economic tools and encouragement measures
17. Creation of a national focal point for the exchange of information on biodiversity

4.3 Example of ties- the case of Bassin de la Luki

Bassin de la Luki is situated in the guineo-congolaise forest region. The forest is called Mayombe on the side of the Republic of Congo and Mayumbe on the side of the DRC in the lower province of Congo.
The presence of species of economic interest such as *Terminalia superba* and *Chlorophora excelsa*, as well as the proximity of the port of Matadi, which facilitates the exportation of wood, has encouraged the excessive exploitation of this forest.

One thousand five hundred and thirty plant species, belonging to 146 families, are known in this basin.

The mixture of rain, secondary and marshy forest species increases the ecological interest of this forest.
Among the rainforest species one finds: *Staudtia spitata, Polyathia suaveolens, Oxyanthus speciosus, Gilbertiodendron dewevrei, Diospsyros* sp., *Brachystegia laurentii*.

In the secondary forests one notes the presence of the following: *Macaranga spinosa, Maesa rufescens, Harungana madagascariensis, Holoptelea grandis, Pentaclethra macrophyla, Triplochiton scleroxylon, Musanga cecropioides, Phyllanthus discoideus, Trema orientalis, Vernonia conferta, Caloncoba welwitschii, Hymenocardia ulmoides, Pentaclethra ectveldeana, Plagiostyles klaineana, Tetrochidium didymostemon, Macaranga monandora, Pycananthus angolensis, Maesopsis eminii, Xylopia aethiopica, Pterogota macrocarpa, Myrianthus arboreus, Funtumia latifolia, Fagara macrophylla, Fagara altissima, Ricinodendron heudelotii, Bosqueia angolensis, Combretodendron africanum, Chlorophora excelsa, Alstonia boonei* and *Terminalia superba*.

In the swampy forest species one can cite: *Cleistopholis patens, Coelocaryon botryoides, Dialium corbicieri, Baphia dewevrei, Carapa procera, Quassia africana, Memecylon* sp., *Millettia drastica, Mitragyna stipulosa* and *Symphonia globulifera*.

As far as fauna is concerned, one can see the following species in the Mayumbe forest:

Mammals:
Viverra civetta, Genetta trigina, Nandinia binotata, Cephalophus monticola, Cephalophus nigrifrons, Cephalophus dorsalis, Cephalophus sylvicultor, Potamochoerus porcus, Dendrohyrax dorsalis, Tragelaphus scriptus, Manis gigantea, Manis tetradactyla, Manis tricuspis, Taphozous mauritianus, Nycteris hispida, Hystrix cristata, Cercocebus albigne, Cercopithecus cephus, Cercopithecus neglectus, Perodicticus potto, Gorilla gorilla, Pan troglodytes, etc.

Amphibians:
Xenopus calcaratus, Bufo regularis, *Rana albolabris, Rana maxareniensis,* etc.

Birds:
Poicephalus robustus fascicollis, Psittacus erithacus erithacus, Polipicus elliotti, Bycanistes albotibialis, etc.

Reptiles:
Naja melanoleuca, Dendraspis kaimosae, Causus rhombeatus, Bitis nasicornis, Agama calonorum, Monopeltis guentheri, Mabuia maculibris, Mabuia raddonii, Chamaeleon dilepis, etc.

The animal species that are widely hunted are; cephalophes, civet, potamocheres, porcupines, rats, pangolins and monkeys.
Faced with the increasing pressures of forest exploitation and deforestation in Mayumbe, the Ministry of Environment, which manages the Luki forest reserve, created in 1937 and covering 32,714 ha, decided in 1979, in collaboration with UNESCO, to classify this reserve in the world network of biodiversity (M.A.B.)

From that time the objective was to make this reserve an entity that would reconcile the protection of the biodiversity and intergrated development. Through intergrated pilot operations, carried out in the transition zone of the reserve, the latter was to contribute in the rational valorisation of natural resources, agriculture, forest, fauna, tourist for the benefit of the local communities.

To achieve this objective, the reserve would be subdivided into several blocks for forest exploitation and a central zone for the protection of biodiversity and scientific research.

In 1980, under the pretext of work to open routes in the reserve, the forest exploiters destroyed a third of the central zone despite the fact that this zone was totally protected by law.

In 1986, the development plan of the Reserve written by the Permanent department of inventory and forest development of the Ministry of Environment estimated the annual cutting of wood at a net volume of 4,500 m^3 in the areas marked for exploitation, or a net volume of 2,700 m^3 of wood per year for all the species confined for a period of 20 years.

Taking into account the demands of the exploiters and the forecast of the Plan on the Development of Reserve the net volume is left at 530 m^3 per year in 20 years, or 10,800 m^3. Unfortunately, in less than 10 years the volume of wood cut from the Reserve, save for the cubage illegally cut, will go up to 16,352,895 m^3. This volume is by far higher than that estimated in the Development Plan.
This situation led to the disappearance of species needed in the world market, from the exploitation zones of the Reserve. In addition to that, there was anarchical human settlement in the Reserve.

Since no study has been carried out on the fauna after this anarchical exploitation,we are not in a position to give information on numbers. Nevertheless, in an empirical way we know that the destruction of an habitat has consequences on the fauna found in that habitat.

The example of Luki shows the disparity that exists in the DRC between what is planned and what is realised.
The National Administration on Environment does not have sufficient means (human, logistic and financial) to ensure a better follow-up of the forest exploiters who are preoccupied with the benefits they get, to the detriment of the ecological consequences.

For such a case, the proposed solutions are :
- Come up with a biological inventory so as to identify the zones with high biological value and to totally protect them.
- Reorganise the exploitation by coming up with follow-up and evaluation measures as well as sanctions for the offenders.
- Suspend forest exploitation where ecological damages are great.
- Go back to agroforestry where possible (for example : Limba Association - cacao or coffee)

4.4. Major problems and constraints

The political willingness alone is not enough. The co-operation of national and international partners is needed to put the programme into action.
For it to succeed, the following constraints must be done away with:

Political:	– Uncertainty linked to the tense socio-political climate
Economic:	– Change of resources into money
	– Economic instability
	– Dollarisation and hyperinflation
Social:	– Penetration of informal activities
	– Unemployment

Technical:	–	Old production equipment
	–	Poor state of basic infrastructure
	–	Difficulties in getting petroleum products
Human Resources:	–	Under qualification
Biodiversity conservation:	–	Forest fires
	–	Poaching
	–	Illegal sale of live specimen and their products
	–	Destruction of the habitat

V. PROPOSED STRATEGIES AND SOLUTIONS

5.1. Planned actions

The DRC has developed several projects in the forest sector. Following are some of the examples related to the conservation of biodiversity:

Project 1
PNAE CONGO

Title of the action:
Reduction of the pressures exerted on the dense Guineo Congolese rainforest

Area:
Natural ecosystems

General goal:
The project will lead to the reduction of the pressures caused by the irrational exploitation of forest resources, by preparing a sustainable management plan and strengthening supervision and application of the rules in this area.

Objective:
To ensure a sustainable exploitation of the natural resources of the Guineo-angolaise forest.

Expected results:

- Put in place control and supervision of the regulations
- Inventory of available results
- Management plan and exploitation of resources

Estimated costs in US dollars:
US$ 658,000

CONSTRAINTS

- Problems among the executing departments within the same ministry (DGFC), National Tree Planting Department (SNR), appropriate technical department on wood energy (CATEB), permanent inventory department of forest planning (SPIAF)
- Centralisation of the administration
- Lack of financial credit
- Under qualified agents
- Lack of involvement by the active population

Project 2
PNAE CONGO

Title:
Management of dense rain forests

Area:
Natural ecosystems

General goal:
The project will contribute towards improving the potential knowledge on forest resource in view of their sustainable and rational exploitation, by the promotion of a participatory management involving the rural and native communities.

Objective:
Strengthen the planning of forest resources in the light of their durable utilisation and the guarantee of the continuity of the biodiversity.

Expected results:

- Data on potential biological resources (inventory on 1,000,000 ha annually)
- Creation of local land management committees (participatory management)
- Improvement of production statistics by putting together available data

Estimated costs in US dollars:
US$ 5,596,000

CONSTRAINTS

- Centralisation of administration
- Lack of financial credit
- Under qualified agents
- Lack of involvement by the active population

Project 3
CERDAS

Title:
Inventory of the sacred forests in the DRC

Area:
Natural ecosystems

General goal:
The project will contribute towards improving the potential knowledge on forest resource and record the different sacred forests in the DRC.

Objective:
Contribute to the validation of biodiversity of the sacred forest.

Expected results:
- Data on ethno-botanical and zoological sacred forests;
- Creation of a database based on ecological and traditional knowledge;
- Improvement of conservation strategies of natural sites;
- To help the population move from a mentality of superstition to that of ecological preservation.

Estimated costs in US dollars:
US$ 340,000

CONSTRAINTS
- Lack of financial credit
- Unavailability of traditional information
- Inaccessibility to certain regions

5.2 Proposed solutions

5.2.1 At the policy level

- Speed up the adoption of the law – environmental framework integrating the diverse areas concerning biodiversity contained in the national strategy and the convention on biodiversity;
- Integrate the knowledge and the local know-how which has proved successful in the preservation of biodiversity and the influence of the local communities in the biodiversity conservation policy;
- Implement a certification system for sustainable forest planning - naming the production forests, and allowing the DRC to benefit from funds from the convention on Biodiversity and support the SPIAF in the reduction of forest exploitation;
- The DRC last year intended to organise a seminar on certification. However, the present situation did not allow for the organisation of this seminar.

While waiting for the certification process to materialise, it is necessary to:

- Develop a realistic book list in the planning and management of environmental and natural resources;
- Apply a rigorous biodiversity protection policy through the cultural and historical heritage of the DRC;
- Include in the decentralised budget the amount due to the traditional chiefs;
- Put an end to the uncertainties linked to the socio-political climate.

5.2.2 At the economic level

- Carry out socio-economic studies (the economic importance of these resources to the local population, industries and the government);
- Guide forest exploiters in adopting a favourable attitude towards the environment;
- Give the wood exploiters the necessary production tools;
- Follow administrative procedures in the evaluation process or in the sale of the forest products;
- Encourage acquisition of equipment on hire purchase;
- Develop alternative economic activities linked to firewood, charcoal by creating socio-economic infrastructures in the affected areas;
- Strengthen the contribution of forest enterprises to economic development and set up a tax system.

5.2.3 At the technical level

- Equip the management of forests and hunting with the means necessary to enable it to play the intersectorial coordination role;
- End the concentration of personnel and technical resources in Kinshasa to the detriment of other provinces;
- Form professional bodies charged with the supervision of the exploitation of fauna.

5.2.4 At the level of human resources

a. Training

- Regular organisation of rotational sessions for wood agents and DGFC agents
- Rehabilitation and capacity building of natural environmental resource planning

b. Education

- In collaboration with NGOs, promotion of education and sensitisation of the public, primary and secondary schools and university on the importance of forests.

5.2.5. Biodiversity conservation

- Creation of data base on the sacred forests of DRC and their biological resource potential;
- Come up with an inventory on the forest heritage with a historic and cultural value;
- Application of the outcome on the convention on biodiversity and the CITES convention;

- Strengthen the forest resource planning;
- Intensify forest resource research with a view to reorganising conservation priorities;
- Strengthen the supervision of protected areas;
- Put in place a permanent financing mechanism for biodiversity conservation.

CONCLUSION

The analysis of the forest sector in the DRC in relation to biodiversity shows that there are a number of problems related to the strategic management of ecosystems, all these problems have been regrouped under institutional capacity, legislation, management of protected areas and forest planning.
The abundance of forest resources is contradicted by lack of sufficient quantitative and qualitative knowledge on them and their inherent vulnerability to the natural and anthropological factors as well as human pressures on the forest. Insufficient industrialisation of the forest sector has led to the growth of the informal sector.
The few protected areas are faced by socio-economic crisis.
Our report has tried to show that all these structural factors make it difficult to define a guaranteed model on the survival of tropical forests in the DRC.

Thanks to knowledge and local know-how, efforts have been made so that the Congolese forest heritage is not destroyed.
It is through all the strategies developed in the report that the DRC can guarantee the development of a harmonious and sustainable forest sector.

What was done and what was not done?

To conclude, we will look **at the active**:

a) Forest legislation exists, but it is 52 years old. A new law project is already written.
b) Knowledge and traditional know-how of the native population preserves biodiversity of the forest ecosystem.
c) The national forest plan has been outlined since 1988 but is not effectively applied.
d) The forest policy conforms to international agreements (cfr. Ratification of 8 international accords).
e) A systematic inventory of forest ecosystem and species has been realised.
f) Numerical cartography has been developed (cfr. Cartographed ecosystems of Salonga Park, Fauna Reserve at Okapis and Kahuzi-Beiga Park).
g) The role of NGOs has been strengthened in the local communities.
h) Existence of the National Strategy and the Action Plan on biodiversity in the DRC with the outcome of: the creation of a National Network on biodiversity and elaboration of the legal framework project on environment.

On the other hand **in the passive** we note that:

a) The adoption of a legal framework on the environment has not been effected.
b) The action plan for the implementation of the National Strategy on biodiversity has not yet been executed, as such, a real integration of the problem of biodiversity in forest exploitation has not yet been realised.
c) The forest policy is no longer operational since 1970.
d) Several species are subject to poaching, intensive capture and extinction.
e) Research at the genetic level is not advanced.
f) The socio-economic studies on biodiversity are not fully realised.
g) Wood network agent sessions do not exist.
h) Environmental education is less developed.

The worry in integrating the problem of biodiversity in the forest sector is expressed in the National Plan on Environmental Action (PNAE) and the National Strategy and Action Plan on biodiversity but in practice a lot still remains to be done.

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