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Exploitation of Littoral Zones in Cameroon

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Abstract: Littoral zones the world over fall amongst the most productive ecosystems because they possess diverse attributes which could be exploited for socio-economic development, such as mangroves. The Republic of Cameroon could equally be accessed via its maritime borders in the south and south west directions along its Atlantic coast. These coastal areas have developed a huge expanse of mangroves. The mangroves along Cameroon's coast could be classified into three groups: the Rio Del Rey Estuary mangrove, the Cameroon Estuary mangrove and the Rio Ntem Estuary mangrove. Due to the lack of a coordinated management system, these mangroves have been exploited unscrupulously by the neighbouring communities in different ways as a livelihood activity in order to satisfy their needs and wants. This study sets out to assess the exploitation of mangroves along the littoral coast of Cameroon through field surveys and the consultation of institutional sources from government ministries such as Forestry and Wildlife (MINFOF) and Environment, Nature Protection and Sustainable Development (MINEPDED). It was observed that Cameroon's Littoral zone extends to a distance of about 402km long, containing about 250,000 hectares of mangroves. However, these mangroves are unsustainably exploited by the neighbouring communities notably for fishing, mineral (mostly sand, petroleum) exploitation, wood harvesting for the smoking of fish and fuel wood, housing or settlement expansion, industrial activities, etc. All these human activities jeopardize the future existence of this mangrove-rich ecosystem as well as the benefits they hold for environmental sustainability and sustainable development, which is a major concern of the Cameroon government who have enacted various legislation and policies for their sustainable management.
Keywords: Exploitation**,** Littoral zones, management, legislation, mangrove, Cameroon.

INTRODUCTION

Cameroon is endowed with a rich and diversified flora and fauna. In addition to its dense forest found in the different ecological zones of the country, one can identify therein forest, among which include the Atlantic coastal mangroves.

The term "mangrove" usually refers to a complex of wetlands under the influence of tides and which consists of swamp forests and other settlements found in the intertidal zone under the tropical and subtropical latitudes.

In Cameroon, mangrove areas cover a land surface of more than 250,000 hectares. They are among the most extended in Africa. It should be pointed out that Cameroon has signed all the conventions related to sustainable management of Littoral zones, including that of mangroves along its Littoral zones. According to [1], Littoral zones fall amongst the most productive ecosystems in the biosphere; they pose specific attributes from which socio-economic development can either benefit or suffer. Thus, their harmfulness is commensurate to their potentials as they are often subjected to chaotic and even destructive exploitation which tends generally to offset the ecological equilibria.

The study area, (the Littoral zone of Cameroon), is located within the Gulf of Guinea large maritime ecosystem, and stretches at the geographical coordinates of Latitudes 2°20' – 4° 40' Latitudes, from the Equatorial Guinea border to the Nigeria border and Longitudes of $8^0$15'E and $9^0$35'E (Fig. 1). It is opened to the Atlantic Ocean with a coastline of about 402km (Sayer et al, 1992 cited in [2, 1].

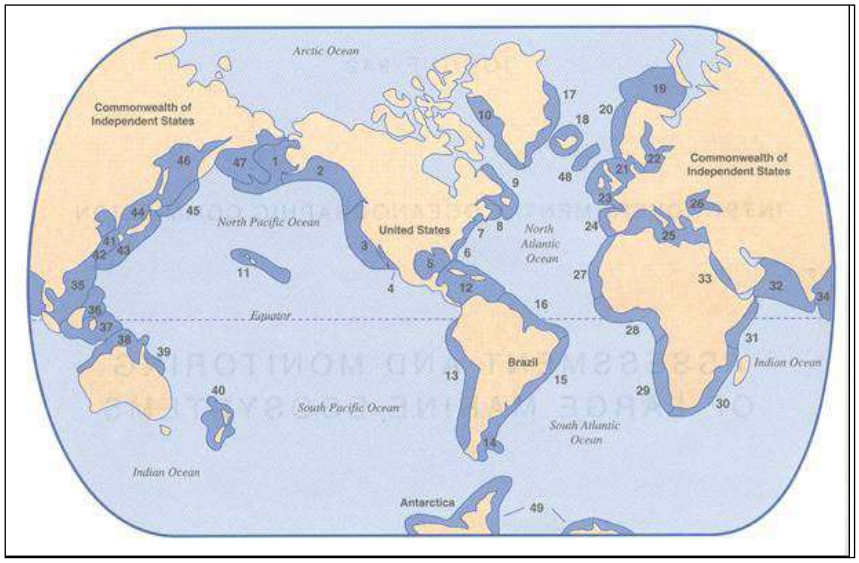

Fig-1: Gulf of Guinea large marine ecosystem (28) within the world map of large marine ecosystems

The Littoral zone of Cameroon (Fig. 2) is defined as the area that extends from low tide mark to 60km hinterland and to 200 nautical mile limits offshore. The continental shelf is about 10.600km^2 with an Exclusive Economic zone (EEZ) of about 15,400km^2. All aquatic ecosystems of this coastal plain of the Atlantic are covered within these limits, notably: ocean, coastal forests, deltas, sand dunes, mangroves, coastal rivers, estuaries, bays, lakes, beaches muddy coasts [2]. The limits of the coastal environment start from the high tide mark up to 60km inland. The continental limit is illustrated by a hypothetical line drawn from the north to the south which passes throug: Mundemba, Muyuka, Dibombari, Edea and Nyambessan. This line passes through the South West, Littoral and South Regions.

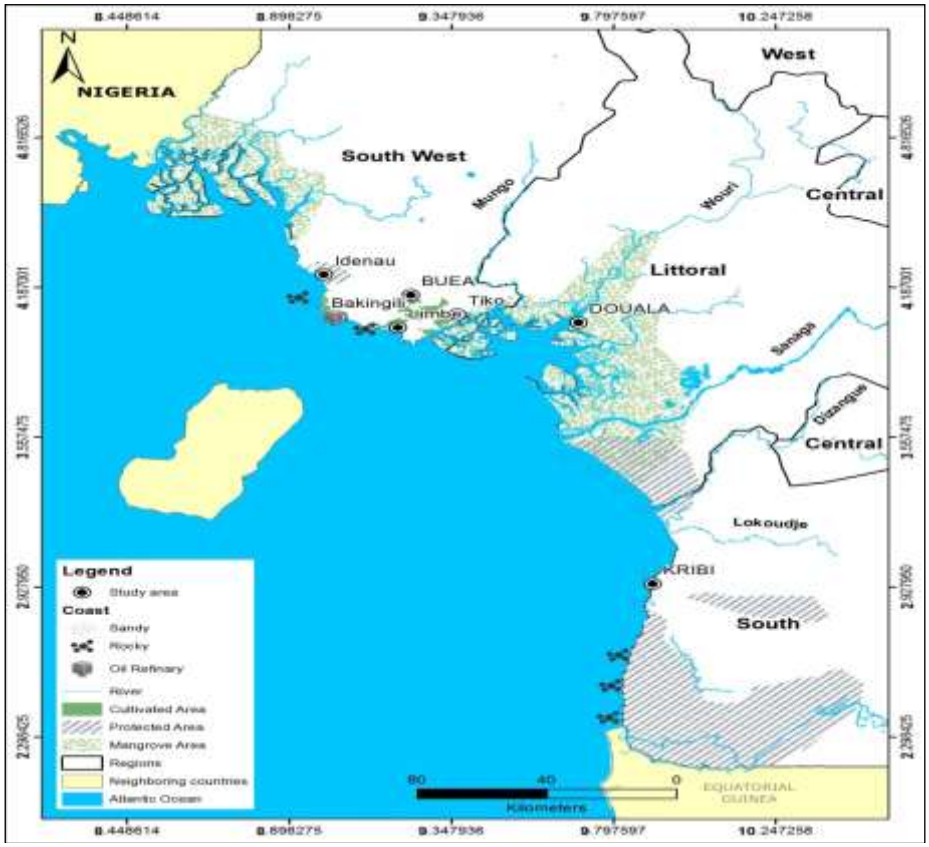

Fig-2: The limitation of Cameroon coastal and marine environments

Regarding the population, the Littoral zone of Cameroon covers three regions: South, Littoral and South West. In 1987, the population of these regions represented about 15% of the total population of Cameroon. With the growth rate varying between 2 and 6%, this population was almost doubled in 1995. Today, it is estimated to constitute between25-30% of the country's total population. As far as economic activities are concerned, this zone is considered as the "economic lung" of Cameroon because it hosts about 70% of the economic activities of the entire country. Consequently, with respect to national averages, this region has less jobs in the primary sector and more in the secondary and tertiary sectors: 36.9% of the active population is engaged in the primary sector as against 71.9% for the whole country: 21.4% and 41.7% Work in the secondary and tertiary sectors respectively, as against 7.3% and 20.2% for the whole country [1].

Like all Littoral zones, the Littoral zone of Cameroon is complex and diversified environment controlled by atmospheric, marine and terrestrial phenomenon. This diversity is a result of not only natural changes, but also human activities and even the diversity of its resources [1]. The main problem of this study is the fact that the management of this zone and its resources is complex because of the absence of an institution in charge of the management the coastal zone. As consequence, responsibilities are fragmented leading to the multiplication of conflicts of resources management between institutions with overlapping missions. This paper aims at assessing the exploitation of mangroves by neighbouring community inhabitants as well as the Cameroon government's policy vis-à-vis the management of Littoral zones.

METHODOLOGY

The data for this study was collected via two sources: field surveys and secondary sources. Field surveys entailed the direct observation of various human activities taking place along this Littoral zone by the inhabitants of the neighbouring communities. It also involved semi-structured interviews with key resource persons such as officials of MINFOF and MINEPDED in Yaoundé. Besides the institutional actors, interviews were also enabled with some members of the neighbouring local communities adjacent to these littoral zones who exploit the area using a random sampling method. They were considered as the target population for the study, since their livelihoods depend on these areas. Field studies were carried out with this target population for a duration of 5 weeks continuously during which relevant information were obtained. Finally, photographs were also taken from the field.

Besides the primary sources, other secondary sources or literature were equally consulted. These include end of year report from government ministries, specifically MINFOF and MINEPDED. These documents made reference to the management of the littoral zones in the country, including mangroves. Also, journal articles some of which have been obtained from the internet were equally consulted. A review on literature available in both government and non-government organisations, Libraries along Cameroon's Littoral zones, the capital cities of Yaoundé (administrative) and Douala (economic) was made to acquire relevant information. The collected data was analysed using descriptive techniques as well as photographic illustrations.

FINDINGS

Mangrove diversity along the Littoral zone of Cameroon

Mangroves in the Cameroon covers about 2700km. along its Littoral zone, the mangroves still have enormous potentials, despite the destruction of almost one of their total. They serve as a nursery zone and shelter for shrimp and fish [1].

Mangroves in Cameroon develop around the mouth of many rivers and this favours the development of a multitude of islands with many channels which constitute large forest areas [3]. Three main groups of mangroves are attested in the country:

- The Rio del Rey Estuary mangrove whiuch is located along the Rio del Rey Estuary at the frontier with Nigeria (Akpa River, Yafe, Ndian and Meme);
- The Cameroon Estuary mangrove, which comprises the Bimbia, Mungo, Wouri and Dibamba Rivers around Douala and Limbe Towns;
- The Rio Ntem Estuary mangrove which is found in Southern Cameroon at the boundary with Equatorial Guinea. It consists of small populated areas situated along the southern coast of the mouth of the Sanaga, Nyong, Lokoundje and Ntem Rivers, around Campo Town [3].

According to [3], mangroves of the Cameroon's Littoral zone still have enormous potentials, despite the destruction of about one third of their total area. They cover 2,700km^2 (Valet, 1973 cited in [2] and serve several purposes:

- Shelter interesting endemic species of flora and fauna.
- Mangrove trees constitute excellent shelter for shrimps, molluscs and fishes, and substrate for periphyton consumed by animals.
- Aquaculture and eco-touristi sites.
- Nursery zone for fish and other aquatic animals

Cameroon is a signatory to all international agreements which specifically concern mangroves and which were signed during the Rio del Rey Summit, one can cite the Convention on Biological Diversity (CDB), the United Nations Framework Convention on Climate

Change (CCNUCC), the Kyoto Protocol. Other conventions are much older, especially the Convention on Wetlands and Migratory Species, which was specifically concerned with mangroves; the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), and the Roma Declaration for Responsible Fishery[1]. The country is also member of some regional organizations such as the Conference of Ecosystems of Dense and Swamp Forests of Central Africa (CEFDHAC) and the Commission of Forests in Central Africa (COMIFAC). The targeted objective being the creation of a network of cross-border protected areas.

A study carried out in 2006 by the Ministry of Forest and Wildlife (MINFOF) and the World Food Program has identified 67 species of mammals, 34 of fish and 167 of birds in the Cameroon mangroves [3]. To this list can be added many species of reptiles and amphibians (*Schusaquaticus*), Some species are of local use such as Swamp-Dwelling antelopes (*Tragelaphus spekei*), Water Chevrautain (*Hyemoschus*), Cameroon Clawless Otter (*Anyxcongicus*), Sea Cow (*Trichecussenegalensis*), the Old World Monkey (*Cercopithecidae*) [3]. Many of these species are vulnerable and are listed among the endangered species. In the Rio Ntem area, the beaches which surround mangroves are an area where Sea Turtles, a protected species, lay eggs. The presence of White Sharks in this river and that of elephants in the vicinity of mangroves was confirmed by wildlife and fishery workers.

Artisanal fishing (Fig. 3) carried out in mangrove waters provided information about the species which are found therein and has therefore revealed the presence of a large community of Pelagic and Demersal fish. The significant proportion of species caught during maritime fishing consists of Crustaceans such as small crustaceans which are locally called "crayfish or mandjanga" (*Nematopalacm or Hastatus*), Red Crawfish (*Penalusduorarum*), Caramote Prawn, and crabs (*Panopeus africanus*, *Cardiosomaarmatus*) found in the mangroves. One can also add oysters and gastropods which belong to the groups of molluscs.

[1]After WWII, the preservation of ocean and maritime funds was the main concern of the International Community; 1948: Founding of the International Maritime Organization in Geneva (OMI), a specialized institution of the United Nations in charge of maritime transport security and ship pollution prevention in seas.1960: Founding of the Intergovernmental Oceanographic Commission (COI) which is attached UNESCO. This commission promotes international cooperation and the coordination of programs in marine research and surveillance as well as the conservation and protection of marine environments. 1969: Signature of the International Convention on Civil Liability for Oil Pollution Damage. 1976: Founding of the World UNESCO Heritage Committee. Out of the 197 designated sites, 70 of them are either coastal or maritime sites. 1982: The United Nations Convention on the Law of the Sea is signed at Montego Bay in Jamaica. This convention defines maritime spaces, rights and duties of States (navigation and exploitation of resources) and marine environment protection. As a result of this convention, the Sea International Court was founded in Hamburg. 1992: The Convention on Biological Diversity adopted during the Rio de Janeiro Earth Summit has established a coherent and complete network of Protected Marine Areas (AMP) in the world. 1998: Ocean International Day. 2002: During the Summit for Sustainable Development in Johannesburg, a global forum on oceans, coasts and Islands was founded in order to promote the sustainable management of oceans, coastal areas and islands. June 2009: The United Nation General Assembly has instituted the World Oceans Day which is scheduled on July 8.

Fig-3: Artisanal fishing carried out along the Littoral zone of Cameroon

Mangroves in Cameroon display a remarkable productivity. The ones which are more taken care of are found in the Littoral Region (Cameroon Estuary) and in the Southwest Region (Rio Del Rey). They comprise many high trees among which dominate (*Rhizophora racemosa* and *Avicenna africana*). When these trees are between 15 to 25 years old, their diameter reaches 25 cm with an annual growth of 1.9 cm. Their density is 1000 trees per hectare in recently populated areas. The average material volume on foot is estimated at 1333 m^3 per hectare (2000 trees per hectare) in the Littoral region, compared to 1537 m^3 per hectare in (2350 per hectare) in the Southwest [4].

Also, Non-Timber Forest Products (NTFPs) comprise about 241 plant species which are frequently used, 113 of them being used for consumption and 128 of them used for miscellaneous purposes. Five main categories are identified: edible, craft, wrapping, mystico-religious and energetic products. In the Littoral Region, there are 77 species from which NTFPs have been obtained and 17 other are grown in kitchen gardens [4]. It has been revealed by the Ministry of Environment and Nature Protection (MINEP) that many studies and estimates conducted by the geology and mine research unit have shown that the coastal region of Cameron is endowed with much mineral resources:

One can cite minerals such as ilmenite in the Souelaba Headland (331.000 t), in Londji (137 000t), olivine in the vicinity of Idenau, syenite in Eboundga found between Kribi and Campo, iron of Kribi (300 million tons); sources of mineral water of Muyuka in the vicinity of Buea and in Bakingali in the Southwest and in Njombe in the Littoral; polymetal nodules which might be found in the deep waters, but their exact quantity has not yet be determined; the quantity of sand and gravel in the area of Manoka, near Douala has been estimated at 200, 000 tons.

Cameroon's littoral or maritime zone which is estimated at about 402km on the coastline lacks sufficient resources from water such as fish. Due to its rapid population growth and the increasing home demand for fish as a source of protein food, the country is unable to supply satisfactorily the national market. Consequently, in order to ensure the permanent supply on the markets, Cameroon must import fish. This high external dependency on water resources (fish) is the obvious proof that the country has not yet reached its food self-sufficiency. This external dependency on food products has been decried by the former Minister of Agriculture and Rural development[2]. Also, the fact that the country has not yet got its food self-sufficiency has often weakened its political power. In 2008, the riot which took place in the economic capital was due to the increase of the prices of basic consumption products on various markets. That is why this riot was known as "riot for hunger".

Socio-economic uses of mangroves along the littoral zone of Cameroon

Mangroves are the scene of intensified economic activities which are conducted by an increasingly growing neighbouring human population in coastal areas globally. The census conducted in 2005 has estimated this population at 2 million inhabitants in this littoral region. This population is essentially heterogeneous and comprises Cameroonians, Nigerians, Beninios and Ghanaians. The man activities carried out by these populations are fishing, smoking fish, hunting, cutting-down and trading of wood, collection of NTFPs (leaves, stems, barks, fruits, honey), and sand extraction (Fig. 4).

[2] Essimi Menyie, Ministry of Agriculture and Rural Development, during an interview granted to Cameroon Radio Television on July 18, 2013 said that Cameroon spend more than CFA 6000 billion annually for the purchase of food products (rice, fish).

Fig-4: Sand mining along the Littoral zone of Cameroon (Cameroon estuary mangroves at Yopwe in the Douala)

The populations who live in the vicinity of mangroves are very skillful in making and running canoes. They constitute the preferred coastal network for the transportation of goods and people in the areas where road transport is defective. The vitality of the activities in the area is due to the improvement in the quality of small boats, availability of motor boats and the increasing demand in miscellaneous products in the urban centers. Ndin Ndongo [5] upholds that:

Many generations of littoral communities have always drawn from mangroves firewood and wood for building habitats and making canoes and for medicinal purposes; food security is linked to the existence and vitality of mangroves from which populations get crayfish, oysters and other species of shellfishes; local fishing which is the main activity of the people of littoral community in Cameroon depends on the vitality of mangroves. Mangrove is an area of intensified economic activities carried out by an increasingly growing population. This population comprises people of various nationalities: Cameroonians, Nigerians, Beninions and Ghanaians whose main activities are fishing, sand extraction and the collection of water products such as mussels and shellfishes, fish smoking and its trading in the country, hunting, agriculture and cutting down of trees to make canoes and paddles. Although informal, the economic activities are complex and well organized. It is the case of the trading of sand and firewood and fuel wood. Also, many NTFPs such as creeper/liana and rattan are in great quantity in the region are much needed in craft industry [5].

In addition to fishing, logging (Fig. 5) and bush fires cause a lot of damages in the mangroves of the Littoral zone of Cameroon. The exploitation of sand quarries, transport by canoe and boat as well as the trade of fuel constitute a danger for the ecosystem. Artisanal fishing is equally practiced with the use of unauthorized fishing nets and has a negative impact on the water resource capital. The town of Douala with its port, industrial and residential infrastructures is partly built on mangroves. The town has expanded onto wetlands in previously mangrove occupied areas which degrades water sources and neighbouriong lands.

Fig-5: Unsustainable harvesting of mangroves used as fuel wood for fish drying by inhabitants along the Littoral zone of Cameroon

The Nigerian population constitutes more that 75% of the populations of the Rio del Rey Estuary mangroves while the Cameroonian population constitutes 15%. Ghanaian, Beninese and Togolese populations are also highly represented in this area. The impact of these populations on mangrove forests and water resources is very significant [6]. For instance, due to its enclaved nature, the Rio del Rey Estuary mangrove is used as an informal route for smuggling. The majority of smuggled products which are sold on Cameroon markets transit through mangroves where clandestine routes have been developed. For instance, [1] established that road networks in this zone covers some 1400km long, representing average density of 1km per 1000 inhabitants where the national average stands at 3.5km per 100 inhabitants.

The Rio Ntem Estuary mangrove is not very much populated. Despite this low population density in the Rio del Ntem Estuary mangroves situated around Campo Town, experiences a high pressure of human activities on its littoral mangroves. In the Dipicar Island, the populations which originate from Equatorial Guinea contribute to the development of illegal activities such as poaching and anarchical fishing with unauthorized fishing nets. A high pressure exerted on NTFPs has also been observed in this island [6]. Megaprojects such as the construction of the Menvé'éle dam and that of the Kribi Deep Seaport are also ongoing in this area. Off-shore petroleum platforms both in Equatorial Guinea and in Cameroon have significantly negative environmental and social impacts on these mangroves. This is the case of the PERENCO Company which is a company which has been operational in Cameroon for many years in the sector of exploration and production of hydrocarbons. The exploration activities of the PARENCO Company are carried out in Kombe-Nsepe and Ebodje, both situated in the Douala and Kribi-Campo Basins. The company owns two concessions, more precisely Moudi in the Rio del Rey Basin and Ebome in the Kribi-Campo Basin. The installations of this company constitute potential risks of pollution through:

- The Floating Terminal for Stocking and Offloading (TFSD) is a tanker which has been converted into a tank for stocking crude oil. Hydrocarbons are usually spread in the environment from this tank when the tank is not functioning well;
- The waste water of the tankers which come for refueling and which do not follow the regulations which prohibit ballasting;
- The generation of waste water by the boats which come for support;
- Collision risks during offloading, risks of accidental leaking [7].

Mangroves in Cameroon are endowed with much oil and gas resources, especially in the Rio del Rey Basin. Cameroon petroleum production is carried out on 49 offshore sites and the Rio del Rey Basin contributes at 90% in the national production of crude oil.

Water ecotourism is not yet much developed along the Cameroonian mangroves despite the fact that it is an activity which can generate much financial resources to the decentralized territorial collectivities and also to neighbouring communities. National mangroves are endowed with an exceptional richness in wildlife products which comprise a great variety of reptiles: boa constrictors, crocodiles, caymans, varans, turtles, migratory and sedentary birds, primates, fish and mammals. This activity is advantageous not only to the fishermen who will become tourist guides but also to those who will develop in addition to tourism various activities which generate financial incomes such as gastronomy, handicraft, lodging, etc. The incomes generated by tourism will diversify the sources of income of the neighbouring communities and therefore increase the purchasing power which will alleviate poverty which has gradually been rampant in Cameroon for the past two decades [8]. It should be mentioned that many African countries succeed in boosting their economies thanks to tourism. It is the case of countries such as Tunisia, Morocco, Egypt, Kenya, South Africa, etc. Although Cameroon is endowed with an important potential for tourism, one does not understand why this activity which offers much job opportunities is not effectively developed along the littoral zones of the country.

The bases for the sustainable management of mangrove forest resources in Cameroon have been elaborated and codified taking into account the international commitments of the country. With the help of development partners, the reforms taken in the domains of the preservation of the environment and the sustainable management of natural resources have enabled the putting at the country's disposal of a reviewed national and institutional framework as well as a body of laws and regulations. On can also cite amongst other:

- The outline law on environment management;
- The law on the regime of forests, fauna, fishery and its implementation texts among which include the texts on the creation of a Special Fund for Forestry Development (FSDF) and the Special Fund for the Planning and Equipment of the Areas of Conservation and Protection of Fauna (FSPF)[3];

[3] The management of funds involves an inter ministerial committee in charge of determining the annual program of activities which is to be submitted for approval to the ministry concerned before any disbursement of funds for various interventions.

- The creation of a Ministry of Forestry and Wildlife (MINFOF);
- The creation of a Ministry of Environment and Nature Protection (MINEP);
- The creation of a Ministry of Planning, Programming, Development and Regional Development;
- The drafting of a document on forestry policy
- The National plan for the Management of the Environment;
- The Program for the Conservation and Management of Biodiversity (PCGB);
- The Forest-environment sectorial program (PSFE).

The outcomes from these legal frameworks have been instrumental to the contribution of the forest-environment sector in the Poverty Reduction Strategy Paper (DSRP) which has served as a reference framework for the planning of all recovery activities and national economy revival [9]. Given that the DSRP fell short of public expectations, it was replaced by the Growth and Employment Strategy Paper (DSCE). An important component of this program is devoted to the Rural Sector Development Strategy (SDSR) which takes into consideration the sustainable management of natural resources (including mangroves), but more specifically the sustainable development of mangroves. The main objective of the Growth and Employment Strategy Paper is to contribute efficiently to the improvement of the living conditions of populations. It has been observed that the living conditions of populations have considerably been degrading for the past two centuries. This situation has led to the development of informal activities and the excessive exploitation of natural resources as it is the case of mangroves, some of which are found in Marine Protected Areas along the Littoral zones of Cameroon.

The Convention on Biological Diversity defines a Maritime Protected Area as:

"an area within or adjacent to the maritime environment, together with its overlying waters and associated flora, fauna, and historical and cultural features, which has been reserved by legislation or other effective means, including custom, with the effect that its marine and/or coastal diversity enjoys a higher level of protection than its surroundings" [10] (Trans.)

So, a Maritime Protected Area is an area where some measures which aim at protecting, managing and recovering the health of maritime species have been implemented. In other words, the aim is to preserve the quality and diversity of ecosystems, habitats and species, their essential functions or simply the beauty of the maritime world. Due to the extreme climate hazards and the consequences linked to the human exploitation of natural resources, the creation of Maritime Protected Areas, therefore, aims at reducing the exploitation of water resources, so as to preserve the sustainable use of the biodiversity elements and the equal sharing of the benefits drawn from the exploitation of genetic resources. According to President Biya, president of the Republic of Cameroon:

The stake is vital and common to us. It obviously calls for a massive mobilization so as to safe a planet whose bleak future will have and impact on all countries. It is undeniable that for this mobilization to yield the expected outcomes, it should be accompanied by a real transfer to the countries of the South, the rationally ecological technologies which can enhance development and protect environment. All is about a knowledge, if not, of a requirement of international solidarity. This requirement which imposes itself to us should not be limited to an expression of a wishful thinking. It should be transformed into a reality, in concrete acts.

Cameroon calls for a rapid signature of an agreement which will be in force in 2012, so that the expiry of the Kyoto Protocol does not put the whole planet in uncertainty and distress. My country calls on all the parties concerned to join their efforts so that the Bali Conference, (…) marks the beginning of a new era which will be known in the history as that during which all countries of the world have decided to wage a constant fight, that of the protection of the earth, our common property. As the representatives of "the peoples of the United Nations", we have the duty to face this historic responsibility [11].

DISCUSSION

More than 90% of mangroves develop in poor or emergent countries where natural resources are solely managed by the State. Confusion which arises in the management of these resources favours their degradation as a result of their abusive exploitation which is often uncontrolled and illegal. In fact the law makes provision for many authorities to be involved in the management of the same resource. The law governing the management of the estate does not seem to make provision for the involvement of local communities in the management of mangroves for which they are the guarantor [12].

In the Cameroonian anthropology, mangroves serve as places for rituals and initiation for the neighbouring populations [13]. The areas for fishing were limited due to the fact that fishing was carried out by the use of locally made canoes. As a consequence, the extraction of water and NTFPs resources was moderate.

With the use of equipped canoes powered by engine going vessels and the use of sophisticated equipment, the areas for fishing have been extended and

the volume of catch has been increased. In the absence of equipment for the conservation and transformation of fish, the following can be used: cold stores, canning and fish smoking, a method which is commonly practiced. Fish smoking is a method of conservation of fish which, unfortunately, requires a great quantity of mangrove woods. Methods of energy saving such as improved sources of heat are not developed. No alternative to the use of wood exist. Demographic growth in villages and urban agglomerations situated in the vicinity of mangroves has led to an acute shortage of land and resources to a population which live in precarious conditions characterized by a low literacy rate, a rudimentary habitat, a lack of potable water and transport infrastructures and who only survive by exploiting in an uncontrolled manner the resources of mangroves.

Douala economic metropolis which is a port and industrial town as well Kribi, Tiko, Ekondo Titi, Limbe and Edea are increasing the number of infrastructures and equipment which are necessary for their development. The multiplicity of sand yards in these towns is an illustration of this phenomenon. Also, industrial and urban wastes are favoring the degradation of mangroves whose surface area is reducing as the days go by.

The negative environmental impact of megaprojects such as hydroelectric dams, exploitation of off-shore hydrocarbons, and the use of chemical substances in agro-industrial plantations as it is the case of rubber at HEVECAM; palm oil at SOCAPALM is stated below:

In addition, there are agro-industrial companies such as SOCAPALM, HEVECAM and CDC which grow industrial products such as palm oil, rubber, banana and tea. These companies are located in the coastal area and make use of a lot of fertilizers, pesticides and herbicides which are generally washed out and affect mangroves. These products generates nitrite, phosphate, chlorine and organic substances which, when in contact with mangroves, cause eutrophication phenomena which cause reduction in the production. This is very remarkable in Tiko, on CDC and Del Monte plantations; in the vicinity of Kribi with the activities of HEVECAM and SOCAPALM companies).

There is the lack of a cross border strategy in order to limit and monitor the activities of the nationals from neighbouring countries who are involved in poaching, exploitation and exportation of wood to Nigeria [14]. The lack of knowledge about resources, their distribution as well as their capacity to be renewed, the limited access to alternative sources of energy, the decrease in value of local knowledge and the lack of studies prior to any significant investment are a testimony of the low consideration attached to this ecosystem in national planning policies despite the positive perception of what mangroves represent for the country and its populations.

It can be observed that the law in force does not take much into account the specificities of mangrove ecosystems. On the one hand, mangroves undergo the influence of the sea and that of the activities which are conducted therein and, on the other hand, that of the industrial activities conducted on farm lands, port lands and urban lands. In fact law N° 94/01 of January 20, 1994 laying down forest, wildlife and fishery regulations, the outline law on the environment as well as the official documents on the regulation on the exploitation of mines and quarries [14] is a body of law and regulations which handles in a marginal way the exploitation mangroves. As regards the conservation of resources, the zoning plan of the town does not incorporate these mangroves for them to be part of the national forest estate and therefore benefit from the State protection. Out of the 250,000 hectares of mangroves, just 20% benefit from the status of protected areas. This land surface is found in the fauna reserves of Douala, Edea as well as in the Campo Ma'an National Reserve [15]. This insignificant consideration towards mangroves has constituted an impediment to the valuing of their tourist potentialities.

Environmental and social impact studies should be conducted before any investment is done in the mangroves or in their vicinity. In case the data from such studies are not available, the principle of precaution should prevail so as to avoid an eventual degradation of this ecosystem. As such, soil and subsoil exploitation should be prohibited in mangrove areas. The process of decision making and action planning should be implemented in these areas following a participatory approach. This participatory approach should bring together all the stakeholders involved in the exploitation and management of mangrove resources, especially local communities[4].

CONCLUSION

Mangroves in the Littoral zones in Cameroon are currently being unscrupulously exploited by adjacent neighbouring communities for housing or settlement construction, artisanal fishing, logging, tourism and related purposes, etc because of its potentialities. However, this mangrove-rich zone is unsustainably managed despite its economic, ecologic and social values. The lack of cooperation between the various state organs, the low capacity of their surveillance, the ignorance and poverty of the

[4] The various parties concerned should coordinate and harmonize their interventions within the framework of existing or future operational institutions which make sure that all the stakeholders are involved both at the local, regional or international levels.

neighbouring communities are among other factors which do not favour its sustainable management. This study therefore recommends the urgent need to act in a concerted manner within an appropriate institutional and legal framework since ecosystem survival depends on this.

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